Gerard J. Tellis

Beyond the Many Faces of Price: An Integration of Pricing Strategies

The author reviews the field of pricing strategy and constructs a unifying taxonomy of the many strategies described in the literature. The taxonomy is based on the simple proposition that all the strategies have a common denominator—shared economies among buyer segments, across firms, or among products. The author presents the strategies in comparable terms, emphasizing the principles underlying each and demonstrating the relationship among strategies, the circumstances in which each can be used, and the legal and policy implications of each.

IN the last two decades the field of pricing strategy has made great progress in the form of better theoretical explanations, more precise models, and innovative pricing strategies (see Nagle 1984 for one review). However, the rich variety of pricing models and strategies developed in different time periods and contexts has resulted in a multiplicity of labels, several overlapping descriptions of strategies, and partially obsolete typologies. Some pricing strategies are not yet presented adequately in the marketing literature (e.g., price bundling, Stigler 1968; random discounting, Varian 1980; or price signaling, Cooper and Ross 1984) and others have not been developed formally (e.g., price skimming and penetration pricing, Dean 1951). A more pressing issue, however, is that because the principles underlying each strategy have not been presented together, it has not been possible to develop a unifying taxonomy of strategies that shows their relatedness or differences and immediately suggests the circumstances under which each can be adopted. Thus there is a need to compare, rationalize, and reclassify the various pricing strategies in the literature.

The first objective of this article is to present a number of pricing strategies, some of which are simplifications and others elaborations of strategies described in the literature. A second objective is to state their underlying principles in comparable terms and thus demonstrate their relationship to each other and their practical applications. A third objective is to propose a classification of these strategies that is parsimonious, logically derived, and enlightening to the user. Such a taxonomy could stimulate alternate schemes or general theoretical models or new applications of empirical models or new strategies (Hunt 1983, p. 348–60).

These objectives are carried out in the following order. First the classification is presented (though it can be fully appreciated only at the end of the article). Then each strategy is discussed in terms of a pricing problem presented in simple numerical form. A particular pricing strategy is shown to be the only one that can resolve the problem, given the demand, cost, competitive, and legal environment. The theoretical and welfare aspects of the strategy are summarized and applications discussed. Finally, the relationship among strategies is explained.

This article describes a set of normative pricing

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strategies. A pricing strategy is a reasoned choice from a set of alternative prices (or price schedules) that aim at profit maximization within a planning period in response to a given scenario. Thus, the article describes a set of ideal options one may choose and outcomes that result from such choices, assuming profit maximization by the strategist. Several important pricing topics are necessarily excluded from this discussion: managerial pricing approaches, price implementation, and price, cost, and demand estimation (see Monroe 1979 or Rao 1984 for excellent reviews).

In the case of consumer behavior, however, allowances are made for non-optimal behavior. Its most important cause is incomplete information which leads to three types of behavior: consumers may purchase randomly, consumers may use a surrogate for an unknown attribute (e.g., price as a surrogate for quality), or consumers may evaluate choices incorrectly with resultant intransitivity in preferences. On the basis of this hypothesis, Kahneman and Tversky (1979) developed prospect theory as an alternative to traditional utility theory and Thaler (1980, 1985) extended that work. Their work has important implications for pricing strategy. This article shows the impact of all three types of information deficiencies on pricing strategies.

A Classification of Pricing Strategies

The underlying principle in all the strategies discussed here is that the best strategy in certain circumstances is not apparent until certain shared economies or cross-subsidies are taken into account. In a shared economy, one consumer segment or product bears more of the average costs than another, but the average price still reflects cost plus acceptable profit. The use of such economies may be triggered by heterogeneity among consumers, firms, or elements of the product mix. The pricing strategies can be broadly classified into three groups based on which of these three factors affects a firm's use of shared economies: differential pricing, whereby the same brand is sold at different prices to consumers; competitive pricing, whereby prices are set to exploit competitive position; and product line pricing, whereby related brands are sold at prices that exploit mutual dependencies. The pricing objective of the firm thus constitutes the first dimension on which this classification scheme is constructed.

The second dimension is the characteristics of consumers. Again there are three categories of interest. First, at least some consumers are assumed to have search costs. That is, consumers do not know exactly which firm sells the product they want and they have to search for it. Further, for some of them the opportunity cost of time exceeds the benefit of search, so that they are willing to purchase without full information. Second, at least some consumers have a low reservation price for the product. That is, some consumers are price sensitive or do not need the product urgently enough to pay the high price other consumers pay. Third, all consumers have certain transaction costs other than search costs—for example, traveling costs, the risk of investment, the cost of money, or switching costs.

The two dimensions—firm objectives and consumer characteristics—each with three categories yield nine cells into which the strategies discussed here are classified (see Table 1). Table 2 further compares and contrasts these strategies on several dimensions and is discussed in the concluding section. The real world, however, is more complex and several of the conditions listed (search costs, transaction costs, or demand heterogeneity) may occur jointly. Accordingly, in reality a firm may adopt a combination of these strategies. What is demonstrated in the proposed classification is the necessary conditions for each strategy, conditions that are jointly sufficient to classify them conveniently. Similarly, in the following discussion the problems define fairly simple scenarios where "other things are assumed constant" and only factors affecting the choice of a strategy are allowed to vary.

The list of available strategies also is affected by the legal environment. Because of the potential for pricing abuses, especially against weak competitors or weak or uninformed buyers, Congress and the states have passed laws that regulate the pricing strategies firms can adopt. These laws generally ensure that there is no collusion among competitors, no deception of consumers, no explicit discrimination among industrial buyers, or no attempt to manipulate the competitive structure. Some of these laws rule out certain pricing options whereas others include new possibilities, and these effects are discussed in the appropriate place. The laws are not always fully explicit, but the general motivation of the laws and the spirit in which they have been interpreted by the courts indicate that no strategy should reduce the impact of competitive forces unless it is to the benefit of consumers (Areeda 1974; Scherer 1980).

