

**Industrial Market Structure
and Economic Performance**

Third Edition

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Product Differentiation, Market Structure, and Competition

We advance now to firms' product policies—that is, to the important strategic choices they make in differentiating their goods and services from rival offerings. Four main product differentiation modes can be identified.¹ First, sellers may select plant or store locations more convenient (in terms of travel time and/or transportation costs) than rival locations. The locational advantages of the corner drugstore and the local gravel quarry are illustrations. Second, there are physical differences in product attributes. A suit may incorporate the most finely woven wool worsted or a coarser substitute; the design of an appliance may be mundane or reflect the genius of a Henry Dreyfus; beer may be hops-laden or bland; a computer may be addressed through complex logical codes or simple pictograms; and so forth. Third, firms may offer exceptionally good (or bad) service. As the previous chapter's discussion of the links between manufacturers and their distributors revealed, some retailers maintain large and well-trained staffs to provide prompt, intelligent, and courteous service; others are better known for long check-out lines and grumbling cashiers, mollifying the effect with rock-bottom prices. Some microcomputer software writers maintain hot lines to advise users how to overcome problems in using their products; others are unreachable. Finally, products are differentiated in terms of the subjective image they impress on the consumer's mind. Sellers attempt to enhance the image of their products through brand labeling, advertising, the design of attractive packages, and by distributing only through prestigious retail outlets.

Most of the product differentiation effort observed in a modern private-enterprise economy is a natural and healthy response to consumer demands. Peoples' wants are diverse. It is a rare consumer who doesn't value convenience in the location of suppliers, and many will pay a price premium for a certain amount of locational convenience. Nearly every consumer prefers good service over poor, although the prices individuals are willing to pay for extra service vary widely. The diversity of preferences with respect to physical design and performance attributes is especially great. Some men prefer cotton shirts, some silk shirts, some hair shirts, and some no shirt at all. Some want to fly supersonically; others would just as soon walk in the woods. Likewise, different consumers assign varying weight to the subjective image that accompanies the products they buy.

This rationale for product differentiation is generally accepted by consumers and scholars. To the extent that debate persists, it focuses on *how much* differentiation there should be and whether certain market conditions might lead to excessive (or inadequate) differentiation. Most controversial and important in this respect is image differentiation, especially the image differentiation created or reinforced through advertising.² In this chapter we direct our inquiry mainly to various facets of the image differentiation question, probing the bounds to which economic analysis can carry our insights and identifying the value judgments that

1. Compare Richard E. Caves and Peter J. Williamson, "What Is Product Differentiation, Really?" *Journal of Industrial Economics*, vol. 34 (December 1985), pp. 113–132, who use factor analysis to identify five dimensions.

2. For systematic expositions of economists' strongly differing views on the effects of advertising, see the papers by Yale Brozen and Michael Mann in Harvey J. Goldschmid et al., eds., *For-*

distrial Concentration: The New Learning (Boston: Little, Brown, 1974), pp. 115–156; William S. Comanor and Thomas A. Wilson, "The Effect of Advertising on Competition: A Survey," *Journal of Economic Literature*, vol. 17 (June 1979), pp. 483–476; Jules Backman, *Advertising and Competition* (New York: New York University Press, 1967); and Robert E. McAuliffe, *Advertising, Competition, and Public Policy* (Lexington: Lexington Books, 1987).

underlie contending viewpoints. We then examine more briefly how market structure affects firms' product variety and durability choices.

Advertising, Information, and Persuasion

In 1986, it is estimated, \$102 billion were spent on advertising in the United States. How those expenditures were distributed across the various advertising media is shown in Table 16.1. In 1977—the last year for which detailed industry breakdowns are available—the median manufacturing industry (among 225 candidates) devoted 0.66 percent of its sales revenue to advertising.³ However, a few industries are much more advertising-intensive. Table 16.2 lists the ten leading industries, ranked in the order of their media advertising/sales ratios for 1977. Prominent among the leaders are industries supplying repetitively purchased consumers goods advertised heavily on television, including (in tenth place) the industry from which the term *soap opera* comes.

Advertising can perfect competition by helping consumers make better-informed choices, or it can make competition less perfect by persuading consumers to favor a particular brand over alternatives. Drawing a line between these modes is often difficult, since information and persuasion are combined in widely varying proportions. Newspaper advertising, accounting for a fourth of U.S. outlays in 1986, is preponderantly informative, although some insertions mislead more than they inform,⁴ and as any erstwhile home seller knows, even classified ads are written in persuasive fashion. Television advertising in the United States probably occupies the opposite extreme. A 1976 study examined 378 television commercials to determine whether they contained information on fourteen points such as price, quality, product performance, taste, nutrition, new ideas, warranties, etc.⁵ Only 49 percent of the insertions were found to be informative in the sense of satisfying at least one of the fourteen information content criteria. The

Table 16.1 Estimated U.S. Advertising Expenditures by Media in 1986

Medium	Billions of Dollars
Newspapers	26.99
Television	22.59
Radio	6.95
Magazines	5.32
Direct mail	17.15
Business papers	2.38
Farm publications	.19
Outdoor	.99
Miscellaneous	19.60
Total	102.14

Source: U.S. Bureau of the Census, *Statistical Abstract of the United States: 1988* (Washington: USGPO, 1988), p. 530, drawing upon McGraw-Hill data. The miscellaneous category includes all advertising expenditures not classified as television, newspaper, magazine, radio, direct mail, business papers, farm publications, outdoor, or miscellaneous.

Table 16.2 The Ten Leading Manufacturing Industries in Terms of Media Advertising/Sales Ratios, 1977

Industry	Industry Advertising as a Percent of Sales
Over-the-counter drugs preparations	20.2
Perfumes, cosmetics, and other toilet preparations	14.6
Soft drink syrups and other flavorings	13.8
Cutlery (including razor blades)	12.9
Cereal breakfast foods	11.4
Dog, cat, and other pet foods	11.0
Distilled liquors	11.0
Magazines and similar periodicals	10.3
Cigarettes	8.8
Soap and other cleaning preparations	8.0

Source: Federal Trade Commission, *Statistical Report: Annual Line of Business Report, 1977* (Washington: 1983), p. 17.

highest rate of informative advertising (60 percent) occurred during the evening; the lowest rate (33 percent) during weekday afternoons.

Search, Advertising, and Price Dispersion

If consumers lack information on the prices charged by alternative sources of a desired product or service, the vendors' ability to charge higher prices is enhanced. This imperfection can be lessened when consumers search, by foot or telephone, for the lowest price. In a seminal article, George Stigler showed that more search was warranted, and hence competition was more apt to drive prices toward equality, the larger the amount of the consumer's intended expenditure.⁶ When vendors advertise their prices, Stigler continued, "Search now becomes extremely

3. Federal Trade Commission, *Statistical Report: Annual Line of Business Report, 1977* (Washington: April 1983), pp. 26–41. Total selling expenses, including the cost of sales representatives, point-of-sale displays, coupons, samples, advertising allowances to retailers, and trade allowances as well as media advertising expenses, tend to be much larger, with a median value of 7.75 percent of manufacturers' sales in 1977. On reasons for the differing emphasis across industries on media advertising versus other selling expenses, see Leonard W. Weiss, George Pascoe, and Stephen Martin, "The Size of Selling Costs," *Review of Economics and Statistics*, vol. 65 (November 1983), pp. 668–672; and Richard E. Caves, "Information Structures of Product Markets," *Economic Inquiry*, vol. 24 (April 1986), pp. 195–212.

