Economic Foundations for Pricing

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Economic Foundations for Pricing

Understanding the economic environment in which pricing decisions are made is an important first step toward making them effectively. This paper reviews the theoretical literature in economics that is most helpful in furthering that understanding. It explains the implications for pricing of three general areas of research: the economics of information, the economics of spatial competition, and the economics of segmented pricing. It also reviews a number of papers that deal with specific pricing problems.

Introduction

Pricing, like most business decisions, is an art. This is not, however, a justification for basing pricing decisions purely on the "hunch" of a talented manager. Art is beyond neither critical judgment nor scientific analysis. And talent is rarely by itself sufficient for artistic success. An architect's exceptional creativity, for example, could hardly compensate for an ignorance of structural engineering. No less important are the principles of economics to the successful study and practice of the art of pricing.

Yet, if one approaches economics expecting too much, one may well come away with too little. Economic models are not designed to describe realistically the way firms make pricing decisions or the way consumers respond to those decisions.[1] Economic models are abstractions;

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1. Because of this lack of realism, some marketers approach economics with hostility. They, in effect, judge economics by the standards of good psychology, which it is not. Economic theorists do not claim to describe the processes by which people actually make decisions; they claim rather to explain why certain decisions persist. Economic theory assumes that persistent and widespread behavior, whatever the underlying psychological process leading to it, must somehow be reinforced by success at furthering economic well-being. Such reinforcement encourages people, on average, to act "as if" they understood and responded "rationally" to the economic process that rewards their behavior (Alchian 1950; Friedman 1953).

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they hold constant many real variables that are not germane to their theoretical objectives. Consequently, they rarely provide practical algorithms for implementing pricing strategies.[2] But marketing academicians and practitioners, whose goal is to help firms make better pricing decisions, can little afford to ignore the interrelationships between price and other marketing variables that economists hold constant. Consequently, they are soon disillusioned if they look to economics for practical solutions to pricing problems.

Still, it would be shortsighted to label the theoretical models of economics irrelevant to practical pricing problems. Economic models may be weak in specific prescriptions for individual action, but they are strong in useful heuristics for understanding the consequences of action. To draw on an earlier analogy, no one rejects structural engineering as irrelevant because it "fails" to show architects how to design buildings. Likewise, the role of economics is not to price products, but to explain the economic principles to which successful pricing strategies will conform. Pricing products—including the development and testing of practical pricing procedures—is appropriately the task of marketing. If, however, economists are doing their job well—that is, if the principles they identify in theory have actual counterparts in reality—the marketer's task should prove less strenuous when he stands on a sound foundation of economic theory.

Economics is not, of course, the only useful foundation for research in marketing. Psychology, sociology, and even biology may also serve the marketer's purpose. Our premise here is simply that research with a theoretical base is more likely to be productive than ad hoc research and that economic theory provides a particularly sound basis for pricing research. Our goal in this paper will be to review those areas of economics that offer the most promise for practical application to pricing. Before proceeding with that review, however, a brief example, illustrating how pricing research can benefit from a foundation in economic theory, seems in order.

Dealing—that is, temporary price cutting—is an important element of pricing strategy for many frequently purchased, packaged goods. Marketers have long wondered whether consumers who responded to such deals were simply a cross-section of regular buyers or were a clearly identifiable segment. If the latter, marketers wanted to know how to identify that segment so as to target dealing where it would be most effective. Numerous statistical studies (e.g., Webster 1965; Montgomery 1971) that approached the problem without a theoretical

2. For example, the fundamental economic principle, that current profit is maximized when marginal revenue equals marginal cost is neither a practical nor "optimal" prescription for action when demand is uncertain and when tomorrow's demand, cost, and competition are affected by today's pricing decision (see Alchian 1950; Dean 1951; Robinson and Lakhani 1975; Dolan and Jeuland 1981).

foundation found little or no correlation between deal proneness and the demographic, socioeconomic, and personality characteristics the authors considered (Frank, Massey, and Wind 1972, p. 124). It appeared that deal proneness was simply randomly distributed among consumers.

That conclusion proved too hasty, however, when Blattberg et al. (1978) took a new look at deal proneness from the perspective of a newly developed branch of economic theory: the economics of the family. Economists in this area (primarily Gary Becker and his students) had characterized the family as a production unit, optimally allocating its resources (money, time, and talents) by making economic trade-offs.[3] Blattberg et al. hypothesized that deal proneness might be explicable as the result of such an optimal allocation. The advantage of this theoretical starting point was that it allowed the authors to select variables that should influence deal proneness and to hypothesize about their expected effect.

If the economics of the family characterized some aspect of purchase decisions among the families in the authors' sample, then families with a lower opportunity cost of buying on deal should have been more deal prone. Consequently, the authors hypothesized that

1. families that own homes and cars should be more deal prone because they generally have more storage space (i.e., lower inventory holding costs) and lower costs of transporting extra purchases of products on deal; and
2. families that have preschool children at home, a working wife, or high incomes should be less deal prone because of the high value of alternative demands on their time.

Without a theoretical foundation, one would not intuitively have suspected (and earlier authors apparently did not suspect) that variables such as auto ownership, home ownership, or preschool children might influence a family's propensity to buy aluminum foil on deal. Yet the authors found that those variables did influence deal proneness for aluminum foil, as well as for waxed paper, headache remedies, liquid detergent, and facial tissue. With economic theory as a guide, they were able to identify a market segment that could not be identified by earlier empirical studies lacking an underlying theoretical structure.