Differential Pricing Strategies

The price strategies discussed here all arise primarily because of consumer heterogeneity, so that the same product can be sold to consumers under a variety of prices. The three strategies discussed refer to consumer heterogeneity along three dimensions: transaction costs that motivate second market discounting, demand that motivates periodic discounting, and search

TABLE 1
Taxonomy of Pricing Strategies

Characteristics of Consumers	Objective of Firm: Vary Prices Among Consumer Segments	Objective of Firm: Exploit Competitive Position	Objective of Firm: Balance Pricing Over Product Line
Some have high search costs	Random discounting	Price signaling	Image pricing
Some have low reservation price	Periodic discounting	Penetration pricing Experience curve pricing	Price bundling Premium pricing
All have special transaction costs	Second market discounting	Geographic pricing	Complementary pricing

TABLE 2
Comparison of Pricing Strategies

	Differential Pricing			Competitive Pricing			Product Line Pricing		
Criteria	Second Market Discounting	Periodic Discounts	Random Discounts	Penetration and Experience Curve Pricing	Price Signaling	Geographic Pricing	Price Bundling	Premium Pricing	Complementary Pricing
Characteristic of price strategy varies systematically over:									
Consumer segments	Yes	Yes	Yes	No	No	No	No	No	No
Competitors in market	No	No	No	Yes	Yes	Yes	No	No	No
Product mix	No	No	No	No	No	No	Yes	Yes	Yes
Characteristics of consumers	High transaction costs: physically separated segments	Only some with low reservation price: price sensitive segment	High search costs: some uninformed about price	Some with low reservation price: price sensitive segment	High search costs: some uninformed on quality; uninformed prefer high quality	High transportation costs: geographically distinct markets	Some prefer one product, others, another: asymmetric demand	Only some prefer basic products at low prices	High transaction costs: risk aversiveness or store or brand loyalty
Product and cost characteristics	Unused capacity	Economies of scale or unused capacity	Economies of scale or unused capacity	Economies of scale or experience, or unused capacity	Signaling firm has higher costs or suboptimizes or cheats on quality	Higher production costs in adjacent market; economies of scale or unused capacity	Perishable product or purchase occasion	Joint economies of scale across products; features with low cost increase relative to price increase	Patents, superior technology
Variants	Generic pricing, dumping	Price skimming, peak-load pricing, price discrimination, priority pricing	Variable price merchandising, cents-off, coupons	Limit pricing	Reference pricing	FOB, base point, uniform, zone, and freight pricing	Mixed bundling, pure components, pure bundling	—	Captive pricing, two-part pricing, loss leadership
Relevant legal constraints	Explicit price discrimination illegal	Explicit price discrimination illegal	Explicit price discrimination illegal	Predatory pricing illegal	—	Price collusion, explicit price discrimination, predatory pricing illegal	Explicit price discrimination, pure bundling illegal	—	(Minimum) retail price maintenance illegal, tie-ins illegal

costs that motivate random discounting.[1] These conditions enable a firm to discriminate implicitly in the prices it charges its consumers. In industrial and wholesale markets, explicit price discrimination whereby a firm charges different prices to two competing buyers under identical circumstances is illegal under the Robinson-Patman Act's (1936) amendment of the Clayton Act (1914), unless the price-cutting firm can meet specific defenses (Scherer 1980, p. 572; Werner 1982). In the consumer market, explicit price discrimination would lead to the ill-will of consumers. Aside from the special motivations for each type of discounting to be discussed hereafter, discounting in general has a sales enhancing effect, probably because consumers overweight the saving on a deal ("the silver lining," Thaler 1985) in relation to the cost still incurred in buying the product at the discounted price. If the product were regularly at the discounted price, many of these consumers may not buy it at all!

Second Market Discounting

> Consider a competitive firm that sells 100,000 units of a product at $10 each, when variable costs are $1 and fixed costs are $500,000 for a capacity of 200,000 units. The firm gets a request to sell in a new market such that there will be a negligible loss of sales in the first market and a negligible increase in fixed or variable costs. What is the minimum selling price the firm should accept?

This is a classic problem in incremental costing and the solution is well known. The minimum acceptable price would be anything over $1, because any price over variable costs would make a contribution to this ongoing business. Generics, secondary demographic segments, and some foreign markets provide opportunities for profitable use of this strategy. Often pioneering drugs are faced with competition from identical but much lower priced generics after the expiry of the patent. The pioneering firm has the options of either maintaining its price and losing share or dropping price and losing margin. The relevant strategy would be to enter the generic market segment with an unbranded product and arrest loss of sales to that segment without either foregoing margin or position in the branded segment. The same principle also holds for a firm changing to a mixed brand strategy after selling under a manufacturer brand only or a private label brand only. A second illustration of this strategy is the discounts to secondary demographic markets such as students, children, or new members.

Similarly, for some countries the foreign market represents an opportunity rather than a threat if the same theory is applied. Often a firm's selling price or even current average cost in the home market may be higher than the selling price in the foreign market. However, if its variable costs are sufficiently below the selling price in the foreign market, the firm can export profitably at a price somewhere between the selling price in the foreign market and its variable costs. The term "dumping" is sometimes used to describe the latter strategy if the firm's selling price in the foreign market is below its average costs.

The essential requirements for this strategy are that the firm have unused capacity and consumers have transaction costs so there is no perfect arbitrage between the two markets. In terms of profitability, additional revenues from the second market should exceed all increases in variable and fixed costs and loss of profits from the first market. Note here that the first market provides an external economy to the second, because the latter market gets goods at a lower price than it would otherwise. (For this reason some economists are not critical of dumping. Others, however, stress that there may be long-term damage to the foreign economy from lost wages and production facilities.) The second market provides neither an economy nor a diseconomy to the first in the short run.

Periodic Discounting

> Consider a firm faced with the following pricing problem. Average economic costs[2] are $55 at 20 units and $40 at 40 units. There are 40 consumers per period that are interested in its product. Half of them are fussy and want the product only at the beginning of each period even if they have to pay $50 per unit. The other half are price sensitive and would take the product at any time but will pay no more than $30 per unit. At what price should the firm sell its product?

Initially it may seem that the firm cannot bring the product to market profitably because costs exceed acceptable prices for each segment. However, in effect, the firm can produce and sell profitably if it exploits the consumers' heterogeneity of demand by a strategy of periodic discounting. It should produce at the level of 40 units per period at a cost of $40 per unit, price at $50 at the beginning of each period, and systematically discount the product at the end of the period to $30. In this way it would sell to the fussy consumers at the beginning and to the rest at the end of each period. Note that its average selling price is $40, which equals its average economic cost.

[1]There are also other motivations for discounting, the most common being damaged goods, overstocking, or quantity purchases. These discounts are not considered pricing strategies because they are merely adjustments for costs, often of an *ad hoc* nature. The term "price discrimination" has been used in the literature very broadly to mean charging different customer groups prices not proportionate to costs for the same or related products. It would cover almost all the strategies discussed here (Cassady 1946a,b; Monroe 1979; Scherer 1980).