4. See, for example, "New York and Other States Cracking Down on Auto Ads," *New York Times*, November 19, 1988, p. 52, which observed that advertisements for new and used automobiles had become "so deceptive that dealers themselves can't live with them any more."

5. Alan Resnik and Bruce L. Stern, "An Analysis of the Information Content in Television Advertising," *Journal of Marketing*, vol. 41 (January 1977), pp. 30–33.

6. In a 1976 Harris poll, 46 percent of the 1,510 respondents believed that all or most television advertisements were seriously misleading. "Business, Public Out of Sync," *Advertising Age*, May 23, 1977, p. 102.

Explaining the content of television advertisements for automobiles, General Motors advertising executive Sean Fitzpatrick observed that "Image is not one way to differentiate yourself . . . It's the only way." The Chevrolet "Heartbeat of America" advertisements aired in 1988, he continued, "may look unorganized . . . but every detail is cold-heartedly calculated. People see the scenes they want to identify with; there's a Chevy for everyone. It's not verbal. It's not rational. It's emotional, just the way people buy cars." "On the Road Again, With a Passion," *New York Times*, October 10, 1988, p. A-10.

6. George J. Stigler, "The Economics of Information," *Journal of Political Economy*, vol. 69 (June 1961), pp. 213–223.

economical," and the tendency for price dispersion to vanish is limited only by the fact that not all consumers read the relevant advertisements.⁷ However, despite the considerable amount of price advertising in local newspapers and the opportunities for search, substantial price differences persist in consumer goods markets. Pratt, Wise, and Zeckhauser obtained price quotations on thirty-nine standardized consumer goods and services from an average of twelve suppliers each in the Boston metropolitan area during 1978. They found that on average, the standard deviation of quoted prices averaged 21.6 percent of average price quotations.⁸ Maximum quoted prices exceeded minimum quotations by an average of 120 percent. Our own regression analysis of their data reveals that the standard deviation of prices as a percentage of average prices was smaller for nationally known brands than for other items.⁹ Consistent with Stigler's search hypothesis, prices deviated less from their average, the larger the average transaction was. Contrary to the expectation that quality might vary more widely for services, the deviation was lower for services than for goods. However, the search and quality relationships were not statistically significant.

Advertising, Price Levels, and Quality

Despite the persistence of substantial price dispersion, there is reason to believe that advertising, and especially price advertising, can lead to lower service prices in local markets. The richest evidence on this point exists for the fitting of eyeglasses, since optometrists' and opticians' professional codes of ethics vary widely from state to state in the extent to which advertising is permitted. Analyzing the results of an unusually well-controlled Federal Trade Commission experiment, John Kwoka found that the examination prices of optometrists advertising in media other than the Yellow Pages were roughly 45 percent lower than comparable prices in cities where advertising was prohibited.¹⁰ In the cities permitting advertising, even the prices of nonadvertisers were lower, although only slightly so, than the averages for cities with no advertising. Nonadvertisers in cities permitting advertising provided examinations of somewhat higher quality than those of their peers in no-advertising cities, while the active advertisers conducted significantly less thorough examinations. Thus, consumers in cities with advertising had a choice between less thorough but much less expensive service and more thorough, higher-priced service. However, holding quality constant, consumers in the cities with advertising were served at prices that were lower on average.

Local consumer-oriented advertising could lead to lower prices by intensifying price competition among contending suppliers, or by permitting suppliers to attract more business than would otherwise be possible, thereby facilitating the realization of scale economies and hence cost savings.¹¹ Large chain optometrists in the Federal Trade Commission experiment had slightly lower prices than small-firm advertisers, suggesting that both effects may have been at work. Whether this result generalizes to other trades and to national as well as local markets is unknown, compelling us to reiterate Neil Borden's conclusion from an early comprehensive survey of the evidence that "it is impossible from cost data to trace a causal relationship between decreased production costs and advertising."¹²

A line of analysis articulated most fully by Robert L. Steiner suggests that even when it assiduously avoids mentioning prices, national advertising significantly affects consumer goods prices by altering the power relationships between manufacturers and their retailers.¹³ When a product appeals directly and successfully to

consumers through advertising, the relevant retailers are virtually forced to stock it or suffer a loss of customers to competitors who do carry the best-known brands. Facing relatively high elasticity of demand for such products because of the inter-retailer competition, monopolistically competitive retailers maximize their profits by accepting relatively slender price-cost margins.¹⁴ This proclivity is reinforced by two other phenomena: the belief by retailers that stocking well-known brands draws customers who, once attracted, will also buy higher-margin items; and the demonstrated tendency, at least with food store products, for nationally advertised brands to have higher shelf turnover, and hence to yield more profit per unit

7. *Ibid.*, p. 223.

8. John W. Pratt, David A. Wise, and Richard Zeckhauser, "Price Differences in Almost Competitive Markets," *Quarterly Journal of Economics*, vol. 93 (May 1979), pp. 206-207.

9. The estimated regression equation was:

$$\begin{aligned} \text{SIGMA/MEAN} &= 56.3 - .021 \text{ VALUE} \\ &\quad (3.75) \quad (0.60) \\ &\quad - 3.78 \text{ SERVICE} - 11.97 \text{ NATBRD} \\ &\quad (0.68) \quad (1.92) \\ &\quad - 8.36 \text{ SQRTNR}, R^2 = .224, N = 39; \\ &\quad (2.05) \end{aligned}$$

where SIGMA/MEAN is the ratio of the standard deviation of prices to mean reported prices (in percent), VALUE is the average value of the quoted transaction, SERVICE is a dummy variable for service (as contrasted to goods) quotations, NATBRD is a dummy variable with value of unity when nationally known branded items were requested, and SQRTNR is the square root of the number of price quotations sought. The values in parentheses are t-ratios. The SQRTNR variable is included because the number of quotations appears the denominator of the calculated standard deviations.

10. John E. Kwoka, Jr., "Advertising and the Price and Quality of Optometric Services," *American Economic Review*, vol. 74 (March 1984), pp. 211-216, extending an analysis by Ronald Bond et al., *Effects of Restrictions on Advertising and Commercial Practice in the Professions: The Case of Optometry*, Federal Trade Commission staff report (Washington: USGPO, 1980). An earlier study with similar findings for the dispensing of eyeglasses was Lee Bechthold, "The Effect of Advertising on the Price of Eyeglasses," *Journal of Law & Economics*, vol. 15 (October 1972), pp. 337-352.

