

# The Economics of Advertising, Introduction

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## 1. Introduction

Advertising is a prominent feature of modern economic life. Consumers encounter advertising messages as they watch TV, read magazines, listen to the radio, surf the internet, or simply walk down the street. And the associated advertising expenditures can be huge. What, then, do economists have to say about advertising?

Up until the late 19th century, this question had a simple answer: nothing. But over the 20th century, research on advertising has proceeded at a vigorous pace, and a vast literature has now emerged. This volume collects some of the central contributions. These contributions, which evaluate the economic effects of advertising from theoretical and empirical perspectives, reveal a number of important lessons. At the same time, advertising is a subtle and difficult subject, with important effects that remain poorly understood. In short, economists now have quite a lot to say about advertising, but there is also much that remains to be said.

This introduction begins with an historical overview of the development of the economic analysis of advertising.<sup>1</sup> I then discuss the specific contributions.

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<sup>1</sup>Bibliographical information is provided at the end of this Introduction for all books and articles, excepting those articles that are included in this volume. The economic analysis of advertising is surveyed more fully by Bagwell (2001).

### 1.1. The Economic Analysis of Advertising: An Historical Overview

In light of the current importance of advertising, it is perhaps surprising that advertising was a subject of little interest to the major economists of the 19th century and before. What accounts for this? First, in the 19th century, a central focus of economic research was the development of the theory of perfectly competitive markets. This theory is not immediately suggestive of a role for advertising. Indeed, under the traditional assumptions that consumers have fixed preferences over products and perfect information, there is no reason for consumers to respond to firms' advertising efforts. Second, large-scale brand advertising did not appear as an important feature of actual markets until the late 19th and the early 20th centuries. Over that period, with technological advances in communication and transportation, it became possible for manufacturers to achieve the scale economies that are associated with mass production. Large-scale brand advertising then began to appear, since it represented an important means through which a manufacturer could stimulate demand for its brand.<sup>2</sup>

At the turn of the century, advertising was a thus a fertile topic for economic research. An early reflection is offered by Marshall (1890, 1919). He distinguishes between two roles that advertising may play. Advertising has a *constructive role* when it provides information to consumers, so that they may satisfy their wants at lower cost. But advertising also may play a socially wasteful *combative role*, by offering little information and serving only to redistribute consumers from one firm to another. While this distinction is useful, and foreshadows later insights, Marshall did not pursue a formal integration of advertising into microeconomic theory.

This task fell to Chamberlin (1933). In his theory of monopolistic competition, Chamberlin models a firm's advertising expenditures as a "selling cost" that shifts out the downward-sloping demand for the firm's differentiated product. He accepts that advertising may provide information to consumers, and he allows, too, that advertising may be persuasive and work to alter consumers' "wants." Informative advertising better enables consumers to respond to price differences and thus increases the elasticity of demand, but persuasive advertising creates brand loyalty and thereby reduces the elasticity of demand. Scale economies play an important role in Chamberlin's theory, and he argues that such economies

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<sup>2</sup>See Ekelund and Saurman (1988) for further discussion on the advertising and 19th-century economists. The emergence of large-scale advertising is described by Border (1942), Chandler (1990) and Pope (1983).

may exist both in production and advertising. Working with these ingredients, Chamberlin argues for a monopolistically competitive equilibrium, in which each firm's demand curve is tangent to its U-shaped average cost of production and selling. In this context, Chamberlin explains that the net effect of advertising on prices cannot be determined by theory alone, since the overall effect is influenced by the extents to which (i) advertising is informative or persuasive, and (ii). scale economies in production and advertising exist.

From this beginning, three views of advertising emerged. The *persuasive view* holds that advertising primarily affects demand by changing tastes and creating brand loyalty. The advertised product thus faces a less elastic demand. This elasticity effect suggests that advertising causes higher prices, though this influence may be moderated by the presence of production scale economies. Going beyond Chamberlin's discussion, the persuasive views holds further that advertising may deter entry. Consumers are reluctant to try new products of unknown quality, and this experience-based asymmetry between established and new products may be exacerbated in the presence of heavy advertising by established firms. Advertising may be particularly effective in this regard if there are scale economies in advertising or production.