A complete review of all economic theory with potential application to pricing is impossible within the confines of one paper. We will instead review topics in economic theory that (1) offer particularly fertile

3. See Becker (1981) for a comprehensive statement of this work and for references to earlier contributions. For a critique of this literature that would be of particular interest to marketers applying it to practical problems, see Mack and Leighland (1982).

ground for the future growth of pricing theory and practice, and (2) have not yet been integrated into marketing.[4] Three general areas of economic theory that meet these criteria are the economics of information, the economics of spatial competition, and the economics of segmented pricing. Our discussions of them will necessarily be selective, since entire volumes could be written on each of these subjects. In addition, we will review individual papers that are not part of developing paradigms in economics but that are by themselves noteworthy in pricing research. In all cases, we will focus on the current and potential usefulness of the theories as a foundation for practical application rather than on their technical details.

The Economics of Information

George Stigler's seminal article (1961) precipitated an explosion of theoretical research on the economics of information. In that article, Stigler noted that economists traditionally ignored problems of information and, in doing so, failed to appreciate much that falls within the purview of marketing. Yet, in the years following, the economics profession has more than made up for lost time. Two subsets of that literature are of particular importance to pricing: one dealing with asymmetric information, the other with consumer information acquisition.

Pricing and Asymmetric Information

An exchange involves asymmetric information when one party to the exchange has more information than does the other. For example, a seller may know the quality of the goods he sells, but buyers do not know the quality until after they have purchased the product. If buyers cannot identify a seller's product quality, they must rely on some average quality as a guide to purchase. That leads to a clear problem for products above the average quality, which may be most products in the market. Uninformed buyers will be unwilling to pay an above-average price, forcing sellers of superior quality either to depreciate it, to withdraw from the market, or to accept a price that does not accurately reflect their products' value.

The study of this problem began with a paper by George Akerlof (1970), who cited the used car market as an example. The price that a seller can get for a used car, even one of the current model year, is usually substantially below the new car price adjusted for depreciation.

4. One important topic in economic theory that has been partially integrated into marketing is the hedonic theory (sometimes called the "New Theory") of consumer choice. According to this theory, consumers do not value a good holistically. Instead, they value it as the sum of the values of its individual characteristics. For a review of this literature that emphasizes marketing application, see Ratchford (1975).

A commonly heard rule of thumb is that a new car loses 10% of its value the moment it leaves the showroom and becomes "used." Akerlof rejected the contention that the price difference reflected simply the pure joy of owning a "new" car. Instead he explained it as a symptom of asymmetric information.

Among new cars, he argued, there are always some "lemons" that prove less reliable than the average car of its brand. For a new car purchase, there is some probability of getting a lemon, but neither the dealer nor the buyer knows whether or not the particular new car being sold will be one. For new cars, therefore, there is no problem of asymmetric information. For used cars, however, the problem is different. The previous owner, who is the seller of the used car, has learned from experience whether or not his car is atypically unreliable.

Those first owners who have lemons—and large repair bills—have an incentive to sell their cars sooner than those who are lucky enough to get more reliable cars. They do not, however, have the incentive to share that information honestly with buyers. Consequently, the used car market has proportionately more lemons than the new car market, though buyers still cannot distinguish them from more reliable cars. Recognizing this asymmetry of information between sellers and themselves, buyers demand a substantial discount on a used car before they are willing to risk getting a lemon. The pricing problem is that sellers who know that their cars are not lemons, and so worth more, are unable to price them accordingly.

Were this just a problem with automobiles, it would be of little interest to marketers. In fact, it is a general marketing problem occurring any time that sellers know more about their products' quality than do buyers, who then use average quality in determining the price they will pay. The problem has never been completely solved by restaurants in locations where there is little repeat business; consequently they rarely offer exceptional quality. The problem is also a common one for innovative manufactured products because, if an early entrant's product is a lemon, it can sour the market for later entrants whom buyers will view more skeptically. But, as Akerlof suggests, branding is a common solution to this problem, since brand names with which buyers have had past experience can signal quality above the average in a product class, enabling a firm to charge an above-average price.[5]

But how much more can a firm charge because its product is branded? Can it get just enough to cover the cost of its higher quality, or can it get a premium? Klein and Leffler (1981) attempt to answer these questions in a way that provides much insight into the relationship between branding and pricing. They show that in product classes

5. For an interesting study of the "lemons" problem in the Soviet Union where branding is restricted, see Goldman (1960).

characterized by asymmetric information about product quality a seller whose product quality is above average would not have the incentive to maintain it unless his price more than reflected his extra costs. A seller whose price just reflected the extra cost of high quality would have an incentive to reduce his quality (and production costs), thus earning extra profits until buyers learned about the reduction through disappointing purchases. Consequently, the price of a high-quality product "must not only compensate the firm for the increased average production costs incurred when [high quality] is produced, but must also yield a normal rate of return on the forgone gains from exploiting consumers' ignorance" (Klein and Leffler 1981, p. 624).

This analysis has important implications for pricing strategy. It implies that buyers who desire high quality in a market with asymmetric information will be influenced by the familiar "price-quality effect" even for repeat purchases.[6] The reason is that the higher the price, the greater the seller's incentive to establish and maintain high quality. If buyers recognize this effect, price competition should be less effective in markets with asymmetric information. Competitors who claim to offer high quality at lower prices should simply be less credible than those who claim to offer the same quality for a higher price.