Similar results were obtained with less satisfactory controls for the type and magnitude of advertising by attorneys in John R. Schroeder, Scott L. Smith, and Steven B. Cox, "Advertising and Competition in Routine Legal Services Markets," *Journal of Industrial Economics*, vol. 36 (September 1987), pp. 49-60.

11. In "Advertising, Information, and Prices—A Case Study," *Economic Inquiry*, vol. 19 (October 1981), pp. 661-671, Amihai Glazer reports that supermarket food prices in Queens, New York, rose relative to those on Long Island when a 1978 strike caused the three leading New York City newspapers to suspend publication while *Monday of Long Island* continued to publish. 12. There is an extensive but ultimately inconclusive theoretical literature on Edward H. Chamberlin's contention that product

differentiation, supported in part by advertising, leads firms into equilibrium on the falling segment of their long-run average total cost function, thereby sacrificing some scale economies. *The Theory of Monopolistic Competition* (Cambridge: Harvard University Press, 1933), Chapter 7. Significant contributions include Nicholas Kaldor, "The Economic Aspects of Advertising," *Review of Economic Studies*, vol. 18 (1950), pp. 1-27; Harold Demsetz, "The Nature of Equilibrium in Monopolistic Competition," *Journal of Political Economy*, vol. 67 (February 1959), pp. 21-30; Richard Schmalensee, "A Note on Monopolistic Competition and Excess Capacity," with a reply by Demsetz, *Journal of Political Economy*, vol. 80 (May/June 1972), pp. 586-597; Arthur S. De Vany and Thomas R. Saving, "The Economics of Quality," *Journal of Political Economy*, vol. 91 (December 1983), pp. 979-1000; and Melvin L. Greenhut, George Norman, and Chao-shun Hung, *The Economics of Imperfect Competition: A Spatial Approach* (Cambridge: Cambridge University Press, 1987), especially Chapters 18-20.

12. Neil H. Borden, *The Economic Effects of Advertising* (Chicago: Irwin, 1942), pp. 121-123.

13. Robert L. Steiner, "Does Advertising Lower Consumer Prices?" *Journal of Marketing*, vol. 37 (October 1973), pp. 19-26; and "Basic Relationships in Consumer Goods Industries," *Research in Marketing*, vol. 7 (1984), pp. 163-208. For a mathematical treatment, see Michael Lynch, "The Steiner Effect: A Prediction from a Monopolistically Competitive Model Inconsistent with any Combination of Pure Monopoly or Competition," Federal Trade Commission Bureau of Economics working paper no. 141 (August 1986).

That price advertising in national magazines is infrequent is shown through a survey by Alfred Auerburn and John Woodbury, "Advertising, Price Competition and Market Structure," *Southern Economic Journal*, vol. 47 (January 1981), pp. 763-775. The fraction of insertions mentioning price averaged 29 percent, with a range of from 0 percent in several food categories to 100 percent for games and toys (the original focus of Steiner's manufacturer-retailer power observations). Price advertising was more common in less concentrated industries. It fell with the intensity of advertising in convenience goods industries (those in which small purchases are made repetitively) but rose in convenience goods industries.

14. See the profit-maximizing price-cost margin formula derived in Chapter 2, note 36, and p. 229 *supra*.

of shelf space with a given price-cost markup.¹⁵ Whether the lower retail margins on advertised items translate into lower prices for consumers is less clear. Products with strong consumer franchises can command relatively high wholesale prices, all else (including manufacturing and distribution scale economies) held equal, and the sum of the high wholesale price plus a thin retailing margin may be a high retail price. However, the outcome can reverse if a product line has entered a relatively mature life cycle phase in which highly advertised brands face strong price competition from other advertised brands or unadvertised (for example, private-label) brands recognized by consumers to be of comparable quality. Then the combination of strong competition among retailers to stock well-known brands plus strong competition among manufacturers for consumers' patronage may mean that consumer prices will be lower than they would be in the absence of national advertising.¹⁶ We shall have more to say about these tendencies in a later section.

A quite different explanation of the informational role advertising plays was advanced initially by Phillip Nelson.¹⁷ He argued that no matter how little solid information advertisements contain, they at least signal to would-be consumers that a product exists and that the originator is sufficiently confident of the product's merits to spend money advertising it. For experience goods, that is, products whose quality can only be ascertained through actual consumption experience rather than prepurchase inspection, the advertisements say in effect, "Try me, you'll like me." If trial is induced and the consumer finds the product satisfactory, repeat purchases ensue. The greater a product's superiority, the higher will be the probability of repeat purchases, and hence the larger is the stream of continuing profits anticipated by a firm using advertising to induce trial, and thus the more it pays to advertise. From this, Nelson concludes that the most highly advertised products are in fact the best buys.

The Nelson theory has been subjected to rich elaboration, revealing that its implications are sensitive to variations in the assumptions. When consumers have difficulty assessing quality even after trial, or when prices rise less rapidly than production costs with increasing product quality, paradoxes may arise, for example, poor-quality brands may advertise as heavily as the best brands.¹⁸ If some consumers choose products on the basis of advertising while others search for the best buys, advertising may signal goods to be of more uniform quality, but not the best quality.¹⁹ And consumers may be guided by high prices as well as, or instead of, high advertising as signals of high quality.²⁰

Tests of these "signaling" theories of advertising and price have yielded equivocal results. One problem is that quality is often multidimensional, and a product superior on one attribute is commonly inferior on another, so no unambiguous correlation with unidimensional signals such as advertising outlays or price may exist. Investigating 10,162 brands in 685 product categories, Peter Reisz found only a weak average correlation of 0.26 between prices and the quality ratings assigned through Consumers Union tests.²¹ In a more narrowly focused study, Archibald and colleagues found that prices and advertising levels for 187 individual runners' shoe designs were only weakly correlated with quality ratings by the magazine *Runner's World* before those ratings were published, but *after* the ratings were published, the advertising correlation jumped to +0.61.²² The price correlation, on the other hand, changed only slightly. The implication appears to be that

the availability of an authoritative, "advertisable" mark of superior quality stimulated advertising by the high-quality producers. However, this finding may not generalize to other products, at least in the United States, since the leading source of objective quality evaluations, *Consumer Reports*, unlike *Runner's World*, does not allow advertisers to quote its ratings.