The persuasive view is developed through a number of writings. Robinson (1933) emphasizes that advertising may create brand loyalty and deter entry. The conceptual foundation of the persuasive view is developed more fully in a perceptive paper by Braithwaite (1928). Kaldor (1950) advances the view further and stresses that advertising leads to a more concentrated market, due to the presence of an advertising scale economy. Working within the structure-conduct-performance paradigm, Bain (1956) and Comanor and Wilson (1967) offer early empirical support for the persuasive view. Looking across U. S. manufacturing industries, they present evidence that advertising intensity exerts a positive and significant influence in the explanation of profits. This is consistent with the hypothesis that advertising creates brand loyalty and deters entry.

The *informative view* holds that advertising primarily affects demand by conveying information. The advertised product thus faces a more elastic demand. This elasticity effect suggests that advertising causes lower prices, an influence which is reinforced when production scale economies are present. The informative view suggests further that advertised products are generally of high quality, so that even seemingly uninformative advertising may provide the indirect information that the quality of the advertised product is high. There are three reasons. First, the demand expansion that advertising induces is most attractive to effi-

cient (low-cost) firms, and such firms are likewise attracted to demand expansion achieved by offering low prices and high-quality products. Second, the product-experience memories that advertising rekindles are most valuable to firms with high-quality products, since repeat purchases are then more likely. Third, a firm sensibly targets its advertising toward consumers who would value its product most. The informative view holds further that advertising is not used by established firms to deter entry; instead, advertising facilitates entry, since it is an important means through which entrants provide price and quality information to consumers.

The foundation for the informative view is laid by Ozga (1960) and Stigler (1961). In an early empirical effort, Telser (1964) looks across U. S. consumer-goods industries and reports evidence that advertising serves mainly to facilitate entry. Nelson (1970) makes the distinction between experience goods and search goods. Nelson (1974) further explains that a high level of advertising provides indirect information that the advertised good is of high quality, for the three reasons given above. This signaling role for advertising is of particular significance for experience goods. As Nelson (1974, 1975) and Demsetz (1973) explain, a finding that profitability and advertising are positively associated may indicate only that firms of superior efficiency advertise more.

Finally, the *complementary view* holds that advertising primarily affects demand by exerting a complementary influence in the consumer's utility function with the consumption of the advertised product. As an example, it may be that a consumer values "social prestige," and advertising may then serve as an input that enables the consumer to derive more social prestige when the advertised product is consumed. The complementary view is logically distinct from the persuasive view, since the complementary view holds that consumers possess a stable set of preferences into which advertising enters as one argument. The complementary view is also logically distinct from the informative view, since under the complementary view advertising may affect consumer demand even if it contains no (direct or indirect) information. An important benefit of the complementary view is that the fixed-preferences assumption permits a straightforward welfare analysis of seemingly persuasive (or at least uninformative) advertisements. Under this view, the market may provide too little advertising, since the advertising firm does not internalize the full increase in consumer surplus that its advertising engenders.

The foundation for the complementary view is developed by Stigler and Becker (1977), although important elements of the view are also found in Telser's (1964)

and even Kaldor's (1950) work. Important contributions are also offered by Fisher and McGowan (1979), Nichols (1985) and Hockman and Luski (1988). Becker and Murphy (1989) provide a thorough defense of the complementary approach.

By the late 1960s, many of the key features of the informative and persuasive views were in place. Following the lead of Bain (1956), Comanor and Wilson (1967) and Telser (1964), economists sought next to empirically test the predictions of the two views. Much of this work uses cross-industry data. Regression techniques are used to assess the relationships between advertising and a host of other variables, including own sales, rival sales, brand loyalty, market-share stability, concentration, profit, entry, prices and product quality. Perhaps the main lesson emerging from this work is that effects of advertising vary importantly across industries and products. But a few specific lessons are also uncovered. First, advertising tends to increase own sales, although the increase may be short-lived and come at the expense of rival sales (advertising is often combative). Second, in many industries, advertising intensity is positively associated with profitability, although the interpretation of this finding is not clear (see above). Third, in retail industries, the ability to advertise is often associated with lower prices.

Important empirical contributions are offered in books by Borden (1942), Comanor and Wilson (1974), Lambin (1976), Porter (1976) and Schmalensee (1974). Comanor and Wilson (1979) provide a summary of many of the findings from the empirical efforts of the 1960s and 1970s. In his classic paper, Benham (1972) offers powerful evidence that the ability to advertise (as determined by state law) is associated with lower prices in the retail market for eyeglasses.