Moreover, the Klein-Leffler paper implies that branding will be more valuable, that is, yield a higher price premium, for some products than for others, an important implication for a firm seeking to diversify. According to this theory, consumers should pay more of a premium for a high-quality brand (1) the more they think an opportunistic seller could depreciate quality without prepurchase detection and (2) the fewer the expected number of repeat purchases. Either of these effects raises the gains from cheating relative to those from repeat sales, requiring a high-price premium for quality maintenance.

Finally, the theory's most interesting implication is that, other things such as market size held equal, producing quality is particularly profitable. Marketers have often maintained this proposition on empirical grounds (e.g., Schoeffler, Buzzell, and Heany 1974), but heretofore without a theoretical explanation. The relative profitability of producing high quality may, under certain circumstances, be maintained even after competition has driven profits to their long-run equilibrium level. The reason is that because price cutting is an ineffective way to attract customers, competition necessarily takes the form of investments in "nonsalvageable capital" such as advertising or attractive places of business. If some firms have a cost advantage in making such investments (perhaps because of scale or experience economies), then they

6. Charles Wilson (1980) offers another rationale for a price-quality effect with asymmetric information: that a higher price enables the buyer to draw from a distribution of products with a higher mean quality.

can earn profits (or more correctly "rents") that cannot be competed away by the entry of higher cost firms.

The Klein-Leffler paper is just one example of an idea in information theory that Telser (1980) formalized and titled "self-enforcing agreements." No one in the Klein-Leffler model must force the seller to supply the product quality he promises; he does so because, at the price he sets for that quality, it is in his interest to do so. There are numerous other applications of the theory of self-enforcing contracts that either have been, or could be, used to explain and prescribe pricing strategies. In one of the most interesting, Klein, Crawford, and Alchian (1978) use the idea to explain, among other things, why a successful pricing strategy for some products will involve primarily outright sales, while for others it will involve primarily leasing.

In the analysis of oligopolistic price competition, the self-enforcing agreement becomes a self-enforcing threat. Each firm attempts to deter its current or potential competitors from encroaching on its market share by threatening to cut price as low as necessary to maintain its intended sales level.[7] But how can it make such a threat credible? Spence (1977), Salop (1979), and Dixit (1980) argue that irrevocable investment in fixed assets, often at a rate faster than market growth would otherwise justify, can make the threat credible. By creating a cost structure with high sunk costs, the firm increases the losses it would suffer if it failed to attain its expected sales level because of new competition.[8] By boxing itself into one strategic option—to fulfill its threat to defend its market—the firm discourages competitive challenges and precludes the need to make good on the threat.

Pricing and Consumer Information Acquisition

The most fundamental concept in pricing is that of price elasticity, which measures the percentage sales loss (gain) from a certain percentage price increase (decrease). A firm may lose sales because buyers are willing to do without the product at a higher price or because they change suppliers. Since changing suppliers is generally less painful than doing without, buyers' willingness and ability to substitute one brand for another is, for most products, the dominant factor determining a brand's price elasticity.

Prior to their study of information, economists assumed that the importance of interbrand price competition, inducing consumers to substitute one brand for another, depended on the number of brands available and on their similarity. But Philip Nelson (1970) pointed out

7. Threats are only one way to deter entry. In the sec. below on spatial competition, we will examine others.

8. See Porter (1980, pp. 335–40) for factors to consider before making such investments in a growing market.

the error in that reasoning. In a world of imperfect information, what really determines price sensitivity is not the number and similarity of substitutes in the marketplace, but the number and similarity about which a typical consumer is aware.[9] That distinction is important, Nelson argued, because the cost of such information differs predictably depending upon the nature of a product's characteristics. Consequently, one can make a priori predictions, based on an analysis of product attributes, about the importance of price in interbrand competition.

Nelson classified product attributes into two types depending on how buyers learn about them.[10]

Search attributes are those that a buyer can readily evaluate prior to purchase. He may judge them from observation—as he would the style of a dress or the scheduled departure time of an airline—or with the aid of a simple test—as he would the purity of an industrial chemical. He therefore knows what he is buying before he makes a purchase decision.

Experience attributes are those that a buyer can evaluate only after consuming the product. He therefore does not know exactly what he is getting the first time he buys it. After having purchased once, however, he can repeat purchase the product in the future, having a good estimate of its attributes based on knowledge from past experience. The taste of a packaged food, the effectiveness of a dishwashing detergent, or the durability of a paint are examples of experience attributes.

Darby and Karni (1973) quickly followed Nelson's article with one of their own noting a third category:

Credence attributes are those that a buyer cannot confidently evaluate even after one purchase. He therefore must rely heavily on the product's reputation with respect to those attributes, even for repeat purchases. A buyer normally cannot, for example, evaluate a doctor's competence after one visit for the treatment of one complaint. In fact, such an evaluation may require a more controlled experiment and a larger sample than is achievable even over a single patient's lifetime.

The importance of these classifications lies in their relationship to the cost of consumer information acquisition. Information about price itself can be obtained directly for all types of products. But as one moves from the search to the experience and on to the credence category, information about brands' differentiating attributes becomes more costly. The greater the cost of information, the less of it people

9. Tibor Scitovsky (1950) actually pointed out this effect long before there was an "economics of information," but with little effect on economists' thinking about these problems.