Other Reputation Effects

Whether or not it is related in any close way to advertising levels, the information created through image differentiation can help consumers select products of high quality and reliability and motivate producers to maintain adequate quality standards. If there were no brand names and trademarks, the consumer might never be sure who made a product, and she would have difficulty rewarding through repeat purchases manufacturers who achieve high quality, or cater to her special tastes. This is a lesson that dawned late but forcefully upon Soviet Union economic planners, who found that requiring consumer goods manufacturers to imprint their individual "production marks" on products helped guard against

15. For new survey evidence that retail margins are lower on nationally advertised food items, see Mark S. Allmon, *Advertising's Hidden Effects: Manufacturers' Advertising and Retail Pricing* (Boston: Auburn House, 1983). For statistical evidence that the relationship may not carry over to products sold in other specialized retail outlets, see Weiss et al., "The Size of Selling Costs," *supra* note 3, p. 670.
16. In a survey of 2,700 *Harvard Business Review* subscribers, 82 percent of them business managers, 49 percent believed that on balance advertising led to higher prices, while 35 percent believed it led to lower prices. Stephen A. Greyser and Bonnie B. Reese, "Businessmen Look Hard at Advertising," *Harvard Business Review*, vol. 49 (May-June 1971), p. 26.
17. Phillip Nelson, "Advertising as Information," *Journal of Political Economy*, vol. 82 (July/August 1974), pp. 729-754.
18. See Richard Schmalensee, "A Model of Advertising and Product Quality," *Journal of Political Economy*, vol. 86 (June 1978), pp. 485-503; Yehuda Kotowitz and Frank Mathewson, "Advertising, Consumer Information, and Product Quality," *Bell Journal of Economics*, vol. 10 (Autumn 1979), pp. 566-588; Carl Shapiro, "Consumer Information, Product Quality, and Seller Reputation," *Bell Journal of Economics*, vol. 13 (Spring 1982), pp. 20-35; and Richard E. Kihlstrom and Michael Riordan, "Advertising as a Signal," *Journal of Political Economy*, vol. 92 (June 1984), pp. 47-60.
19. The paradoxes that arise here are a variant of the "lemons" problem formalized by George Akerlof in "The Market for Lemons," *Quality Uncertainty and the Market Mechanism*, *supra* note 3, pp. 488-500. See also Hayne E. Leland, "Quacks, Lemons, and Licensing: A Theory of Minimum Quality Standards," *Journal of Political Economy*, vol. 87 (December 1979), pp. 1328-1346. Tests of the lemons hypothesis for used truck and car markets have been inconclusive. See Eric W. Bond, "A Direct Test of the Lemons Model: The Market for Used Pickup Trucks," *American Economic Review*, vol. 72 (September 1982), pp. 836-840, with comment by Michael D. Pratt and George Hoffer and reply by Bond, *American Economic Review*, vol. 74 (September 1984), pp. 798-804; and James M. Lusk, *Product Quality and Information in the Used Car Market*, Federal Trade Commission Bureau of Economics staff report (Washington: April 1986).
19. Steven N. Wiggins and W. J. Lane, "Quality Uncertainty, Search, and Advertising," *American Economic Review*, vol. 73 (December 1983), pp. 881-894.
20. Paul Milgrom and John Roberts, "Price and Advertising Signals of Product Quality," *Journal of Political Economy*, vol. 94 (August 1986), pp. 796-821; Benjamin Klein and Keith B. Leffler, "The Role of Market Forces in Assuring Contractual Performance," *Journal of Political Economy*, vol. 89 (August 1981), pp. 615-641; Asher Wolinsky, "Prices as Signals of Product Quality," *Review of Economic Studies*, vol. 50 (October 1983), pp. 647-658; and Alan Schwartz and Louis Wilde, "Product Quality and Imperfect Information," *Review of Economic Studies*, vol. 52 (April 1985), pp. 251-262.
21. Peter C. Reisz, "Price versus Quality in the Marketplace, 1961-1975," *Journal of Retailing*, vol. 54 (Winter 1978), pp. 15-28. See also Christian Hjorth-Anderson, "Price and Quality of Industrial Products: Some Results of an Empirical Investigation," *Scandinavian Journal of Economics*, vol. 83, no. 3 (1981), pp. 372-389, who obtained similar results in a study of 87 Danish products. Thomas Russell and Richard Thaler, "The Relevance of Quasi-Rationality in Competitive Markets," *American Economic Review*, vol. 75 (December 1985), pp. 1078-1080, summarize two studies showing that the highest-priced air conditioners had the best energy efficiencies and the highest-priced dishwashing liquids the greatest washing power per ounce and penny. The implication drawn by Russell and Thaler is that consumers often focus on product dimensions (e.g., bulk or price per se) that are imperfect indicators of value.
22. Robert B. Archibald, C. A. Haulman, and C. E. Moody, "Quality, Price, Advertising, and Published Quality Ratings," *Journal of Consumer Research*, vol. 9 (March 1983), pp. 347-353.

deteriorating quality standards.²³ And although there may be incentives to cash in on a good reputation by letting the quality of infrequently purchased durable goods deteriorate,²⁴ the costs of quality failures serious enough to attract public attention are plainly significant. When pharmaceuticals and automobiles were recalled or taken off the market because of late-emerging product hazards, company stock prices declined much more than the cost of remedying the problems, suggesting that the companies also suffered reputation effects impairing the sale of other, possibly unrelated products.²⁵ A market survey revealed that 90 percent of the buyers experiencing costly problems with purchased durable goods did not make additional purchases from the offending manufacturer if nothing was done to correct the problem, but that 54 percent remained loyal when complaints were satisfactorily handled.²⁶

For an auto manufacturer, the discounted present value of sales gained by keeping buyers satisfied over their lifetimes was estimated at \$142,000; for a supermarket, \$22,000 over a five-year period.²⁷ The research that yielded these estimates was motivated in part by recognition that in the past, manufacturers did not take sufficient precautions to control quality at levels maintaining their reputations. Whether image-preserving performance will improve in the future remains to be seen.

Trademarking and brand labeling also contribute in subtle ways to distributional efficiency.²⁸ Without them, the conscientious shopper would have to make repeated inquiries about experience goods susceptible to quality or taste variations, asking whether a particular product was good, what its distinguishing characteristics were, and perhaps (as in the almost bygone days of the pickle barrel) whether he might try a sample. This takes a great deal of time for both merchants and shoppers, increasing transaction costs—the more so, the more prosperous consumers are, and hence the greater is the opportunity cost of their time. The information conveyed by brand names on goods whose characteristics vary little from week to week makes it possible to have convenient self-service shopping and hence to realize the efficiencies of supermarkets. Whether mere trademarking is sufficient to achieve this desirable end, or whether brand images must be reinforced by advertising of greater or lesser intensity, remains uncertain.

Advertising and Product Innovation

Whether or not information on price and other objective attributes is provided, advertising also communicates the availability of new products, accelerating first trial and helping innovators tap larger markets more rapidly. This in turn enhances the profits from innovation and strengthens incentives for timely investment in product R&D.²⁹ How intense advertising must be to achieve this function is debatable. As a glance at Table 16.2 reveals, the fields in which advertising outlays are highest in relation to sales are not exactly those in which human welfare has taken giant strides through technological change. Statistical investigations suggest that R&D/sales ratios are higher in industries with relatively intense advertising. However, the estimated relationship is weakest, falling short of statistical significance, in the study using the highest-quality data and the most extensive controls for other R&D-influencing variables.³⁰ Thus, although advertising almost surely facilitates the introduction of technologically new products, the effect probably operates within modest thresholds, subject to attenuation at high advertising intensities.