[2]The term "average economic cost" is used to mean all costs, production and marketing, fixed and variable, plus acceptable profit divided by number of units.

This is the principle often involved in the temporal markdowns and periodic discounting of off-season fashion goods, off-season travel fares, matinee tickets, and happy hour drinks, as well as peak-load pricing for utilities (Hirshleifer 1958; Houthakker 1951; Steiner 1957; Williamson 1966). Similarly, this is the principle involved in the discounting of older models (Stokey 1981), the priority pricing of scarce products (Harris and Raviv 1981), and the strategy of price skimming, first suggested as one alternative for new products by Dean (1950a). Because of the circumstances in which this discounting strategy has been used, it often is referred to by different names. However, a more general label would be "periodic discounting," because of the essential principle underlying this strategy: the manner of discounting is predictable over time and not necessarily unknown to consumers (unlike random discounting discussed next) and the discount can be used by all consumers (unlike second market discounting).

An interesting issue in periodic discounting is that both segments of the market provide an external economy to each other.[3] The first segment that pays the higher price can be viewed as providing a sort of "venture" price to the firm to produce the product, whereas the second segment can be viewed as providing a "salvage" price to the firm for unsold items at the period's end. This intuition suggests that, even if the demand for the product is not exactly known, a strategy of pricing high and systematically discounting with time is likely to ensure that the firm covers its costs and makes a reasonable profit. However, the first segment provides a greater external economy than the second, because it bears more of the production costs.

Random Discounting

> Consider a firm that has a minimum average economic cost of production of $30. Assume a distribution of prices for the same product between $30 and $50 because there are several other firms with other cost structures and $50 is the maximum consumers will pay for it. It takes one hour to search for the lowest price, $30. If a consumer does not search but buys from the first seller, he/she may if lucky get a $30 seller but if unlucky may get a $50 seller. Further, assume consumers' opportunity cost of time ranges from $0 to well over $20 per hour. What is the best shopping strategy for consumers and the best pricing strategy for firms? For consumers, the problem is fairly simple. Let us assume that the distribution of prices is such that on average a consumer who does not search and is uninformed about prices pays $40 for the product. Then on average a consumer who searches and is informed saves $10 (40 − 30). Hence consumers whose opportunity cost of time is more than $10 should not shop and the rest should. Let us assume that at least some consumers search and others buy randomly. What strategy should the firm with an average economic cost of $30 adopt?

The answer is a strategy of random discounts, which involves maintaining a high price of $50 regularly and discounting to $30. However, the manner of discounting is crucial. It should be undiscernible or "random" to the uninformed consumers and infrequent, so that these consumers do not get lucky too often. The uninformed consumers will not be able to second guess the price; they will buy randomly, usually at the high price. In contrast, the informed will look around or wait until they can buy at the low price. In this way the firm tries to maximize the number of informed at its low price instead of at a competitor's low price, while maximizing the number of uninformed at its high rather than its low price. Research on the intransitivity of preferences indicates some interesting twists to the appeal of discounts and coupons. First, searchers are likely to oversearch. They spend more time shopping than is justified by their gains, the result of what Thaler (1980) calls the "endowment effect." The real saving from the discounts is overweighted in relation to the opportunity cost of time. In contrast, nonsearchers are likely to undersearch for high cost products. This behavior can be explained by the psychophysics of pricing (Thaler 1980). Consumers relate the benefits of search to the cost of the good rather than to the cost of the time it takes to search.

Most discounting today by specialty stores, department stores, services, and especially supermarkets is of this type (referred to as "variable price merchandising" by Nelson and Preston 1966; Preston 1970). Out-of-store coupons or features are of this type unless motivated by periodic discounting, inventory buildup, or damaged goods.

The vast volume of business in this category has increased the importance of understanding the issues involved. A static model of interfirm price variation due to consumer search costs first was developed by Salop and Stiglitz (1977) in their well-known piece, "Bargains and Ripoffs." Varian (1980) developed a dynamic model of random price variation by each firm, similar to the mechanism described in the last example. Since then a whole body of literature has developed pursuing various ramifications of this strategy. The basic condition for this strategy is heterogeneity of perceived search costs, which enables firms to attract informed consumers by discounting. All consumers know there is a distribution of prices and have the same reservation price. However, for high income individuals hunting for the lowest price may not be worth their time. For others the opposite holds.

[3]The discussion of welfare applies only to the competitive case as in the example described. Some of the applications of this strategy cited above have been to the monopolistic case, in which situation the price sensitive buyers are the primary beneficiaries. However, as the example illustrates, *monopoly is not a necessary condition for periodic discounting,* though some authors mistakenly say so.

The individual firm should adopt a strategy of random discounts if the increased profit from new informed consumers at the discounted price exceeds the cost arising from the uninformed buying at the discounted price plus the cost of administering the discount (see McAlister 1983 and Neslin and Shoemaker 1983 for profitability models).

It is interesting to examine the implications of this strategy. First, note that the uninformed consumers provide a diseconomy to other uninformed consumers and to informed consumers. Inefficient firms that produce above $30 or efficient firms that price above $30 can exist because some consumers do not search. As a result, prices vary, so that the informed must search for the lowest price. Similarly, the average price paid by the uninformed is higher as the proportion of uninformed increases. In contrast, the informed provide an external economy to the uninformed by encouraging the existence of low price firms, thus lowering the average price the uninformed pay. From a public policy perspective, all consumers as well as the efficient firms would benefit if some mechanism could be provided to disseminate price information in the market at relatively low cost.

Competitive Pricing

This category covers a group of pricing strategies based primarily on a firm's competitive position. Penetration pricing and experience curve pricing attempt to exploit scale[4] or experience[5] economies, respectively, by currently pricing below competitors in the same market and thus driving them out. Predatory pricing is a strategy of pricing low to hold out competition with the sole objective of establishing monopolistic conditions and subsequently raising price; this practice is illegal under Section 2 of the Sherman Act and the Robinson-Patman Act of 1936. Many states also have laws that forbid a firm from pricing below cost for extended periods of time. A third strategy is price signaling,[6] whereby a firm exploits consumer trust in the price mechanism developed by other firms. A fourth strategy, geographic pricing, involves competitive pricing for adjacent market segments.

Penetration Pricing

> Consider the periodic discounting example with the following two modifications: the economic cost price at 40 units is $30 and other competitors can freely enter the market with the same cost structure. How should the firm price now?