10. Actually, Nelson did his early analysis based on search and experience goods rather than attributes. See Nelson (1978, 1980) and Wilde (1980) for reformulations based directly on attributes.

try to obtain. Consequently, other things equal, consumers should choose to inform themselves about the differentiating characteristics of fewer brands, and inform themselves less completely, in categories with high costs of collecting such information.[11]

The fewer brands about which buyers are informed, according to Nelson, the less price sensitive they will be to the price of any one brand. As a result, the effectiveness of price competition is reduced as is the ability of new competitors to enter the market with a strategy of low, penetration pricing. Nelson formally tested this proposition by classifying goods into search and experience categories and comparing the degree to which output is concentrated in a few competitors. He found markets for experience goods significantly more concentrated than those for search goods. Moreover, casual observation seems to confirm the value of this distinction as an analytical marketing tool. For example, the attributes differentiating brands of airline travel—time of departure, type of planes, airports used—are primarily search attributes and price competition for air travel is intense. Those differentiating brands of dishwashing liquids are primarily experience attributes and price competition is less intense. Those differentiating brands of photographic film are primarily credence attributes (at least for the casual photographer) and price competition in that market is notably ineffective.[12]

The literature on the economics of information is rich in its implications for pricing.[13] Moreover, it complements the work being done by marketers specializing in consumer behavior (e.g., Bettman 1979). In the hands of marketing researchers, the economics of information could aid in explaining even more marketing phenomena.

The Economics of Spatial Competition

In the analysis of product positioning, current research in economics has a structure very similar to that in marketing. Known as the economics of spatial competition, this work analyzes the effect on price competition of a brand's location in physical space. The spatial location of brands serves in economics, as it does in marketing, as a metaphorical representation of product variety in any product attribute

11. The cost of collecting information may, of course, differ across buyers. Assuming such a difference, Salop and Stiglitz (1977) explain the persistence of high- and low-priced stores for the same products. In their model, high-priced stores cater to buyers with a high cost of information collection.

12. One might object that the lack of price competition for photographic film is due to a lack of competitors. But the lack of competitors is a symptom of the information problem, because when new firms have tried to enter by undercutting Kodak's prices, they have failed to attract buyers (see "Kodak Fights Back" 1982).

13. See Wilde (1980) for a review of the development of this literature.

that is measurable and, therefore, spatially representable.[14] Models of spatial competition have a long history in economics beginning with Hotelling (1929) and Smithies (1941). Recently, however, the models have developed to a point that they have become useful tools for analyzing realistic positioning strategies and their effect on pricing. They now offer the potential to advance substantially our understanding of the relationship between product variety and interbrand price competition.

Though each author structures his model differently, I will attempt to illustrate the basic principles of spatial competition using one simple model adapted from Hay (1976). Assume that consumer preferences—what marketers call "ideal points"—are uniformly located along a straight line measuring some dimension of product variety. An individual consumer's demand depends both on the brand's price and on its closeness to his ideal point. All consumers have the same demand function; they differ only in the location of their ideal points.[15] Figure 1 illustrates the position of the first brand, A, in the market. Brand A's market area, the range of ideal points for which it is close enough to attract some sales, extends five units in each direction. Now, how should firms locate additional brands along this line in order to minimize price competition and, thus, maximize their long-run profitability?[16]

Hay (1976) shows that a new entrant can maximize his prices and profits in the short run by locating so as to avoid any overlaps (and thus any price competition) between his market area and the market area of A (fig. 2).[17] But that is not a good long-run strategy. To maximize long run profits, B need consider not only potential price competition with A, but also with potential entrants. To maximize long-run profitability, B must locate closer to A, suffering some price competition in the short run but precluding even more intense competition in the long run.

For example, if at current prices a later entrant would need to serve a market area of at least four units (two in each direction), then B could

14. In contrast, however, to the multidimensional product maps generated by marketers, economic theorists usually assume that brands vary along a single product dimension (Eaton and Lipsey [1976] is an exception), which they represent spatially as distance along a line (with or without finite length) or around the perimeter of a circle. This simply reflects economists' predilection for tractable models at the expense of descriptive realism. The principles of spatial competition they derive are nonetheless conceptually applicable to the multidimensional case (Baumol 1967; Lancaster 1975). These models have also been used to analyze the positioning of political candidates (see, e.g., Riker and Ordeshook 1973).

15. See Hay (1976) for a more specific and complete listing of assumptions. Eaton and Lipsey (1978) show the implications of changes in the standard assumptions.

16. Eaton and Lipsey (1978) prove formally that some spatial locations can maintain long-run profitability.

17. Assuming that sufficient room exists between A's market area and the end points of the market to enable B to gain an equally large market area without encroaching on A.

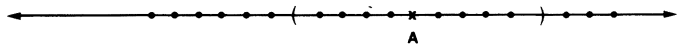

FIG. 1.—A single brand

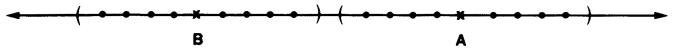

FIG. 2.—Brand B avoids price competition

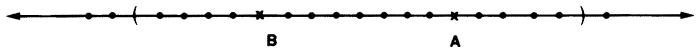

FIG. 3.—Brand B locates to protect its rightward flank

preclude new entry on its right flank by locating less than eight units from A (fig. 3). No entrant would try to squeeze between A and B, because it would achieve only slightly less than its minimum market share (four units) after sharing the market with B on its left flank and A on its right (fig. 3).[18] Both B and A pay a cost for this preemption, a bit more than one unit each on their shared flank, but they insure no further erosion of profitability in the long run. Moreover, if the new entrant anticipated that A and B would cut prices in response to its entry between them, it would anticipate the need to have a market area even longer than four units to survive. In that case, B could leave even more than eight units between itself and A while still precluding new entry between them.