Given the general absence of sweeping (cross-industry) empirical conclusions, economists began in the late 1970s to place more emphasis on the advancement of advertising theory. This work benefited importantly from the concurrent development of game-theoretic methods. In one set of work, the welfare consequences of persuasive advertising are evaluated from a theoretical perspective. A second set of work considers whether informative advertising is provided by the market at the socially efficient level. A third set of research scrutinizes Nelson's reasoning and considers further the role of advertising in providing indirect information as to the quality of an experience good. Finally, a fourth set of research considers the interaction between advertising and market structure. This work examines the impact of market structure on optimal advertising and reconsiders as well the impact on advertising on entry.

There are many important papers in each set. Dixit and Norman (1978) offer an influential welfare analysis of persuasive advertising. The complementary view

also emerged during this research phase. Butters's (1977) classic model marked the beginning of the theoretical literature on informative advertising. As Milgrom and Roberts (1986) show, Nelson's argument can be defended in a formal model, although the argument becomes more subtle when price is endogenous. Finally, Dorfman and Steiner (1954) offer an early model of optimal advertising as a function of market structure, while Schmalensee (1983) explains that ability of advertising to deter entry is less clear than might be supposed.

In the 1980s and 1990s, economists returned to the empirical analysis of advertising with renewed interest. In comparison to the earlier empirical research, though, the second wave of empirical work tends to be more narrow in focus. The new work is characterized by three features: it is usually directed toward single industries or small groups of industries (as opposed to cross-industry analyses); it often uses new data sources; and it reflects the influence of the intervening theoretical work. Some of this work takes the intervening theoretical work quite literally and specifies a structural model of industry behavior. Other work extracts a broad theme from the theoretical models and then investigates the empirical validity of this theme within a given industry.

In the second-wave category, Gasmi, Laffont and Vuong (1992) offer an influential analysis of price and advertising in the soft-drink market. Using their methodology, the researcher may choose a best-fitting oligopoly game and then use the structural estimates that this conduct hypothesis implies. Sutton's (1991) approach is to look for a broad theoretical theme. For a wide class of oligopoly models, he shows that an increase in market size does not lead to a fragmented market structure, when firms endogenously incur sunk costs through their advertising (or R&D) choices. Looking at food industries in different countries, Sutton then provides supportive evidence.

In summary, like the field of Industrial Organization itself, the economic analysis of advertising has moved through several phases. The analysis began with general views, which offered sweeping interpretations. These views, however, have become increasingly qualified as they have been subjected to rounds of empirical, theoretical and again empirical evaluation. After a century of work, has any progress been achieved? At a minimum, we have learned that one-size-fits-all conclusions as to the effects of advertising are overly simplistic. This in itself is progress, but can we say more? The contributions collected in this volume make a strong argument for an affirmative answer. We now have a much clearer understanding of the key determinants on which the effects of advertising hinge, and we have greater confidence as to the effects of advertising in particular industries.

We also have a much richer tool set - both theoretically and empirically - with which to continue the analysis.

## 1.2. Specific Contributions

With the historical overview in place, I turn now to the specific contributions collected in this volume. The papers are treated in the order that they appear.

### 1.2.1. Advertising: Persuasion and Welfare

Kaldor (1950) argues that advertising usually provides little information and is persuasive in nature. Further, advertising is an unusual good, since it is sold jointly with the advertised product and has no separate market. The direct effects of advertising suggest that it is probably supplied to an excess degree. Kaldor also considers the indirect effects of advertising. Holding that an important advertising economy of scale exists, he argues that advertising leads to more concentrated markets. Advertising may thus lead to lower prices, if there are significant economies of scale in production. But advertising may also result in higher prices, if it generates brand loyalty. Kaldor also offers a fascinating account of the use of advertising by manufacturers in Britain in the late 19th century. Manufacturers used advertising to establish their brand names and thereby establish a direct relationship with consumers.

Allowing that advertising may be persuasive and change tastes, Dixit and Norman (1978) develop a modeling framework for welfare analysis. The welfare effects of advertising may be evaluated relative to pre-advertising or post-advertising tastes. Among other results, they show a monopoly advertising that raises price is socially excessive, even relative to the post-advertising taste standard.<sup>3</sup> As Shapiro (1980) notes, the opposite conclusion follows when monopoly advertising serves rather to inform consumers of the existence of the monopolist's product. Fisher and McGowan (1979) contend further that the Dixit-Norman approach is problematic, since for any given standard demand is allowed to respond to advertising while utility is not.