The firm could still adopt a strategy of periodic discounting, producing 40 units a period at $30 each and selling to the first set of consumers at $50 and to the second at $30. Now, however, because its average cost price is $30, it would make an excess profit of $10 per unit. Given this scenario, any other firm would be willing to come in and sell the same product for an average price that is less than $40 but more than $30. To preempt competition and stay in business, the firm would have to sell at $30 to all consumers.

The same logic underlies penetration pricing, a strategy first proposed for new products by Dean (1950a,b, 1951) as an alternative to periodic discounting (or price skimming in Dean's terminology). Periodic discounting is obviously preferable for a firm, even if its costs are lower than demand prices (as in the modified example here), as long as there is no immediate threat of competitive entry. Besides being used for new products, penetration pricing can be ob-

[4]"Economies of scale" refers to the decline in average total costs with scale. This effect is generally attributed to superior technology or more efficient organization or cheaper purchases (Mansfield 1983; Palda 1969). Average total costs also are believed to increase beyond a certain point because of the difficulty of managing very large operations.

[5]"Experience curve" or "experience economies" refers to the decline in average total costs in constant dollars with *cumulative* volume (see Figure 1). Define C_1 as average costs at volume V_1, let V_1 hold for n_1 periods; define C_2 as average costs at volume V_2, let V_2 hold for n_2 periods. Then economies of scale are captured by the elasticity ϵ_s defined by

$$\frac{C_2}{C_1} = \left(\frac{V_2}{V_1}\right)^{\epsilon_s}, \quad V_2 \neq V_1 \tag{1}$$

and economies of experience by the elasticity ϵ_e defined by

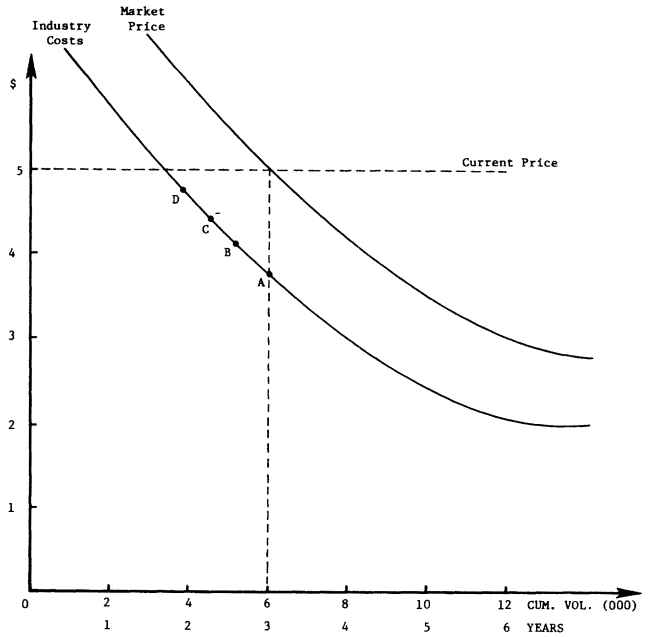
$$\frac{C_2}{C_1} = \left[\frac{\sum_{j=1}^{n_2} V_{2j} + \sum_{i=1}^{n_1} V_{1i}}{\sum_{i=1}^{n_1} V_{1i}}\right]^{\epsilon_e} \tag{2}$$

$$= \left(\frac{n_2 V_2 + n_1 V_1}{n_1 V_1}\right)^{\epsilon_e} = \left(1 + \frac{n_2 V_2}{n_1 V_1}\right)^{\epsilon_e}.$$

Note that change in the scale of operation, measured by V_2/V_1, affects the value of ϵ_s and ϵ_e, which are therefore related. However, ϵ_s does not *cause* ϵ_e or vice versa. Moreover, unlike ϵ_s, ϵ_e is defined even if $V_2 = V_1$, and when $V_2 \neq V_1$ may still be dependent primarily on n_2/n_1, the time parameters. The strategic implications of the experience curve were best documented and popularized by the Boston Consulting Group (1972), though the issue was addressed in the literature earlier (e.g., Alchian 1959; Arrow 1962; Hirsch 1952; Preston and Keachie 1964). More recent theoretical contributions were made by Robinson and Lakhani (1975), Dolan and Jeuland (1981), and Kalish (1983). The decline in costs due to experience could be caused by a number of factors, most importantly labor efficiency and newer process technology (see Abell and Hammond 1979 and Porter 1980 for a complete list). Two important issues to be kept in mind when pricing are that economies of experience *can occur independently of scale* (as shown above) and that their decline generally takes place fairly constantly with cumulative volume. Because cumulative volume increases at a faster rate in the first few years of a product's production history, experience effects are most noticeable at that time period. Because of competitive pressures, prices also decline with costs.

[6]The term is used here to mean firms signaling quality to consumers by price. It must be distinguished from various interfirm signaling strategies that firms may use to "implicitly collude" (Scherer 1980).

FIGURE 1
Effect of Experience Economies on Pricing Strategy



served in the growth of discount stores and in the consolidation of manufacturers during the "shake out" phase of the life cycle. A variation of penetration pricing that has been closely studied in the economics literature is limit pricing (Scherer 1980), whereby a firm prices above costs but just low enough to keep out new entrants.

Penetration pricing is relevant only when the average selling price can or does exceed the minimum average cost. Other essentials for penetration pricing strategy are price sensitivity on the part of some consumers and the threat of competitive entry. In penetration pricing, unlike periodic discounting, the presence of the price sensitive consumers and of competition provides a benefit to the price insensitive segment, who can now buy the product at a price lower than they were willing to pay.

Experience Curve Pricing

Assume a competitive market with experience effects as shown in Figure 1. There are four firms (A, B, C, and D), each with per period volume of 2000 units but the first having the most experience and average costs of $3.75 per unit. Current prices are $5 per unit. Consumers are price sensitive and react immediately to price changes. What would be a good pricing strategy for firm A?

Note that currently firm A makes more profit than the others and that, given the projections, cost declines will be less prominent after year 6. A good strategy for firm A would be to price aggressively, even below current costs, at $3.75. This strategy has two advantages. First, it will be uneconomical for firms B, C, and D, which may have to leave the market. Firm A is then faced with less rivalry. Second, firm A can benefit from the share of the others and gain experience more rapidly. Indeed, it would sell a cumulative volume of 12,000 units as early as year 6 and its costs would have dropped by then to $2 per unit. In addition, the low price is likely to encourage more consumers to enter the market, giving firm A an opportunity to exploit economies of scale. As a result the firm will soon be profitable again and total revenue and profits could be much higher in the future. The strategy for the other firms is less clear. In general, unless there are other competitive advantages, it is inadvisable for the others to start a price war as they have a cost disadvantage to firm A.