There are also options that A could use to protect itself from B's encroachment. Richard Schmalensee (1978), in an analysis of the breakfast cereal market, showed how brand proliferation could be a profitable entry-deterring strategy when there are shared costs among brands of the same firm. For example, if the producer of A could produce other brands that could be profitable with market areas of only three units (as opposed to four for a new entrant with one brand), he might profitably preempt emerging market opportunities. His lower costs would enable each brand to be profitable while keeping a potential new entrant from finding a viable market for its first brand.[19] Eaton and Lipsey (1979) show that such a preemptive proliferation strategy is profitable even if established firms have no cost advantages when introducing new brands. The reason is that an established firm can re-

18. Of course, a new entrant would never even try to squeeze between competitors unless other more open areas were already filled. In addition, the model assumes that because of sunk capital expenditures, his entry will not prompt A and B to spread out further giving him more room.

19. A new entrant could, of course, enter with multiple brands. Schmalensee argues, however, that the cost of finding multiple attractive entry opportunities all at the same time generates a barrier to entry (1978, pp. 317–18). Schmalensee also argues that brand introduction by established firms may involve less uncertainty than by new entrants, reinforcing the tendency toward brand proliferation (p. 317).

duce the negative effect of its new brands on the sales of its already established brands when selecting prices and locations. Rao and Rutenberg (1980) develop dynamic decision rules for the optimal timing of preemption, given expectations about rivals' actions based on past experiences.

Marketers are already using spatial representations of product positions and have techniques (called multidimensional scaling) for spatially representing actual markets. They use them to find "holes" for new product entries and to evaluate competitive interactions. A useful next step would be to incorporate the strategic principles from the economics of spatial competition into the analysis of product positioning, identifying not only where a firm might introduce a brand to maximize market potential, but also where it might introduce one to minimize potential competition from later entrants.[20]

The Economics of Segmented Pricing

Though the "marketing concept" may be the essence of marketing theory, the guiding principle of marketing practice is "market segmentation." In fact, the process of segmenting buyers by designing marketing strategies more consistent with their diverse preferences is arguably the marketing concept's operational counterpart. In the last decade, marketing academicians have produced an abundance of research on segmenting markets for product and promotional targeting, (see Frank et al. 1972; Blattenberg and Sen 1974; Mahajan and Jain 1978) but research on segmenting for pricing has been notably small.[21] Fortunately, market segmentation for pricing has a long history in economic research. Since the economics literature on segmented pricing arose from attempts to explain specific pricing strategies, often to lawyers rather than to other economists, it is also usually accessible and directly applicable.

Segmented pricing is the policy of pricing differently to different groups of buyers. It may involve "price discrimination:" the offering of different prices for the same product, usually in the form of discounts to more price-sensitive buyers. More often it involves offering the same prices to all buyers, but with a structure of prices for different points in time, places of purchase, or product types[22] that results in

20. Porter (1980, pp. 335–38) has begun to bring preemptive investment to the attention of practitioners.

21. Marketers do universally acknowledge the need for segmented pricing as part of an overall segmented marketing strategy, but research on strategies for price segmentation has not kept pace with that for product and promotional segmentation. Notable exceptions are Frank and Massy (1965), Elrod and Winer (1982), and Narasimhan (1982).

22. Eli Clemens (1951) shows that there is conceptually no difference between the pricing of different products produced with the same resources and the pricing of identical products for different market segments.

some buyers' paying more relative to marginal cost than do other buyers who are more price sensitive. Airlines, for example, segment buyers by time of flight (weekend and evening versus weekday flights) and by product type (regular tickets allowing flexible scheduling versus discount tickets with scheduling restrictions; first class versus coach seating).

Ralph Cassady (1946*a*, 1964*b*) reviewed and illustrated the basic techniques of segmented pricing in two classic (though much neglected) articles that are as valid today as they were when written.[23] I will not repeat what is said there. Instead, I will review those advances in our understanding of segmented pricing that have occurred since then.

Segmenting by Tie-Ins and Metering

Segmentation by metering or tie-ins is often extremely important for the pricing of assets. The reason is that buyers generally value an asset more the more intensely they use it. The buyer of a photocopying machine who makes 20,000 copies a month will value it more than the buyer who makes just 5,000 copies. And food processors canning fruit year round in California will value canning machines more than will fish packers in Alaska who can salmon only a few months each year. In such cases, tactics that segment buyers by use intensity can substantially improve the effectiveness of a pricing strategy.