More Global Effects

Advertising also has several broader effects on the provision of information and the quality of life. For one, it is an important source of revenue to the mass communications media, upon which citizens depend for information on many things other than the products they consume. During the late 1970s, the sale of advertising space or time provided roughly 71 percent of American newspapers' gross revenues, half of general periodicals' revenues, and (excluding educational stations) virtually all the revenue of radio and television broadcasters.³¹ For the typical newspaper, the marginal cost of printing an extra copy is less than the revenue received from readers, but newsstand and subscription revenue is profitably supplemented by the higher advertising charges that can be levied with additional readership. Such contributions are a mixed blessing. They may undermine what might otherwise be an important external benefit of the mass media—the cultivation of a sensitive, informed public. Consumer goods advertisers tend to favor media that will transmit their message to the largest relevant audience, and when radio frequency band restrictions or economies of scale severely limit the number of television stations or newspapers, the media attempt to maximize audience size by appealing to the lowest common denominator. The result is the scandal sheet and television's "vast wasteland," to quote the words of Federal Communications Commission chairman Newton Minow, as true now as when they were uttered in 1961. Indeed, many TV programs are of such low intellectual caliber that the commercials stand out as a refreshingly sophisticated interlude.

On a quite different plane, there has been a lively but thus far inconclusive debate over whether advertising, and especially the persuasive advertising that alters consumers' preferences, adds more to economic welfare than its costs.³²

23. See Marshall Goldman, "Product Differentiation and Advertising: Some Lessons from Soviet Experience," *Journal of Political Economy*, vol. 68 (August 1960), pp. 346-357. For a more critical view, see Philip Hanson, *The Consumer in the Soviet Economy* (London: Macmillan, 1969), pp. 204-206.
24. See, for example, Kotowitz and Mathewson, "Advertising," and Shapiro, "Consumer Information," supra note 18. Compare C. G. von Weizsäcker, *Barriers to Entry* (Berlin: Springer, 1980), Chapters 5 and 6.
25. Gregg Jarrell and Sam Peltzman, "The Impact of Product Recalls on the Wealth of Sellers," *Journal of Political Economy*, vol. 93 (June 1985), pp. 512-536.
26. See "Making Service a Potent Marketing Tool," *Business Week*, June 11, 1984, p. 165; and "Complaints? I Love 'em," *The Economist*, November 5, 1988, p. 78.
27. "Making Service," p. 167. See also Borden, *The Economic Effect of Advertising*, supra note 12, pp. 631-632 and 866.
28. See, for example, William M. Landes and Richard A. Posner, "Trademark Law: An Economic Perspective," *Journal of Law and Economics*, vol. 30 (October 1987), pp. 265-309.
29. See F. M. Scherer, "Research and Development Resource Allocation under Rivalry," *Quarterly Journal of Economics*, vol. 81 (August 1967), pp. 368 and 388; and Yehuda Kotowitz and Fred Mathewson, "Informative Advertising and Welfare," *American Economic Review*, vol. 69 (June 1979), pp. 284-294.
30. Jhn Lunn and Stephen Martin, "Market Structure, Firm Structure, and Research and Development," *Quarterly Review of Economics and Business*, vol. 26 (Spring 1986), pp. 31-44. See also Stephen Farber, "Buyer Market Structure and R&D Effort: A Simultaneous Equations Model," *Review of Economics and Statistics*, vol. 63 (August 1981), pp. 336-345; David G. Hula, "Advertising, New Product Profit Expectations, and the Firm's R&D Investment Decisions," *Applied Economics*, vol. 20 (January 1988), pp. 125-142; and (on pharmaceuticals only) Keith B. Lefler, "Persuasion or Information? The Economics of Prescription Drug Advertising," *Journal of Law & Economics*, vol. 24 (April 1981), pp. 45-74.
31. U.S. Bureau of the Census, *Statistical Abstract of the United States: 1979* (Washington: USGPO, 1979), p. 591. Later editions lack comparable data.
32. See Avinash K. Dixit and Victor D. Norman, "Advertising and Welfare," *Bell Journal of Economics*, vol. 9 (Spring 1978), with comments by Franklin Fisher, John McGowan, and Carl Shapiro and replies by Dixit and Norman, *Bell Journal of Economics*, vol. 10 (Autumn 1979), pp. 726-729 and vol. 11 (Autumn 1980), pp. 749-754. The debate continues on, but in the end misses the point of, the analysis in Chapter 15, pp. 352-348 supra.

For analyses of advertising's effects from more qualitative perspectives, see Julia Henry, *Culture Against Men* (New York: Random House, 1965), Chapters 2 and 3; Walter Taplin, *Advertising: A New Approach* (Boston: Little, Brown, 1963); and Michael Schudson, *Advertising the Unwary Persuasion* (New York: Basic Books, 1984).

Often overlooked in such debates is the fact that advertising can destroy utility along with creating it. Much advertising leads consumers to make introspective comparisons between their own well-being and that of people they admire or would like to emulate. Translated into economic jargon, advertising seeks to make the utility of individual consumers depend not only upon the goods and services they themselves consume, but also upon the consumption decisions of their peers. It renders utility functions interdependent, generating external diseconomies in consumption. To be sure, by purchasing an advertised product in response to the message that they are not consuming what the "right" people consume, individuals may feel they are gaining something worthwhile. But it is not clear they have done any more than return to the satisfaction level they would have maintained without the persuasive assault on their preference structures.

Finally, it is sometimes urged that advertising has macroeconomic effects, for example, through the direct contribution advertising activity makes to aggregate demand and the indirect impact of persuasive advertising in altering marginal propensities to consume. On the first point, the evidence is clear. Advertising expenditures are mildly destabilizing to the macroeconomy, rising in booms and falling during recessions.³³ On the second point, a mixed and more uncertain verdict must be rendered. Analyses of the time-series relationship between aggregate advertising outlays and changes in national consumption or saving have yielded conflicting results, with negative findings emerging *inter alia* from the most recent studies using relatively new Granger-Sims techniques for ascertaining causal priority.³⁴ It is questionable, however, whether there is enough year-to-year variation in national aggregates for even the most powerful time-series methods to extract conclusive results. A more promising but largely neglected approach might be the analysis of differences in advertising and savings rates across nations. Advertising expenditures as a percent of gross national product, averaged over the years 1977 to 1980, varied widely among relatively industrialized nations, for example, 0.33 percent for Italy, 0.45 percent for Sweden, 0.84 percent for West Germany, 0.93 percent for Japan, 1.28 percent for the United Kingdom, and 1.59 percent for the United States.³⁵ For fifteen such nations, the simple correlation between 1977-1980 advertising/GNP ratios and the ratio of 1978-1981 personal saving to disposable household income was -0.35 . The more intense national advertising was, the lower the savings rate. However, advertising intensities were positively correlated with gross national product per capita, which in turn was negatively correlated with savings rates ($r = -0.50$). When both advertising intensities and GNP per capita were included as independent variables in a regression seeking to explain international savings rate differences, both had negative coefficients, but neither was statistically significant.³⁶ Further work with richer data and a more fully specified econometric model is needed to determine whether advertising in fact tends to raise consumption propensities.³⁷

Advertising, Image, and Monopoly Power

Some advertising, by increasing consumers' objective knowledge about product alternatives and prices, helps perfect competition. Other advertising, by creating or reinforcing consumer preferences for particular brands and making the de-

mand for those differentiated brands less elastic, can increase monopoly power. How these effects balance out is vigorously disputed. Here we begin our analysis of the monopoly nexus.