Experience curve pricing, like penetration pricing, is an alternative strategy to periodic discounting. In this strategy the consumers who buy the product early in the life cycle gain an external economy from late buyers, as they buy the product at a lower price than they were willing to pay. They get this discount, however, because of economies of experience and active or potential competition that forces prices down.

The essential requirements for adopting an experience curve pricing strategy are that experience effects are strong, the firm has more experience than competitors, and that consumers are price sensitive. Typically, these conditions occur for nonessential durable goods in the early or growth stage, when a relatively large number of competitors are striving for a strong long-run position. The different sources of economies for penetration pricing and experience curve pricing must be clearly understood, because the circumstances in which they are applicable are often very similar but the mechanisms for tracking costs and pricing products are very different.

Price Signaling

Consider a market in which firms can produce products at two different quality levels, under the constraint that the minimum average economic cost is $30 for the low quality product and $50 for the high quality product. Assume that, to avoid image conflicts, each firm chooses to produce only one quality but may sell at either price, $30 or $50. Let us assume for convenience that there are at least a few firms selling the high quality product for $50 and the low quality product for $30. Consumers can easily find the lowest price (in negligible time), say by a phone call or consulting a price list. They generally prefer high quality, but it takes them 1 hour of study and consulting manuals to tell quality differences. Let these consumers have a distribution of opportunity costs of time as in the random discounting example. What are consumers' shopping strategies and firms' pricing strategies?

Firms can choose among three pricing strategies (no firm would sell the high quality product at less than $50). First, they could produce the low quality product and sell it at $30. Second, they could produce the high quality product and sell it at $50. Third, they could sell the low quality product at $50, with the intention that some consumers who cannot tell high quality but want it will be fooled. The latter strategy is called "price signaling." Consumers also have three strategies. Those with low costs of time could study quality and buy the high quality product at $50. Those with high costs of time could adopt a risk aversive strategy and always buy the low priced product, or could buy the high priced product with the hope of getting a high quality product.

Extensive research in marketing has indicated that consumers may use price to infer quality (Monroe and Petroshius 1981; Olson 1977), but the equilibrium properties of such behavior in real markets have only recently been worked out (Cooper and Ross 1984; Tellis 1985). Three underlying conditions are necessary for price signaling to be an equilibrium strategy. First, consumers must be able to get information about price more easily than information about quality. Second, they must want the high quality enough to risk buying the high priced product even without a certainty of high quality. This motive is especially necessary because consumers underweight the value of uncertain events (the "certainty effect," Kahneman and Tversky 1979). Third, there must be a sufficiently large number of informed consumers who can understand quality and will pay the high price only for the high quality product. This third condition ensures a sufficiently positive correlation between price and quality so that those uninformed consumers who infer quality from price find it worthwhile to do so on average.

The issue of pricing in the presence of quality variation and asymmetric consumer information is typical of durable goods, though not uncommon for services and nondurable goods where it may involve less risk. For durables, quality is an important attribute yet consumer information on quality is low because of the difficulty of determining quality by inspection, the large number of brands, and the high innovation rate relative to repurchase time (Thorelli and Thorelli 1977). One result is the possibility of consumers using price to infer quality. However, another result is that the correlation between price and quality is low (Tellis and Wernerfelt 1985) and consumers may often be mistaken. Price signaling is probably most common for new or amateur consumers in a market, who do not know the quality of competitive brands but find quality important. The purchase of a high priced wine by the casual buyer is a good example. The success of several high priced, inferior quality brands, as reported by *Consumer Reports,* is another illustration of consumers either buying randomly or using price to infer quality.

There are some other variations of price signaling that firms can adopt to exploit consumer behavior in other circumstances. Image pricing, discussed subsequently, and reference pricing are two common examples. In reference pricing, a firm places a high priced model next to a much higher priced version of the same product, so that the former may seem more attractive to risk aversive uninformed consumers. The latter model serves primarily as a reference point, though consumers who infer quality may buy it. Monroe and Petroshius (1981) document empirical support for consumers' use of reference prices. Kahneman and Tversky (1979) provide the rationale for this behavior in what they call the "isolation effect": a choice looks more attractive next to a costly alternative than it does in isolation. The strategy is sometimes adopted by retailers of durable goods. A more common variation is for firms to state that a product is on sale, with the "regular" sticker price adjacent, when actually the regular price is on for less than half the time. To minimize deception on the part of firms, several states now define minimum time periods for the regular price.

In this context it is worthwhile to consider the welfare aspects of such strategy. The most important point is that all consumers would be better off if a mechanism could be devised to provide information on quality to the market at low cost. Second, those firms that sell the low quality product for the low price and those that sell the high quality product for the high price would also be better off if information on quality were disseminated, because they would not lose customers to firms that sell the low quality product at the high price. The last category of firms would vanish. Therefore, heterogeneous search costs on quality create benefits for some firms at the expense of others. Third, there could be many reasons for firms to sell the low quality product at the high price. Some could adopt such a strategy accidentally, others because they are inefficient producers, and still others because they intentionally cheat. Fourth, consumers who use price to infer quality may not necessarily be worse off. To the extent that obtaining information on quality is difficult for them, the correlation between price and quality is positive, and they prefer the high quality product, they may profitably use the high price to infer quality. In such a situation there is an external economy from the informed to the uninformed who gather information via the price mechanism.

Note that price signaling is independent of the strategy of random discounting. Both are used in situations in which consumers have heterogeneous search costs, but differ on other dimensions. For price signaling, there must be quality differences among products, information on quality must be more scarce than

that on price, and quality must be important to consumers; further, each firm need adopt only one price level always and at least some efficient firms are necessary to establish consumer trust in the price mechanism.

Geographic Pricing

> Consider two adjacent markets X and Y, of 20 consumers each, where all consumers have a reservation price of \$50 for the product and incur a cost of more than \$10 for purchasing the product in the adjacent market. A firm operating in market X is faced with free competitive entry and the following cost structure: the economic cost price for the product is \$40 at 20 units and \$30 at 40 units, with an added cost of \$10 per unit to ship the product to the adjacent market. The cost of production is higher in market Y. What pricing strategy should the firm adopt?

The firm should produce 40 units and sell to both markets at an average economic cost price of \$35 (\$30 + \$10 × 20 ÷ 40). To avoid competitive entry, the firm must set the average selling price over both markets at \$35. However, the firm has several options for pricing the product to the two markets, called "geographic pricing strategies," depending on the competitive condition in market Y.