The Fisher-McGowan critique leads naturally to the complementary view, as formalized by Becker and Murphy (1989). In the Becker-Murphy analysis, advertising enters directly into the consumers' utility function, and advertising is complementary to the consumption of the advertised product. Like Kaldor, they note

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<sup>3</sup>See Braithwaite (1928) for a similar finding, when pre-advertising tastes are used as the standard.

that it is often infeasible to separately sell advertising to consumers. Advertising may be given away, or it may be bundled with other goods. While the advertising market has special properties, Becker and Murphy conclude that these properties do not prohibit the assimilation of advertising into consumer choice theory. It is thus possible to use standard Industrial Organization methods and conduct a welfare analysis of advertising. An important finding is that monopoly advertising that lowers price is undersupplied.

### 1.2.2. Advertising: Information and Welfare

As Stigler (1961) explains, consumers may be imperfectly informed when there are search costs that are associated with obtaining information as to the location, price and qualities of available products. Price dispersion is one important manifestation of consumer ignorance. From this perspective, firms advertise in order to provide consumers with information, and advertising tends to reduce the extent of price dispersion, just as would a reduction in search costs.

Telser's (1964) further develops the foundation for the informative view. In an early empirical study of advertising, Telser considers the relationship between advertising and concentration across 42 consumer-good industries. Using a linear regression of concentration on advertising intensity, he concludes that the correlation is "unimpressive." Telser also examines the relationship between advertising and market-share stability. Looking at three consumer-goods categories, Telser reports that greater advertising activity tends to be associated with *less* market-share stability. On the whole, Telser's work suggests that advertising may work more to facilitate than to deter entry.

The important distinction between search and experience goods is made and explored by Nelson (1970). From here, Nelson (1974) argues that advertising may provide indirect information that the advertised product is, in fact, a good deal. As I mention above, advertising may be especially attractive to efficient firms selling high-quality products that are especially well suited for consumers that are targeted by the advertising campaign. Advertising may be most effective as an indirect information source for experience goods, since sellers of search goods are better able to provide direct information through advertisements. Nelson (1974) offers various evidence that is consistent with this perspective. A basic implication of Nelson's (1974) approach is that seemingly uninformative advertising may influence rational consumer behavior, even if the advertising does not change or directly impact consumer tastes.



### 1.2.3. Advertising and Search Goods: Theory

Butters (1977) offers a first equilibrium analysis of informative advertising. In his model, firms are identical but consumers are poorly informed. A consumer can learn of a firm's existence and price only by receiving one of the firm's advertisements. Firms thus become "informationally differentiated" after advertising. In comparison to Stigler's analysis, an important innovation of Butters's work is that the distribution of prices is endogenized. An key issue is then whether firms provide the socially efficient level of advertising. Butters's striking finding is that firms supply advertising at the socially efficient level.

Grossman and Shapiro (1984) allow that firms are horizontally differentiated, so that advertising creates social surplus when a previously uninformed consumer becomes informed (as in Butters's model) or an already informed consumer learns of a product that is a better match. Firms fail to internalize the full consumer surplus gain that is associated with their advertising, indicating that advertising may be undersupplied. This is the only externality under monopoly, as in Shapiro's (1980) model. With more than one firm, it is also possible that advertising is excessively supplied, since each firm is motivated by the prospect of stealing business that would otherwise accrue to a rival firm. The model then includes Marshall's constructive and combative roles for advertising. When the number of firms is sufficiently large, the business-stealing externality dominates, and the supply of advertising is excessive.

Robert and Stahl (1993) allow that consumers can also obtain price information through (costly) sequential search. Thus, in their model, both the supply and the demand for price information are endogenized: firms supply price information by advertising, and consumers acquire price information by receiving advertisements and undertaking search. A unique price-dispersion equilibrium is characterized. In this equilibrium, a firm either charges a high price that is not advertised or selects from an interval of lower prices. An interesting prediction is that advertising intensity is greater at lower prices.

Bagwell and Ramey (1994) consider the indirect information contained in non-price advertising by retail firms. Building from Nelson's (1974) insights, they note that advertising is most valuable to low-cost firms. Such firms also have the greatest incentive to offer low prices and large product variety. They thus argue that high-advertising firms are characterized by large investments in cost reduction, extensive product variety and low prices. Retail advertising therefore provides valuable indirect information. Under the assumption that consumers differ in their ability to observe advertising, Bagwell and Ramey construct a monopolisti-

cally competitive equilibrium, in which “superstores” coexist with “Mom & Pops,” with each earning zero profits (after advertising). Social welfare is higher when advertising is allowed, since it is through this means that retail scale economies are achieved. More generally, the model predicts that the ability to use non-price advertising results in lower prices and larger stores.