That prices are affected when a product has a superior image linked (in ways yet to be pinpointed) with advertising is readily apparent from a trip through any supermarket. One of the clearest cases is old-fashioned liquid laundry bleach, which is offered as a rigidly standardized 5.25 percent sodium hypochlorite solution. Visits to five retail food stores in the western Philadelphia suburbs during October 1988 revealed prices for two-quart containers of nationally advertised Clorox of \$1.09 (twice), \$1.09, and (in a Seven-Eleven convenience outlet) \$1.15. Local and private-label brands were available in the three larger stores, in each instance in an adjacent shelf position, at prices 14 to 40 percent lower than that of Clorox. An older example particularly well documented because of an (ultimately unsuccessful) antitrust suit concerns reconstituted bottled lemon juice. The product is easy to make, and (with minor exceptions) the diverse producers' offerings were physically identical. The leading seller's 1971 marketing plan stated as its objective:

Although reconstituted lemon juice is virtually indistinguishable one brand from another, heavy emphasis on the RealLemon® brand through its media effort should create such memorability for the brand, that an almost imaginary

33. See Borden, *The Economic Effects*, supra note 12, pp. 735-750 and 865-866; Julian Simon, *Issues in the Economics of Advertising* (Urbana: University of Illinois Press, 1970), pp. 67-74; Richard Schmalensee, *The Economics of Advertising* (Amsterdam: North-Holland, 1972), pp. 56-75; and Ingo Böbel, "Advertising and Economic Development: The West German Experience During the 1970s," *Journal of Advertising*, vol. 1 (July-September 1982), pp. 237-252.

34. Advertising was found to have a positive influence on aggregate consumption in Lester D. Taylor and Daniel Weisberg, "Advertising and the Aggregate Consumption Function," *American Economic Review*, vol. 62 (September 1972), pp. 642-653; William S. Conrator and Thomas A. Wilson, *Advertising and Market Power* (Cambridge: Harvard University Press, 1974), Chapter 5; and (for Australia) M. M. Metwally and H. U. Tamaschke, "Advertising and the Propensity to Consume," *Oxford Bulletin of Economics and Statistics*, vol. 43 (August 1981), pp. 273-284. Negative interferences were drawn by Richard Schmalensee, *The Economics of Advertising*, supra note 33, pp. 48-86; Simon, *Issues*, supra note 33, pp. 193-206; R. Ashley, C. W. J. Granger, and R. Schmalensee, "Advertising and Aggregate Consumption: An Analysis of Causality," *Econometrica*, vol. 48 (July 1980), pp. 1149-1167; and Brian T. Stuegem and Nicholas Wilson, "Advertising Expenditure and Aggregate Consumption in Britain and West Germany: An Analysis of Causality," *Managerial and Decision Economics*, vol. 5 (December 1984), pp. 219-227.

35. "Trends in Total Advertising Expenditures in 29 Countries, 1970-1980," *Journal of Advertising*, vol. 1 (January-March 1982), pp. 37-48. Only the data for OECD member nations (that is, the

more industrialized nations) are analyzed here. Personal saving data were obtained from Organization for Economic Cooperation and Development, *Historical Statistics: 1960-82* (Paris: 1984), Table 6-18; and GNP per capita data from U.S. Bureau of the Census, *Statistical Abstract of the United States: 1980* (Washington: USGPO, 1980), p. 910.

36. The regression was:

$$\begin{aligned} \text{SAVING} &= 22.6 - 3.03 \text{ ADVERT} \\ &\quad (5.15) \quad (0.93) \\ &\quad - 0.77 \text{ GNP/CAP}, R^2 = .303 \\ &\quad (1.73) \end{aligned}$$

where SAVING is 1978-1981 personal saving as a percent of personal disposable income, ADVERT is 1977-1980 advertising as a percent of gross national product, and GNP/CAP is 1978 gross national product in thousands of dollars per capita. T-ratios are in parentheses. Despite one chance in three that the true effect is zero, the ADVERT effect is not trivial: a two standard deviation increase in advertising implies a 2.4 percentage point reduction in the savings rate.

37. For a much more richly specified model explaining advertising/GNP ratios for 1968-1979 samples covering forty-three nations, see Seymour Banks, "Cross-National Analysis of Advertising Expenditures: 1968-1979," *Journal of Advertising Research*, vol. 26 (April/May 1986), pp. 11-16. Banks finds a cluster of variables closely associated with the level of economic development (for example, GNP per capita) to be the strongest positive predictor of advertising intensities.

superiority would exist in the mind of the consumer, a justification for paying the higher price we are asking.³⁸

Recognizing their name as "one of the greatest brand names in the history of the supermarket," RealLemon's producers were able in 1973 to command a sixty-two-cent price for their product and capture 80 percent of all reconstituted lemon juice sales while the price of the principal competitive brand, Golden Crown, was forty-six to forty-eight cents.³⁹

These cases are apparently not exceptional. Double-blind experiments have repeatedly demonstrated that consumers cannot consistently distinguish premium from popular-priced beer brands, but exhibit definite preferences for the premium brands when labels are affixed—correctly or not.⁴⁰ More generally, the staff of the National Commission on Food Marketing found through a sample survey of ten canned and bottled food products that the price of the most popular nationally advertised brand sold in chain stores was 21.5 percent higher on average than the prices for private-label items of comparable quality.⁴¹ A survey of from forty-six to fifty-seven products sold by three food chains in 1974 revealed that private-label product prices averaged 8 to 13 percent less than national brand prices.⁴²

Price differentials between nationally branded and less well-known items appear to be especially large for medicinal products. A 1989 shopping trip in the Western Philadelphia suburbs revealed 100-tablet bottles of Bayer aspirin to be priced between \$4.39 and \$4.59 in three drug stores and at \$7.11 in an outlet serving the captive Swarthmore College student market. Generic aspirin could be obtained at prices between \$1.19 and \$2.19 per 100 tablets, the highest price again prevailing in the store adjoining Swarthmore College's campus. In a similar experiment eleven years earlier, the cheapest brand was purchased and found to have a binder inferior to Bayer's; its dissolving time on the tongue was roughly thirty-five seconds, compared to twenty-two seconds for Bayer. That the level of prices depends upon the strength of one's trademark position is suggested through an international comparison. In West Germany, the Bayer Company (which held the original patent) has exclusive rights to the name "Aspirin" as well as "Bayer;" others must use different brand designations or the generic name acetylsalicylic acid (equally jaw-breaking in German). A survey of three West German pharmacies in 1989 revealed the prices of Bayer "Aspirin" clustered tightly about an average value of \$6.03 for 100 tablets.⁴³

How does a firm obtain a superior brand image, permitting the maintenance of price differentials relative to less well-known brands? And what role does advertising play in image creation?