If the competitive price in market Y is above \$40, the firm can sell the product at \$30 in market X and \$40 in market Y to reflect the transportation costs of \$10 per unit to the latter market. Because price equals average costs, the price would be profitable yet ward off entry. This strategy is called "FOB." If the competitive price in market Y is a little over \$35, the firm could sell at \$35 in both markets and still achieve the same competitive effect. This strategy is called "uniform delivered price." Zone pricing is a strategy between the two when more markets are involved. When using zone pricing, the firm would charge different prices for different zones depending on the transportation costs to each, but within each zone it would charge one price, the average of all costs to all points in that zone. Basing point is still another variation of uniform delivered price; the firm chooses a base point for transportation costs to points other than the point of production.

If the competitive price is a little over \$30 in market Y, the firm could sell profitably to both markets by pricing at \$30 in market Y and \$40 in market X. This strategy is called "freight absorption cost," because market Y bears none of the transportation cost it incurs for the product. In a monopolistic situation, the firm may absorb the transportation cost or pass it on to consumers in market X. However, in a competitive market such as this one, all the transportation costs are borne by market X.

Geographic pricing strategies can be thought of as being between price penetration and second market discounting (see Table 1). As in price penetration, in geographic pricing the firm seeks to exploit economies of scale by pricing below competitors in a second market segment. As a result, the second market generally provides a benefit to the first. However, in geographic pricing the two segments are separated by transportation costs rather than by reservation prices. In this respect, geographic pricing is similar to the strategy of second market discounting, where two markets are also separated by transaction costs. In second market discounting, however, the firm explicitly attempts to exploit the differences between the two segments, providing considerable savings to the second market. By contrast, in geographic pricing the firm attempts to minimize differences between the two markets by sharing or "absorbing" the transportation costs between them. In spite of these transportation costs and because of economies of scale, the second market does not provide a diseconomy and generally provides an economy to the first.

Some of the geographic pricing strategies discussed may be illegal in certain circumstances. Three general principles can be used to guide policy in this respect. First, a firm should not discriminate between competing buyers in the same region (especially in zone pricing for buyers on either side of a zonal boundary) because such action may violate the Robinson-Patman Act of 1936. Second, the firm's strategy should not appear to be predatory, especially in freight absorption pricing, because such a strategy would violate Section 2 of the Sherman Act of 1890. Third, in choosing the basing point or zone pricing the firm should not attempt to fix prices among competitors because such action would violate Section 1 of the Sherman Act.

Product Line Pricing Strategies

Product line pricing strategies are relevant when a firm has a set of related products. In all of the cases considered, the firm seeks to maximize profit by pricing its products to match consumer demand. However, in each of these strategies, the nature of either the demand or the cross-subsidies varies among the firm's products. A firm uses price bundling when it faces heterogeneity of demand for nonsubstitute, perishable products. A firm uses premium pricing when it faces heterogeneity of demand for substitute products with joint economies of scale. Image pricing is used when consumers infer quality from prices of substitute models. Complementary pricing (including captive pricing, two-part pricing, and loss leadership) is used when a firm faces consumers with higher transaction costs for one or more of its products.

Price Bundling

Assume a distributor of two films, "Romancing the Stone" and "Places in the Heart," is faced by the following demand for these films from two movie houses, Astro and Classic Theatres, that serve the same market.

For:	Maximum Prices ($'000) Paid By: Classic Theatres	Astro
"Romancing the Stone"	12	18
"Places in the Heart"	25	10

What is the best pricing strategy for the distributor to adopt if we assume it cannot explicitly discriminate in price or use tying contracts (force a theatre to buy both movies)?

An explicit price discriminating strategy, charging each distributor the most it will pay for each movie, would yield a total revenue of \$65K, but this practice is illegal. Assume the buyers are sufficiently informed and the products perishable so that differential pricing by periodic or random discounting is not possible. A penetration strategy is to price the first movie at \$12K and the second at \$10K, but in that case total revenue is only \$44K from both theatres ($2 \times (12 + 10)$). A "pure components" strategy is to price the first at \$18K and the second at \$25K, for a total revenue of \$43K.

The best solution is to price the first movie at \$18K, the second at \$25K, and offer both at \$28K for a total revenue of \$56K. Note that Classic Theatres will take both movies at no more than \$37K and Astro at no more than \$28K. Thus both theatres will accept the package for \$28K, which is the profit maximizing strategy. This strategy is called "mixed bundling" to contrast it with a pure bundling alternative in which case only the package is available for \$28K. Pure bundling may be illegal as a tying contract (Scherer 1980; Werner 1982). The mixed bundling strategy has the added advantage of creating the reference price effect: the package is offered at a much lower price than the sum of the parts.

The economics of price bundling was first analyzed by Stigler (1968) and further developed by Adams and Yellen (1976), Telser 1979, Spence (1980), Paroush and Peles (1981), Phillips (1981), and Schmalensee (1984). Examples of such a strategy are the lower prices for season tickets, buffet dinners, packages of stereo equipment, and packages of options on automobiles. The basic requirement for mixed bundling is nonsubstitute (i.e., conıplementary or independent), perishable products with an asymmetric demand structure. Because the products are not perfect substitutes, it is possible to get consumers to buy both (or all). Because the products are perishable, the differential pricing strategies of periodic or random discounting are not feasible. The perishability of food items or seats for shows is apparent. The perishability in the purchase of durable goods is the purchase occasion, at which time it is in the interest of sellers to maximize revenues within consumers' demand schedule by price bundling. For example, consumers may buy automobiles once in 3 or 5 years. Each of those times is an opportunity for a firm to sell a maximum number of options by appropriate pricing.

The strategy of price bundling must not be confused with that of "trading up," in which consumers are persuaded to buy more or higher priced models than they originally intended. As the numerical example shows, a passive strategy of correctly bundling the prices of related items is all that is needed to maximize profit. It is also in the interest of consumers to buy at the price bundle. Thus, all consumers and sellers are better off with the mixed bundling strategy than with the pure components strategy.[7]

Premium Pricing

Consider a firm faced with the following pricing problem. There is free entry and average economic costs (for production and marketing) are \$50 at 20 units and \$35 at 40 units. At any volume, it costs the firm an additional \$10 per unit to produce and market a superior version of the product. Assume that any fixed costs of marketing two products instead of one are negligible. Forty consumers per period are interested in its product. Half of them are price insensitive and want the superior version of the product even if they have to pay \$50 per unit. The other half are price sensitive and want the basic version of the product but will pay no more than \$30 per unit. In what version and at what price should the firm sell the product?