#### **1.2.4. Advertising and Search Goods: Empirical**

As Chamberlin observed, the effects of advertising on price cannot be resolved by theory alone. In a classic paper, Benham (1972) shows that much can be learned from a well-designed empirical study. In the 1960s, important variation existed across states with regard to the legal status of advertising related to eyeglasses. Some states had no restrictions, other states prohibited price advertising but allowed non-price advertising, and some states prohibited all advertising. Comparing across states, Benham finds that prices were lower in states that had no restrictions than in states that prohibited all advertising. Benham observes further that prices were only slightly higher in states that prohibited only price advertising than in states that had no restrictions. Accordingly, even non-price advertising can lower prices, and this association appears to derive in part from the entry of large-scale firms into markets that allow non-price advertising. These findings are consistent with the predictions of Bagwell and Ramey (1994).

Similar findings have been reported for a variety of industries. For example, Cady (1976) examines the effect of state-level restrictions on advertising on the retail price of prescription drugs. Like Benham, Cady finds that retail prices are significantly and positively related to advertising restrictions. In another related study, Kwoka (1984) considers whether the ability to advertise results in a deterioration in product quality. Looking at the optometry industry, Kwoka compares the prices and qualities (time spent in the examination) offered by advertising and non-advertising firms in markets where advertising is allowed with the prices and qualities that emerge in markets where advertising is restricted. When advertising is allowed, non-advertising and especially advertising firms reduce price; furthermore, advertising firms decrease quality but non-advertising firms increase quality. Overall, average quality is higher in markets that allow advertising than in those that do not.

An impressive and contrasting study is offered by Milyo and Waldfogel (1999). They break with the previous cross-sectional efforts and offer a longitudinal analysis that makes use of an exogenous shock: the 1996 Supreme Court ruling that

struck down Rhode Island's ban on advertising prices of alcoholic beverages. Milyo and Waldfogel find that advertising stores substantially cut the prices of advertised products; however, prices of other products, at both advertising and non-advertising stores, tended to rise after advertising was allowed. In contrast to Stigler's hypothesis, no reduction in price dispersion across stores is associated with the introduction of price advertising. Finally, Milyo and Waldfogel report that the stores that chose to advertise had lower average prices, both before the law change and afterwards.

### **1.2.5. Advertising and Product Quality Information: Theory**

In line with Nelson's (1974) arguments, advertising may signal quality for an experience good, since the return from advertising and achieving thereby an initial sale is greater for a high-quality product due the repeat purchases that follow. Nelson, however, did not model this process. A first formal investigation is offered by Schmalensee (1978). He emphasizes that the marginal cost of production may be greater when a high-quality good is produced. Under the assumption that all sellers must charge the same price, the value of an initial sale then may be greater when a low-quality good is sold, as the mark-up is then larger. This effect can counter the repeat-purchase effect. Schmalensee demonstrates that low-quality brands may advertise more, if consumers are responsive to advertising and a sufficient cost difference exists between high- and low-quality production.

As Kihlstrom and Riordan (1984) emphasize, a weakness of Schmalensee's formulation is that consumer behavior is ad hoc. They thus consider whether advertising signals quality in a model with rational consumers. In particular, they assume that quality is either high or low and that firms are competitive price takers, where the price that is "taken" may differ depending upon whether a firm is perceived to offer a high- or low-quality product. Advertising can be understood as an "entry fee" that is necessary to enter the high-quality market. In their two-period approach, a low-quality firm could advertise, fool consumers and obtain the high-quality price in the first period. Likewise, a high-quality firm could refrain from advertising and obtain thereby the low-quality price in the first period. A potentially important issue is the information that consumers possess in the second period with regard to a high-quality firm that did not advertise in the first period. Two models are considered. They find that advertising can not (can) signal quality if low-quality firms (do not) enjoy a sufficient marginal-cost advantage, where the precise extent of the critical advantage varies across the two

models.

Milgrom and Roberts (1986) consider a monopolist that chooses advertising and price in order to signal its product quality. Their findings may be understood in the following terms. Suppose that the marginal cost of production rises with quality. When the monopolist raises its first-period price, its sales in the first period are reduced (holding all else constant). This first-period effect is less painful for a high-quality monopolist, as the monopolist then has a higher marginal cost. The price hike also reduces sales in the second period, since there are then fewer satisfied consumers that emerge from the first period. This second-period effect may be more painful for a high-quality monopolist, because a greater fraction of its first-period consumers would have had a satisfactory experience. Due to these offsetting effects, it may be that the cost of a price increase is equalized across the low- and high-quality monopoly types. As both types also experience the same cost from advertising, the monopolist may have no better alternative than to use both a distorted price and a positive advertising expenditure when signaling high quality. By contrast, if the marginal cost of production falls with quality, then the cost of a price hike is greater for a high-quality monopolist. In this case, advertising is not used as a signal, since the high-quality product is best signaled with a low price.