That advertising matters is shown by the history of the U.S. beer industry. The industry is unique in the sense that more than 700 participants came off the starting blocks virtually simultaneously in 1933, when the thirteen-year constitutional ban on the production and sale of alcoholic beverages was repealed. Unlike the vast majority of brewers, who viewed their markets as essentially local, a few Midwestern brewers—notably, Anheuser-Busch (Budweiser), Schlitz, Pabst, and Miller—chose at that time to market their products nationally. Since transportation costs from the Midwest to the east and west coasts added 25 to 30 percent to

costs, higher prices had to be charged, and to justify the higher prices absent recognizable taste or quality differences, the national sellers advertised their brands as "premium," justifying a price differential over "popular" local brands. At first this strategy allowed the premium brands to capture only a few percent of the national market, but as increasingly prosperous consumers sought to trade up to higher quality during the 1950s and 1960s, the national brewers gained market share rapidly, reinforcing their growth with heavy advertising. The retention of a premium image was not, however, automatic. After encountering marketing setbacks during the 1960s, Pabst experimented with systematic reductions in its price to "popular" levels. At first this paid off in significant volume gains, but as the price reductions were extended, Pabst found that its premium image had been eroded, and in most states it was unable to return to premium-price levels. The image of Schlitz, once the nation's leading seller, was tarnished during the 1970s through a product reformulation that failed to capture consumers' approval.⁴⁴ The field was left to Budweiser and Miller, joined by Coors, which had pursued a later move to national premium status.

Equally informative is the story of the U.S. industry's most significant post-Prohibition innovation, "light" beer. When it was acquired by Miller in 1972, Meister Brau, Inc. had been selling small quantities of a light beer, one of several on the market, targeted toward diet-conscious women. Reconsidering the acquired brand's potential, Miller discovered through in-depth marketing research that an important market segment was badly served: its members wanted to guzzle numerous beers in a sitting, but were concerned about the weight gain consequences. Miller therefore retargeted its acquired "Lite" brand toward heavy drinkers, supporting it with a massive television advertising campaign featuring charismatic sports heroes proclaiming that with Miller Lite, they could drink as much as they wanted without feeling filled up. Its success was spectacular. By

38. Quoted in the initial decision of the administrative law judge in *The Matter of Borden, Inc.*, 92 F.T.C. 669 (1978), para. 83.

39. For a dissenting view, suggesting that lower-priced brands may on occasion have experienced random or deliberate quality variations, see Clement G. Krouse, "Brand Name as a Barrier to Entry: The RealLemon Case," *Southern Economic Journal*, vol. 51 (October 1984), pp. 498-492.

40. *In re Borden*, para. 75, 81, and 82.

41. Douglas F. Greer, *Industrial Organization and Public Policy* (New York: Macmillan, 1980), pp. 87-90.

42. U.S. National Commission on Food Marketing, *Special Studies in Food Marketing*, Technical Study No. 10 (Washington: USGPO, June 1966), p. 65.

43. Willard F. Mueller et al., *The Profit and Price Performance of Leading Food Chains, 1970-74*, report issued by U.S. Congress, Joint Economic Committee (Washington: USGPO, April 1977), p. 97.

44. The German tablets were in a 500-mg. dosage size while the standard American tablets contained only 324 mg. A price adjustment was made to compare identical dosage sizes. The prevailing exchange rate of \$1 = DM 1.88 was used. If the U.S.

market basket purchasing power parity rate of approximately DM 2.30 is used, the Bayer price average for Germany was \$4.93.

Non-Bayer branded acetylsalicylic acid tablets were available at an average price of \$2.59 at prevailing exchange rates or \$2.11 at purchasing power parity.

For a fascinating history of the discovery and marketing of aspirin and its newer substitutes and an analysis of the continuously misleading advertising used to differentiate brands, see Charles C. Mann and Mark L. Plummer, "The Big Headache," *The Atlantic Monthly*, October 1986, pp. 39-57.

44. Carling's, once the leading beer brand in Canada, lost its position when an additive used in Quebec proved to be lethal to a few consumers who drank prodigious quantities daily.

In automobiles, inept styling and inattention to other aspects of quality caused Cadillac to lose its image as the premier U.S. luxury car to Mercedes and BMW. See "Europe's Luxury Models Defy the Sales Slump," *Business Week*, August 9, 1982, p. 25; "Cadillac Seeks Sales To Match Its Image," *Advertising Age*, September 9, 1983, p. 10; and "Cadillac's Alltime Struggles," *New York Times*, November 16, 1987, p. D-1.

1986, every major brewer had its own imitation, and the light beer market had expanded to 37 million barrels, or 19 percent of all beer sold nationally. Yet Miller's "Lite," costing less to produce than premium beer but selling at premium prices, retained 54 percent of the product segment it had pioneered.

In beer, premium images rested upon what (in hindsight) proved to be astute product positioning reinforced by appropriate advertising. New technology played no significant role. For a different perspective, we draw upon a Federal Trade Commission study of pharmaceuticals that yielded results radically different from the hypotheses with which it began.⁴⁵ Believing that technological advance and patent protection were crucial variables in establishing leading pharmaceutical market positions, the FTC staff selected for detailed research two quite different product groups, one with significant technological breakthroughs and heavy patenting and one without.

In the oral diuretic (that is, body fluid- and hence hypertension-reducing) drug field, Merck made a key technical advance leading to the introduction in 1938 of the product Diuril (chlorothiazide). Inventing around Merck's patent proved to be easy, and within two years ten other firms were offering therapeutically equivalent substitutes. Yet thirteen years later, after further entry had occurred and improved products had been fielded by several competitors, Merck retained a 33 percent share of the oral diuretic market, despite the fact that it spent only three-eighths as much per sales dollar as its rivals on sales promotion and charged a price four times as high as Abbott Laboratories' chemically equivalent brand of hydrochlorothiazide. Among Merck's competitors, those who captured the largest market shares were for the most part those whose products first offered important therapeutic advantages over the pioneering diuretics.

The experience of Warner-Lambert with its pioneering drug Peritrate (that is, pentaerythritol tetranitrate — PETN) for angina pectoris therapy was surprisingly similar. Warner-Lambert introduced Peritrate in 1952, attracted nearly one hundred competitors, charged prices averaging five to six times higher than chemically identical substitutes, and spent less on promotion per sales dollar than rivals; and yet two decades later, it retained a 30 percent share of the antianginal drug market. Compared to the oral diuretic case, there were only two noteworthy differences. First, Warner-Lambert was neither the technological inventor nor the first to use PETN in treating angina pectoris. Rather, its contribution was to take that already known and unpatented entity, give it a brand name, and promote it vigorously to physicians for anginal therapy, in which nitroglycerin and various nitrates had previously been the drugs of choice. Second, the promotion of Peritrate and similar nitrates emphasized their use in long-term prophylactic therapy, but objective studies cast doubt over whether the early versions were in fact more effective than older entities or even a placebo.⁴⁶ Thus, in the case of Peritrate, as in beer, it was marketing innovation, not technological innovation, that gave Warner-Lambert a highly profitable image advantage.