Before the Clayton Antitrust Act of 1914, a common method of monitoring use was the tie-in sale. Along with the purchase or lease of a machine, a buyer contractually agreed to purchase a commodity used with the machine exclusively from the seller. Thus, the Heaton Peninsular Company sold its shoemaking machines with the provision that buyers buy only Heaton Peninsular buttons. The A. B. Dick Company sold its mimeograph equipment with the provision the buyers buy paper, stencils, and ink only from the A. B. Dick Company. The Morgan Envelope Company sold its bathroom tissue dispensers with the provision that they forever dispense only Morgan's own brand (see *Morgan Envelope Co. v. Albany Perforated Paper Co.* [1893]; *Heaton Peninsular v. Eureka Specialty Co.* [1896]; *Henry v. A. B. Dick* [1912]). While the courts actually supported tying arrangements in these cases, they completely reversed themselves after 1914, claiming that tying arrangements were an illegal attempt to extend monopoly power from one product to the next. In the words of the Supreme Court "the illegality in tying arrangements is the wielding of monopolistic leverage; a seller exploits his dominant position in one market to expand his empire into the next" (*Times-Picayone Publishing v. United States* [1953]).

23. See also Joan Robinson (1936), for the seminal analysis of price discrimination, and Fritz Machlup (1955). Nagle (1983) discusses the implications of segmented pricing for the marketing practitioner.

Economists were naturally skeptical of this argument because if an individual buyer must pay more for the tied good than he would have to pay elsewhere, that simply reduces the amount that he is willing to pay for the tying asset. Consequently, "extension of monopoly" would make sense only if it enabled the firm actually to increase the monopoly restriction—and thus the equilibrium market price—for the tied good. But, in almost all cases, the tying arrangements give the seller an insignificant amount of the market for the tied good. Consequently, the extension of monopoly argument seems highly implausible.

Economists instead explained tying as an effective device for price discrimination. Bowman (1957) and Burstein (1960*a*, 1960*b*) studied numerous tying cases in detail and found that, in each case, the asset itself was sold for a very low explicit price, close to the incremental cost of production. The tied commodity, however, was sold for a premium price. Thus, the true cost of the asset was its low explicit price plus the sum of the price premiums paid for the tied commodity. Since buyers who used the asset more intensely bought more of the tied commodity, they effectively paid more for the asset. The tied commodity was effectively a device for measuring a buyer's value of the asset and automatically charging for each incremental unit of value received.

Since the passage of the Clayton Act, the courts have refused to allow tying contracts in most cases.[24] In 1917, the Supreme Court refused to enforce a sales contract for a motion picture projector requiring that it be used to show only films produced by or under license from the seller. In 1922, United Shoe Machinery Corporation was ordered to cease the same tying policy that had been approved earlier for Heaton Peninsular. Later, IBM was ordered to stop tying computer punch cards in the leases for its machines (*Motion Picture Patents Co. v. Universal Film Manufacturing Co.* [1917]; *United Shoe Machinery Corp. v. United States* [1922]; *International Business Machines Corp. v. United States* [1936]).

Nevertheless, many tying opportunities without contracts still exist. Replacement parts and maintenance service are natural devices for measuring use intensity and for pricing accordingly. So also is food consumed in a theater or amusement park. Razor manufacturers design unique shaving technologies that naturally tie blades to razors. In the 1970s, a lower court did order Kodak to introduce no unique camera designs without first revealing the film's technology to its competitors, but that ruling was overturned on appeal (see *Berky Photo v. Eastman Kodak Co.* [1979]). It seems clear that, even without explicit contracts,

24. The exceptions are tying contracts for service on new, highly technical products where it can be proven essential to maintain the product's performance and therefore its reputation. See *United States v. Jerrold Electronics Co.* (1961).

the tie-in sale is still an important pricing tactic, and the literature in economics provides unusually explicit direction for its use.

The courts have nevertheless severely limited tying arrangements in precisely the cases where it is most dramatically effective. Their rulings challenge sellers to monitor use without restricting competition. In modern times, that challenge has frequently been met by renting assets rather than selling them outright, with the rental fee determined by a simple metering device. Xerox, for example, traditionally rented its copiers for a fixed fee plus so much per copy made.

As a final note, the tactic of monitoring use intensity is not limited to machines and may not involve an actual physical counting device. Nationally syndicated newspaper columns are sold to local papers at prices based on use intensity. The monitoring device is simply the paper's circulation figures. Film distributors rent movies at prices based on the number of seats in the theater. And franchisors lease their brand names and reputations to franchisees not for a fixed fee but for a percentage of sales. No matter how intangible the asset, monitoring use can be an important part of its pricing.

Segmenting by Product Bundling

Product bundling is perhaps the most widely used tactic to achieve segmented pricing, though its rationale often goes unnoticed. Retailers bundle "free" parking with a purchase in their stores. Grocery stores bundle trading stamps or chances in games with purchase of their groceries. Newspapers with morning and evening editions bundle advertising space in both of them. Restaurants bundle foods into fixed price dinners, generally a cheaper alternative to ordering the same items à la carte. And symphony orchestras bundle diverse concerts into season subscription tickets. These are but a small fraction of the goods sold in bundles, but they illustrate the breadth of the practice, from commodities to services and from necessities to entertainment. The question all these examples raise is "under what conditions does it pay to bundle goods for pricing?"

George Stigler (1963) answered that question in an article explaining the bundling of first-run movies, a practice known as block booking. The movie industry at the time would not rent individual films to theaters, but required they rent a block of films. As an example, Stigler cited the blocking together of *Gone with the Wind* and *Getting Gertie's Garter*. Why, he asked, would it make sense to require a theater to buy both films together? It cannot be that the distributors simply used their good films to force junk films on theaters, since a theater would not pay more for the two films together than the sum of what it would pay for the two separately.