As in the periodic discounting example, costs seem to exceed prices if the firm chooses to sell to only one segment or at only one price. However, it can solve its problem by a premium pricing strategy that exploits consumer heterogeneity in demand. It should produce at 40 units, half of which will be of the superior version, for an average economic cost of \$40. It should sell the basic product for \$30 and the premium for \$50, for an average selling price of \$40, at which price it is profitable and wards off entry. Relative to its costs, the firm takes a premium on its higher priced version and a loss on its lower priced version. However, by exploiting joint economies of scale and

[7] In this example all cost issues are ignored, which could lead to at least three scenarios. One is a monopolistic situation in which the costs are sufficiently low that any of the pricing options would be profitable. The second is a cost situation in which only the mixed bundling option would be profitable. This then would hold either for monopoly or pure competition. The third is a situation in which costs are sufficiently low that any option would be profitable, but there is free entry so firms would use only the penetration pricing strategy (\$10 for the first and \$12 for the second movie) which is always the preferable option for consumers.

the heterogeneity of demand, it can profitably produce and sell the product.

Premium pricing applies in a large number of circumstances in markets today. It is used in the pricing of durable goods, typically appliances, for which multiple versions differing in price and features cater to different consumer segments. It also could apply for the pricing of some nondurable goods such as basic and specialty breads or common and exclusive perfumes. A similar strategy is used for the pricing of alternate service plans such as term and preferred insurance policies, front and rear auditorium seating, and deluxe and basic hotel rooms. As is well known in the case of autos, firms do not find their lower priced models "very profitable," but typically make their profits on the premium versions. Often these premium versions differ from the basic only by features and options, whose production costs generally are not high enough to justify the higher markup. Why does the firm produce the lower priced version and why do other firms not enter the market with only the higher priced version? The preceding explanation is based on heterogeneity in demand and joint economies of scale. Notice that the firm, by using a premium strategy, sells at exactly its economic cost price, which is compatible with a competitive market with free entry.[8] No firm could enter and profitably produce only for the price insensitive segment.

Premium pricing also is used in retail, where it enables retailers to carry some otherwise unprofitable products desired only by select segments. The pricing of byproducts, though generally considered different from premium pricing, involves the same principle. A byproduct may carry a cost of disposal to the firm, and this may add to the price of the main product. In some cases a byproduct may be worth much more than it costs the firm to produce, and this advantage can be used to subsidize the price of the main product.

The essential difference between premium pricing and price bundling is that the former applies to substitutes and the latter to complementary products. Both require heterogeneity in demand, but in using premium pricing the firm tries to emphasize segment differences by pricing substitutes differently, whereas in using price bundling the firm seeks to bridge segment differences by selling at the lowest common package price. The difference between premium pricing and price signaling is that in the latter each firm produces only one type of product, which is sold at different prices to differently informed consumers. In the former, a firm produces two types of products to exploit joint economies of scale and markets them to heterogeneous but fully informed consumers.

The welfare aspects of premium pricing parallel those of periodic discounting. The main difference is in the fact that in periodic discounting the strategy is carried out for any one brand and the price variation is over time; in premium pricing, the strategy holds for any one time and the price variation is over related models. As in the periodic discounting example, each segment here provides an external economy to the other; however, the advantage to the price sensitive segment is greater because they buy a product below its average cost.

Image Pricing

By image pricing, a firm brings out an identical version of its current product with a different name (or model number) and a higher price. The intention is to signal quality. This strategy is between price signaling and premium pricing in that the demand characteristics are similar to those of price signaling and the cost aspects are similar to those of premium pricing (see Table 1). Thus the firm uses the higher priced version to signal quality to uninformed consumers and uses the profit it makes on the higher priced version to subsidize the price on the lower priced version. Image pricing differs from price signaling in that the prices are varied over different brands of the same firm's product line. It differs from premium pricing in that differences between brands are not real but only in the images or positions adopted. This strategy may account for some of the variation in prices of alternative brands of cosmetics, soaps, wines, and dresses that differ only in brand names.

Complementary Pricing

Complementary pricing includes three related strategies—captive pricing, two-part pricing, and loss leadership.

> Captive pricing: Consider a firm that produces a durable good whose economic cost price is $100 and life span is 3 years. During that time the product needs supplies that have an economic cost price of $.50 a month. All consumers are willing to pay at most $50 for the product and $2 per month for supplies. Assuming all buyers will keep on purchasing supplies regularly and the discount rate for future earnings is zero, what pricing strategy should the firm adopt?

[8] In some markets oligopolistic or monopolistic situations exist, in which case a firm can market profitably only to the premium segment. However, there are several reasons for marketing to both segments. First, dealers, especially of high priced durables, are more likely to accept an exclusive dealing strategy if the manufacturer has a complete line of products. Second, with a complete line it is easier to develop brand loyalty, especially as consumers tend to buy better versions of durables with each subsequent purchase. Third, a low priced basic version may be used to attract consumers into stores, and then motivate them to buy the higher priced versions. Since an early note by Dean (1950b), there is an extensive literature on alternative theoretical models for premium pricing. However, without formal empirical analysis it is not possible to determine which model is relevant or what alternatives need to be developed (Katz 1984).

Under the given assumptions, the firm would do well to price the basic product at $50 and the supplies at $2. The accumulated premium over the life of the product would equal $54 ($3 \times 12 \times \$1.5$) and would more than compensate for the loss at the time of selling the basic product. In actually computing the minimum price of the product, the firm would have to include as costs a discount for future earnings and the risk that consumers would not purchase supplies. The firm also needs to consider the potential gains from this strategy. For example, consumers may not view the basic product they purchased as a sunk cost, and may try to "recover" their investment by buying the accessories and using it (the "sunk cost effect," Thaler 1980). Alternatively, they may get involved in the product and use it more than expected. This possibility has led some authors to label this strategy "captive pricing" (e.g., Kotler 1984, p. 529).

An interesting question is whether consumers would buy the package with the product at $100 and the accessories at $.50 if they were informed they were incurring the same cost the other way around. Probably they would not. A consumer may be reluctant to incur a big immediate investment (a certain loss) for an uncertain future satisfaction ("the certainty effect," Kahneman and Tversky 1979), or may not have the funds for the purchase. In either case, the consumer has a "transaction cost," which the firm apparently absorbs.