Hertzendorf (1993) extends the analysis in another direction. He allows that consumers observe the monopolist's advertising expenditure with error. By contrast, price is perfectly observed. If no advertising is observed, then it may be unclear whether the firm failed to advertise or the consumer failed to observe the advertising. When consumers are unable to distinguish between these possibilities, if the monopolist's price reveals quality, then the monopolist will not use advertising as a simultaneous signal. Intuitively, if the monopolist were to use advertising, then it could deviate to a lower advertising level, without being detected and without altering the consumers' belief (since price already reveals quality). Advertising may be used, however, when the monopolist's price is independent of quality. When repeat-business effects are sufficiently large and/or marginal cost does not rise too swiftly with quality, the high-quality monopolist advertises to a greater extent.

### **1.2.6. Advertising and Product Quality Information: Empirical**

The theoretical association between advertising and product quality is dependent upon the manner in which marginal costs varies with quality. Direct tests are

thus difficult, since marginal cost may not be easily observed. Nevertheless, the validity of Nelson's (1974) reasoning can be indirectly assessed by examining the actual correlation between advertising and quality in the market place. An early study to of the nature is offered by Tellis and Fornell (1988). Using PIMS (Profit Impact of Market Strategies) data, wherein a firm's product quality is measured on the basis of a (confidential) self assessment, they find that advertising, market share and profitability are all positively associated with product quality, where the relationships are particularly strong in the later stages of the product life cycle. This evidence is broadly consistent with Nelson's reasoning.

Caves and Greene (1996) arrive at a different conclusion. For almost 200 product categories, they evaluate the rank correlations between brands' product quality rankings and advertising expenditures, where quality ranking are measured using *Consumer Reports* data. They find that advertising and quality are generally uncorrelated among brands. Caves and Greene also convened a focus group, which provided ratings on the importance of different types of information that buyers can use when selecting a brand of each product category. They argue that the evidence is consistent with advertising serving as direct information and inconsistent with advertising serving primarily as a signal of quality.

Thomas, Shane and Weiglet (1998) offer a careful assessment of the advertising-quality relationship, using data from the U. S. automobile industry. They find that models priced higher than the full information price level tend to have higher advertising levels. Drawing on theoretical work by Bagwell and Riordan (1991) and Milgrom and Roberts (1986), the authors emphasize that these actions are consistent with the hypothesis that manufacturers of high-quality models signal unobservable quality attributes by setting prices above full-information levels and advertising expenditures beyond those incurred by manufacturers of low-quality models. The signaling interpretation is further supported by the finding that these relationships are weaker for older models, about which consumers are already well informed. Finally, consistent with the repeat-business effect, they find that automobiles that experience higher sales 5 years after introduction are characterized by greater advertising in the current period.

### **1.2.7. Advertising and Market Structure: Theory**

In an influential early contribution, Dorfman and Steiner (1954) consider the endogenous determination of price, advertising and quality. They show that a profit-maximizing firm sets advertising at a level so that the marginal revenue from

advertising is equal to the ordinary elasticity of demand for the firm's product. Their work stands in contrast to the structure-conduct-performance approach, initiated by Bain (1956), which regards advertising more as a structural characteristic that determines the extent of product differentiation and thereby profits. Once advertising is regarded as endogenous, however, it is apparent that other underlying structural features (low production costs, poor consumer information) may simultaneously determine advertising and profits. The approach taken by Dorfman and Steiner thus laid the foundation for an important concern voiced by Schmalensee (1972) and others as to the interpretation of single-regression analyses in which advertising enters as an independent structural variable (e.g., in the explanation of profits).

Following the first wave of empirical work, a number of economists began to scrutinize from a theoretical perspective the hypothesis that advertising influences structure by creating a barrier to entry. Spence (1980) considers the possibility that an advertising contributes to scale economies and leads thereby to an entry barrier. The notion of an advertising scale economy is introduced by Chamberlin and emphasized by Kaldor. As Spence notes, however, while a production scale economy can be defined in terms of the average cost of producing physical units, advertising affects demand and prices, and so the formal definition of scale economies under advertising is subtle. Spence's approach is to think of advertising and output as inputs in a "production function" that generates revenue. An overall economy of scale is then associated with the situation in which the cost per dollar of generating revenue is lower at higher levels of revenue. The presence or absence of such a scale economy in turn is determined by various demand and average-cost elasticities.