Stigler explained this pricing strategy with the aid of the following

illustration. Suppose that the dollar amounts that two theaters A and B would pay for the films is given by the following table:

	Gone with the Wind	*Getting Gertie's Garter*
Theater A	8,000	2,500
Theater B	7,000	3,000

The owners of both theaters would pay substantially more to show *Gone with the Wind* than *Getting Gertie's Garter*. The key to an effective bundling strategy, however, is the reversal in the relative valuations of the two films. *Gone with the Wind* is more valuable to theater A than to theater B, while the reverse is true for *Getting Gertie's Garter*.

To rent the films separately to both theater A and theater B at fixed prices, the movie distributor could have charged no more than $7,000 for *Gone with the Wind* and $2,500 for *Getting Gertie's Garter,* for a total of $9,500 for the pair. But theater A values the pair at $10,500 and theater B at $10,000. Thus by selling the films as a block for $10,000, the distributor can charge $500 more for the pair than if he sold them separately. Why is this segmented pricing? Because each theater pays the difference between the price of the films when sold separately ($9,500) and the price when sold together ($10,000) for different products. Theater A pays the extra $500 for *Gone with the Wind* while theater B pays it for *Getting Gertie's Garter*. Consequently, by charging a single price for an indivisible bundle, the distributor can effectively charge different prices for the components.

Adams and Yellen (1976) explain the conditions for bundling more formally and explicitly. In doing so, they show why products are not generally sold in indivisible bundles only. Most firms follow the tactic of "mixed bundling," whereby the individual products can be bought separately, but at prices exceeding their cost if bought together in the bundle. Mixed bundling is more profitable than indivisible bundling whenever some buyers value one of the items in the bundle very highly but value the other less than it costs to produce. Schmalensee (1982) shows that mixed bundling can be profitable even for a single-product monopolist who buys a competitively produced product from other firms to bundle with his own. Schmalensee (1984) formally derives the explicit conditions that make a bundling strategy profitable.[25]

Focusing on the pure theory and the obvious examples, one could easily underestimate the importance of bundling to pricing strategy. Most bundling opportunities are in fact quite subtle, but the principle of

25. An interesting discovery of this paper is that the preference reversal, which Stigler and others have used to demonstrate the value of bundling, is neither strictly necessary nor sufficient.

bundling is ubiquitously applied in both consumer and industrial markets. The marketing researcher who understood the principle could no doubt use it to explain many more applications; the marketing practitioner could no doubt find new applications not thought of heretofore.

Economic Analyses of Specific Pricing Problems

In addition to the general areas of economic theory just reviewed, the economics literature of recent years contains a number of more narrowly focused papers analyzing specific pricing problems. These papers offer perspectives that could be immediately applied in marketing theory and practice.

Pricing through a Distribution Channel

Managing a product through channels of distribution is a problem of growing interest to marketers (Stern and El-Ansary 1977). Part of that problem involves pricing to the channel, a topic that economic theorists have studied with some success.

Machlup and Taber (1960) have shown that when the uniqueness of a manufacturer's product gives a retailer some "monopoly power" over price, the retailer will set his resale price too high and sell too little to maximize the total channel (manufacturer plus retailer) profits. To avoid this problem, they show how the manufacturer can couple his wholesale pricing with maximum resale prices (which may be enforced merely by advertising a suggested retail price), minimum retail sales requirements, or a more complicated two-part pricing strategy.

Telser (1960) explains the conditions that make it profitable for a manufacturer to impose minimum resale prices. Essentially, his argument rests on the need to reward retailers for offering promotional and maintenance services that positively influence a product's demand. Officials in the current Justice Department have recently recognized this argument and are now committed to changing the courts' negative view of resale price maintenance ("Big Shift in Antitrust Policy" 1981).

The most ambitious study of the relationship between pricing and distribution channels is Porter's (1976) *Interbrand Choice, Strategy, and Bilateral Market Power*. Marketers often write about the "bargaining power" of various channel members. Porter seeks to identify the causes and effects of such power, relying not just on traditional economic concepts such as concentration, but also upon applications of the economics of information. In particular, he argues that bargaining power over margins shifts for manufacturers toward retailers the more buyers rely on retailers for the information they need to make interbrand choices. Adopting this same approach, a number of marketing researchers have recently begun to analyze the effect of channel relationships on pricing and have developed suggestions for favorably con-

trolling those relationships (Farris and Albion 1980; McGuire and Staelin 1981; Zusman and Etgar 1981; Jeuland and Shugan 1982). This work is reviewed in part by Rao (1984).

Pricing Unique Durable Goods

Coase (1972) raised the problem of pricing a unique durable good. He noted that a rational buyer would not pay a monopoly price for a good, even though he valued it by more than the price, if he expected the price to come down. Consequently, a "skimming strategy" of progressively lower prices should fail to the extent that buyers recognize the seller's incentive to cut price and expand his market. Stokey (1981) shows, however, that a skimming strategy is theoretically viable, even if buyers have perfectly accurate expectations, to the extent that the adjustment to a new price level takes time. The reason is that the more highly a buyer values the services of the durable good, the higher is his cost of waiting. Thus, the longer the adjustment period that buyers anticipate, the less problematic are their anticipations of future price reductions.[26] Stokey's work also complements the theoretical research on price declines due to the "experience effect" (Robinson and Lakhani 1975; Dolan and Jeuland 1981; Kalish, in press), which is reviewed in Rao (1984).