The chief restraint on the use of captive pricing for durable goods and accessories is that there are often no major shared economies in the manufacture of the basic product and its accessories. Thus, if the premium on the accessories is too high, marginal producers of the accessories may enter the market and drive down prices. In some circumstances, as in the automobile industry, the accessories are themselves produced by smaller firms. Consequently this strategy has limited importance unless consumers are source loyal and would like to buy supplies from the original source even at a higher price. In other circumstances, manufacturers hold patents or are the only source of the technology for the production of the supplies. In this case captive pricing is crucial for the success of the product. Bain (1956) refers to the superior position of these firms as "absolute cost advantages." In no circumstances may the firm bind the buyer to purchase the supplies from it. Such a strategy of tying contracts may be illegal under the Sherman Act of 1890 or the Clayton Act of 1914 (Burstein 1960; Scherer 1980; Werner 1982).

The well-known examples of captive pricing are razors and blades, cameras and films, autos and spare parts, and videos or computers and software packages. In the case of services, this strategy is referred to as "two-part pricing" because the service price is broken into a fixed fee plus variable usage fees (e.g., the pricing by telephone companies, libraries, health or entertainment clubs, amusement parks, and various rental agencies). The economics of two-part pricing has been studied by several researchers, more recently by Schmalensee (1982).

In retailing, the corresponding strategy is called "loss leadership," and involves dropping the price on a well-known brand to generate store traffic. The drop in price should be large enough to compensate consumers for the transaction cost involved in making the extra trip, switching from their normal place of purchase, or foregoing the cheaper basket of prices they pay at the alternative store. However, in many cases the drop in price may not be exactly that high, primarily because consumers may see the price drop as a real gain while underestimating the transaction costs (Thaler 1985). Nevertheless, to ensure a success in this strategy, retailers normally feature several "super buys," nationally branded products sold below cost.

Manufacturers of nationally branded products have always disapproved of loss leadership for two reasons. First, a product that is often available on discount may give consumers the impression that the quality is inferior. Second, specialty stores that depend on the branded products for their source of income may lose sales to discount stores and therefore cease to distribute the product. Manufacturers have sought to restrain loss leadership by a strategy of retail price maintenance. However, (minimum) retail price maintenance is now illegal under a federal statute, the Consumer Goods Pricing Act of 1975 (Scammon 1985; Scherer 1980; Werner 1982).

The reverse case, maintaining maximum retail prices, is not illegal (Scammon 1985). This situation occurs when a retailer charges too high a price for a branded product over which it has exclusive or selective distributorship. In such a case the retailer may suboptimize the manufacturer's profits (Machlup and Taber 1960). The manufacturer can control this practice by advertising the "suggested (maximum) retail price" and then enforcing such a price during the advertizing period. High priced durable goods such as appliances and automobiles are examples of products for which this strategy is used.

Complementary pricing is similar to premium pricing in that the loss in the sale of a product is covered by the profit from the sale of a related product. However, there are two important distinctions. First, premium pricing applies to substitutes and complementary pricing to complements. Second, complementary pricing requires variation in transaction costs over the products whereas premium pricing requires variation in preferences over consumer groups. As a result there is no sharing of economies among customer groups in complementary pricing.

An Integration and Comparison of Strategies

The preceding discussion demonstrates the variety of pricing strategies available to a firm. The theory underlying some of them has only recently been analyzed in the economics literature, though they all have been discussed in some form in the marketing discipline. A major contribution of this article is that all these strategies are discussed on the same basis and are compared in a manner that is theoretically rich yet typologically simple. The most important contribution is that the strategies are shown to have a common denominator—shared economies. This proposition makes possible an enlightening classification of the strategies and a summarization of their underlying principles. The classification is based on two dimensions: the objective of the firm in exploiting these shared economies and the consumer characteristics necessary for each strategy (see Table 1).

The relevance of the central idea of shared economies is summarized here with respect to Table 1. A more detailed explanation is given in the description of the welfare aspects of each strategy. In the class of differential pricing strategies, one product is sold to two segments at different prices. By this means the firm exploits economies of scale and each segment provides an economy to the other. In addition, in second market discounting and periodic discounting, one segment buys the product at a higher price and in so doing incurs more of the production costs so that the product can be made available to the other segment at its lower acceptable price. In random discounting, the searchers ensure that the product is available at a lower price at random periods, thus providing a lower average price to the nonsearchers.

In the class of competitive pricing strategies, firms sell one product to one or more market segments at the same price, but the pattern of shared economies is more complex. In price signaling, the searchers provide an economy to nonsearchers, who can get the quality they desire (either high or low) at an acceptable risk of an error just by observing prices. In penetration, experience curve, and geographic pricing, the two segments provide a simple cost economy to each other, enabling the firm to exploit economies of scale or experience. In addition, in penetration and experience curve pricing the common price is that of the more price sensitive segment, which therefore confers a greater economy to the price insensitive segment. In geographic pricing, the lower the competitive price in the adjacent market, the higher the price and hence the greater the diseconomy borne by the home market.

In the class of product line pricing strategies, the shared economies are primarily over the production or marketing of the products in the line. In image pricing, premium pricing, and complementary pricing, one product is sold at a "loss" which is then recovered from the higher price of a complementary product sold to the same segment or of a substitute product sold to a less price sensitive segment. In price bundling, there is an asymmetric demand by two consumer segments over two nonsubstitute products. A firm using the optimum price sells both products at the lower of the joint reservation prices. In this way the firm sells one product below the acceptable price of one segment, but compensates by selling both products to both segments. In all of these cases the creative dimension of pricing is to identify the source and pattern of shared economies that can be exploited for the benefit of the individual firm and its consumers.

Besides delineating the classification scheme, this article compares and contrasts the various strategies with closely related alternatives. In addition, a summary comparison based on five criteria is presented in Table 2. These criteria are the characteristics of the strategy; the necessary consumer, product, and cost characteristics; the relevant legal constraints; and the variants of this strategy. The table demonstrates that the multiplicity of names distracts from the essential similarity among the strategies and the common principles that unify them. A small, theoretically based set of labels, like the one suggested here, enhances understanding and communication on the issues.

Besides the pedagogical and managerial benefits from this presentation of pricing strategies, the theoretical presentation suggests certain research avenues. One would be to review and further develop pricing models based on this classification scheme. Different models then could be usefully compared, new uses for older models identified, and newer models developed. Another avenue would be to determine to what extent these different strategies are carried out in practice, the types of firms that use particular strategies, and the factors that determine empirical success. A third avenue is to determine whether the principle of shared economies is in fact the main explanation for these strategies, as is proposed here.

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