Schmalensee (1983) develops a strategic model in which the entry-detering implications of advertising may be directly analyzed. He considers a two-stage Butters-style model. In period one, an incumbent firm sends out advertisements to consumers. The advertisements contain the incumbent's location and phone number, so that a consumer who receives such an advertisement is forever informed of the incumbent's existence and price. An entrant appears in the second period. The act of entry involves a fixed cost. If the entrant incurs this fixed cost, then it sends out its own advertisements, and the firms then engage in a post-advertising oligopoly game. Given that advertising is a durable investment and the entrant faces a fixed cost, it is tempting to reason by analogy with Dixit's (1980) famous entry-deterrence model and conclude that the incumbent over-invests in advertising in order to deter entry. But this analogy is false. The

incumbent best deters entry with a *reduced* advertising expenditure. Intuitively, if the incumbent were to advertise extensively, there would be many consumers that were informed only of the incumbent's product. The incumbent then would be tempted to price high (set a low output) and enjoy high profits on these "captive" consumers. The entrant would then rationally perceive that the incumbent would be a "soft" competitor for those consumers who are informed of both firms.

Bagwell and Ramey (1987) consider a model in which the incumbent's pre-entry pricing and advertising choices may signal its costs of production. Entry is profitable if and only if the incumbent has high costs. The low-cost incumbent therefore seeks to signal its costs in the most profitable manner. If advertising is dissipative, then the low-cost incumbent signals most profitably by distorting its price downward (limit pricing) and not advertising. But if advertising enhances demand, the low-cost incumbent signals most profitably by distorting its price downward and its advertising upward. Intuitively, an increase in demand is relatively appealing when costs are low, and so the low-cost incumbent signals most profitably by distorting price and advertising in demand-increasing directions. Limit pricing and demand-enhancing advertising can therefore deter (unprofitable) entry. This extends the famous Milgrom-Roberts (1982) limit-pricing model to include advertising.

Shaked and Sutton (1987) treat advertising and concentration as endogenous variables that are determined by the nature of technology and tastes and the size of the market. They begin with a "fragmentation" result. Suppose that firms play a two-stage game. In the first stage, firms enter or not, where entry requires that an exogenous sunk cost be incurred, and entering firms choose as well a location along the line. In the second stage, entering firms compete in prices. As the market size (the total number of consumers) gets large, the market structure must fragment: all firms obtain small market share. They next modify the first stage and suppose that firms choose horizontal and vertical attributes, where a higher vertical attribute is associated with an increased sunk cost. For example, advertising and product R&D may result in an enhanced vertical attribute, and the associated sunk cost is now endogenous. Conditions are then given under which the equilibrium market structure does not fragment. A large market size is thus compatible with a concentrated structure, for industries in which firms can offer greater product value through increased advertising.

### 1.2.8. Advertising and Market Structure: Empirical

As I mention above, the first-wave of empirical analysis emphasized cross-industry comparisons. Much of this work analyzes the empirical association between advertising intensity and profitability. In an influential survey, Comanor and Wilson (1979) summarize many of the studies of this period. As their survey indicates, a positive association between advertising intensity and profitability is observed in a number of studies, although there are important questions concerning the interpretation of this finding (entry deterrence or superior efficiency?), and there are also important issues associated with the measurement of profitability (when advertising, like capital, has durable effects). The association appears stronger for manufacturers of consumers goods and for goods sold in convenience outlets.

Gasmi, Laffont and Vuong (1992) pioneer a novel empirical methodology for studying rivalry between firms in pricing and advertising. They illustrate their approach using data on the Coca-Cola and Pepsi-Cola markets over the period 1968-86. A demand function is specified for each product, where sales depend on own and rival prices and advertising selections. Marginal cost is assumed constant, and its value is specified to be linear in measurable input variables. Given these demand and cost specifications, the authors derive four first-order conditions, corresponding to optimality conditions for each firm in price and advertising, where the parameters of these conduct equations take different restrictions as different oligopoly games (e.g., Nash in all variables, Nash in prices and collusion in advertising, etc.) are posited. The authors allow, too, for the possibility of a mid-sample change in behavior. For any given game, the two demand and four conduct equations can be simultaneously estimated, where the six endogenous variables are the prices, advertising levels and quantities for the two firms. The authors then determine the best-fitting game and emphasize the associated estimates. Their analysis suggests that Coca-Cola was a Stackelberg leader in price and advertising until a mid-sample period (1976), after which duopoly conduct is characterized by collusion in advertising and competition in price. In this context, they report that soft-drink advertising is quite predatory (i.e., combative), as increased advertising by one firm tends not to broaden the cola market and works rather to redistribute market share toward the advertising firm.