Pricing for Peak Loads

Pricing strategy frequently must accommodate predictable variations in demand without the luxury of a storable product. In order to accommodate temporary peaks in demand, the firm must build production capacity that is excessive at other times. Economists have analyzed this problem of peak-load pricing in great detail (Houthakker 1951; Steiner 1957; Hirshleifer 1958; Williamson 1966; Symposium on Peak-Load Pricing 1976) and have shown how to allocate capacity costs in order to select profit maximizing prices and sales levels.[27] Unfortunately, because these analyses are almost always in the context of large public enterprises, their broad applicability is generally unappreciated. The principles of peak-load pricing are in fact equally applicable to such private enterprises as hotels, restaurants, health clubs, airlines, theaters, and to some degree most retail establishments. The economic literature in this area is ripe for profitable application.

Pricing by Priority

Harris and Raviv (1981) show that whenever a product is fixed in supply and has demand that potentially exceeds supply, a (monopo-

26. Consequently, a firm attempting skim pricing might rationally commit itself not to cut price for a certain length of time.

27. Essentially, the optimal solution is to allocate that portion of capacity costs to the peak demand periods that is not covered by positive marginal revenues at other times.

listic) seller can increase his profits by "priority pricing." The seller sets a schedule of prices for the product and then serves first those buyers who elect to pay the highest price, second those buyers who elect to pay the next highest price, and so forth until the supply is exhausted. Buyers who elect to pay higher prices increase the probability that they will be able to buy before the product is sold out. The authors' conclusion that this is a superior pricing scheme for products in fixed supply seems consistent with standard practice. They note that priority pricing is used for such obvious cases as antiques and oil leases, as well as for discontinued styles of consumer products that are sold at progressively increasing discounts.

Pricing in Two Parts

Two-part pricing is an important strategy in a large number of industries. Health clubs, amusement parks, auto rental agencies, and the telephone company all charge fixed fees plus variable usage charges for their products.[28] The seller's motivation for two-part pricing is to capture some of the consumer's surplus (excess of value over price for all but the last unit purchased). A number of authors (Hotelling 1938; Gabor 1955; Burstein 1960) analyzed two-part pricing for the case where buyers are homogeneous or where a unique two-part pricing schedule can be implemented for each buyer. They showed that two-part pricing in these cases could capture all consumer surplus for the seller. It was not, however, until Oi (1971) that anyone dealt with the more realistic, and complicated, case of calculating a single two-part schedule for a population with demands of more than one type. Oi showed that with two types of buyers, the optimal variable fee must be higher and the fixed fee lower relative to the case of homogeneous buyers.[29] This substantially reduces the efficiency of two-part pricing, leaving some buyers with much of their surplus. Schmalensee (1982) provides the first completely general analysis of two-part pricing schedules, allowing for buyers with completely heterogeneous demand curves, for income effects (from which previous authors abstracted), and for sales to competitive firms whose derived demands depend on the selling prices of their own goods.

Pricing when Facing a Used Product Market

The effect of a resale market on the prices of new durable goods poses a problem that many durable good manufacturers face. Each unit a manufacturer sells today will add to the used market tomorrow, increasing competition with new units. The manufacturer must decide

28. In fact, the tie-in sale discussed above is, in theory, a two-part pricing strategy for the *services* of the asset.

29. Murphy (1977) presents a more intuitive discussion and relates the two-part pricing to other tactics.

whether to encourage the used market, as do the automobile companies and some office equipment manufacturers, or to discourage it, as do textbook publishers. The rationale for encouraging the used market is that a high resale value will raise the prices buyers will pay for new goods. The rationale for discouraging the used market is that a smaller used market reduces competition with new product sales. Benjamin and Kormendi (1974) show that either strategy may be profit maximizing depending upon the substitutability of used for new products, the marginal cost of production, and the degree of competition in the industry.

Pricing Superstars

One recent and unique article in the literature of economics is "The Economics of Superstars" by Sherwin Rosen (1981). It has important, intuitively appealing implications for product pricing. The phenomenon that Rosen attempts to explain is the disproportionately high profits that the highest quality products—superstars—can earn in some markets. He cites, for example, the services of outstanding lawyers and physicians, performances by outstanding musicians, and copies of textbooks that are outstanding in their fields as examples of the superstar phenomenon. His explanation rests on the simple observation that, for some products, "quality" is not perfectly additive. No number of concerts by mediocre pianists can effectively substitute for an evening with Horowitz; no number of obtusely written textbooks can effectively substitute for one that makes the subject perfectly clear. This is not true for all products. Larger quantities of a mediocre detergent, for example, can give the same cleaning power as the highest quality brand. Thus, when pricing a high-quality product (or when deciding whether to produce one), an important factor to consider is the ability of more mediocre alternatives to compete with it by substituting quantity for quality.

Conclusion

Understanding the economic environment in which pricing decisions are made is a first step toward making them effectively. While economics traditionally offered a basic understanding of that environment, advances in the last two decades have significantly refined it. Economic theory now has much more to say about the roles of information, competition, and market segmentation in pricing strategy. Economic theorists have also analyzed specific pricing problems and opportunities in ways that shed much light on pricing practice.

Still, economic theory is just that—theory. No economic model captures the full richness of a practical pricing problem or sets out a complete prescription for solving it. Even with an understanding of

economic theory, marketers are still left with the problem of how to price products. But they are left also with insights and perspectives that should make solutions more attainable and effective.

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