Kadiyali (1996) examines the U. S. photographic film industry over the period 1970-90. As she explains, Eastman Kodak Company had a virtual monopoly in this industry in the 1970s, but a mid-sample change occurred in the 1980s when Kodak accommodated entry by Fuji. Kadiyali constructs a dataset that includes firm-level price, advertising, quantity and input cost data from the pre- and post-



entry periods. Following Gasmi, Laffont and Vuong, she puts forth a general model that specifies a demand equation, a pricing first-order condition and an advertising first-order condition for each of the two firms. For a posited game between the two firms, the parameters of the first-order conditions assume further restrictions, and so it is possible to determine the best-fitting game. Kadiyali reports evidence that Kodak maintained its monopoly position in the pre-entry period by using limit pricing and high advertising. As she notes, a possible explanation is that Kodak sought to signal low costs, as in the theories of Milgrom and Roberts (1982) and Bagwell and Ramey (1987). Kodak was compelled to accommodate Fuji by 1980, however, due to demand and cost advantages that Fuji enjoyed. In the post-entry period, estimates indicate that Kodak and Fuji were colluding in their price-advertising selections, with substantial weight given to Fuji's profits.

Slade (1995) analyzes a dynamic model of price and advertising brand rivalry. Using weekly price, sales and promotional data for four brands of saltine crackers sold in grocery stores in a small town, she estimates demand and conduct equations, where the latter concern the probabilities of changes in prices and advertising efforts. Evidence is given that a brand's sales are decreasing (increasing) in own price (advertising), and increasing (decreasing) in rival-brand price (advertising). Slade argues that advertising is mildly predatory, in that rival-brand sales fall; however, it is not perfectly predatory, in that total sales rise. The effect of advertising in the cracker market thus falls somewhere between the strong predatory effect of advertising in the soft-drink industry that Gasmi, Laffont and Vuong (1992) report and the positive spill-over effect of advertising in the cigarette industry that Roberts and Samuelson (1988) report. Finally, Slade finds cross-brand evidence that advertising efforts are strategic substitutes and prices are strategic complements. In the dynamic game, firms thus compete aggressively in advertising and accommodate when setting prices, but the resulting high prices do not reflect collusion. Finally, low prices and high advertising make a brand "tough" and thus would be used were entry deterrence the objective. This runs counter to Schmalensee's (1983) interesting theory.

In an influential book, Sutton (1991) proposes an alternative empirical approach. An excellent summary of this approach is offered by Bresnahan (1992).<sup>4</sup> Bresnahan first puts Sutton's approach in historical perspective. As Bresnahan observes, Industrial Organization research was initially inductive in nature, with conclusions drawn from industry case studies. This changed with Bain, who articulated a deductive approach under which the implications of theories would be

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<sup>4</sup>For another excellent review, see Schmalensee (1992).

tested across broad industry categories. This was followed by “particularizing” theory and then empirical work. Like Bain, Sutton adopts a deductive approach and looks for the key structural variables that yield predictions amenable to statistical evaluation. But Sutton is able to draw on recent theoretical work, from which he identifies novel structural variables and extracts a few robust predictions that concern the endogenous determination of concentration. Sutton then tests these predictions with data from a particular industry group (namely, food industries in different countries). He also complements his statistical evidence with detailed case studies, which offer a window from which to assess some of the less robust predictions of the recent theoretical work.

What are Sutton’s structural variables? Building on his work with Shaked, Sutton focuses on predictions that concern the manner in which the endogeneity of sunk costs and the “toughness” of price competition influence the relationship between market size and concentration. In exogenous sunk cost industries, as market size increases, the market structure may fragment, although fragmentation requires greater market size when price competition is tougher. By contrast, Sutton provides conditions for endogenous sunk cost industries under which the industry does not fragment no matter how large the size of the market. Market size varies considerably across the countries, and the food group includes industries with disparate advertising intensities, suggesting that the endogeneity of sunk costs varies across industries. As Bresnahan explains, Sutton finds in this data much evidence that is consistent with his approach. Bresnahan also suggests a number of directions for new research.

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