Innovation is the key word emerging from these and other studies of leading brands' image advantages. It is questionable whether a superior image can be created simply by advertising vigorously. Rather, something more is needed. That "something more" is usually an innovative act of some sort. The innovation may be technological, as in the case of Diuril, or it may be rooted in advertising, but

add new insights into the uses of a product, as with Peritrate and Lite beer. Whatever its source, the image advantage that comes from consumer recognition as the first mover in some product category may permit its possessor to hold prices above costs for significant periods of time while retaining a large share of the relevant market.

The links between image advantages, market share, and a history of having been a first mover have received impressive statistical confirmation. The PIMS (Profit Impact of Market Strategies) data base is unique in providing quantitative information on all three variables (plus many others) for numerous narrowly defined business units. Participating units were asked *inter alia* whether, at the time they first entered the relevant market, they were "one of the pioneers in first developing such products or services," "an early follower," or a later entrant. They also estimated the percentage of their sales volume comprising products *perceived by consumers* to be superior in quality to those of their three leading competitors.⁴⁷ The "relative quality" variable is avowedly subjective, emphasizing consumers' perception rather than imposing an objective standard, and hence corresponds closely to the notion of product image. For a sample of consumer goods industries, Robinson and Fornell found that having been a pioneer added 21 percentage points to a business unit's relative product quality index (whose overall sample mean was 24).⁴⁸ The pioneer's image impact was only half as great, however, for mature products—that is, those in which the pioneering occurred twenty or more years earlier. In a separate analysis, Robinson found that perceived relative quality rose by only 7.6 percentage points on average in pioneering businesses selling *industrial* products, whose customers are more apt to judge sellers on the basis of careful objective analysis than from subjective reputation.⁴⁹ In both consumer goods and industrial product businesses, pioneers also had significantly broader product lines than their followers. Higher perceived quality led in turn to prices higher than those of competitors and (in conjunction with product line breadth) to substantially greater market shares. With all influences combined, pioneers had market shares 23.6 percentage points higher than those of late entrants in consumer goods lines and 17.2 points higher in industrial goods lines, although the advantages declined to 12.8 and 13.0 percentage points respectively in lines where the pioneering had occurred twenty or more years earlier. The pioneers' market share gains were greatest in consumer product lines with low purchase prices and low

45. Ronald S. Bond and David F. Lean, *Sales, Promotion, and Product Differentiation in Two Prescription Drug Markets*, Federal Trade Commission staff report (Washington: USGPO, February 1977); and idem, "Consumer Preference, Advertising, and Sales: On the Advantage from Early Entry," Federal Trade Commission Bureau of Economics working paper no. 14 (October 1979).

46. See Bond and Lean, *Two Prescription Drug Markets*, pp. 132-140. (See also (on more recent developments) Peter O. Oberender, "The Benefit Analysis of Angina Prophylaxis in the Federal Republic of Germany," in W. van Eimeren and B. Horiberg, eds., *Economic Evaluation of Drug Therapy* (Berlin: Springer, 1980), pp. 132-140.)

47. Strategic Planning Institute, *PIMS Data Manual* (Cambridge, February 1978), p. 3-50.

48. William T. Robinson and Claes Fornell, "Sources of Market Pioneer Advantages in Consumer Goods Industries," *Journal of Marketing Research*, vol. 22 (August 1985), pp. 305-317. As earlier but more limited analysis in the same spirit was Robert D. Buzzell and Paul Ferris, "Marketing Cores in Consumer Goods Industries," in Hans Thordahl, ed., *Strategy + Structure = Performance* (Bloomington: Indiana University Press, 1977), pp. 122-145. They found that consumer goods pioneers spent 1.45 cents per sales dollar less on advertising and promotion than early followers, who in turn had a 2.1 cent advantage over late entrants, all else equal.

49. William T. Robinson, "Sources of Market Pioneer Advantages: The Case of Industrial Goods Industries," *Journal of Marketing Research*, vol. 25 (February 1988), pp. 87-94.

The Pricing Implications of Image Advantages

purchase frequencies—that is, those for which search may be more trouble than it is worth and learning by trial and error relatively slow. They were lower in consumer product lines with annual or periodic design changes and even more so in lines with seasonal product changes—those in which reputation or image might be considered a less reliable basis for judging new offerings.

A clear recognition of the links between being a first mover in some product line and monopoly power—that is, the ability to hold prices above costs while defending a sizable market share—emerged from several empirical studies during the 1970s. The next task was to shape a theory that fit the facts. There have been several contributions. Here we characterize the work of the first mover, Richard Schmalensee.³⁰

Schmalensee's analysis focuses on experience goods, whose properties can be ascertained by trial. The first key question is, when will a consumer try some product? Trial will occur, Schmalensee argues, when the discounted present value of consumer's surplus expected through trial exceeds the similarly discounted consumer's surplus expected from continuing to use the product already accepted. The surplus anticipated from trial is the probability-weighted sum of the benefits from a successful trial, followed by switching to the new brand, plus the disbenefits of an unsuccessful trial (including the money wasted buying the tried product and the money value of any unpleasantness, pain, and/or embarrassment incurred) followed by a return to the old brand. These considerations are compressed into a single variable τ , which we shall call the *risk-cost factor*. τ is greater, the larger the probability, and the higher the cost to the consumer, of a bad consumption experience and the less frequently repeat purchases occur. Trial will occur then when:

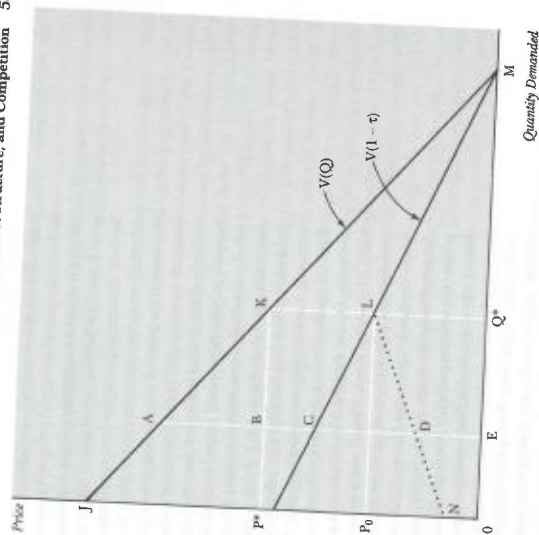
$$(16.1) \quad P < V(1 - \tau) - S$$

where P is the price at which the challenging product is offered, V is the value of the new product to the consumer if it turns out to be satisfactory, and S is the consumer's surplus realized on the product currently used, if any, in the relevant category. (For the first entrant into a new category, $S = 0$.) If there were no risk-cost factor τ , trial would occur whenever consumer's surplus on the new product (that is, the difference between V and P) exceeded the consumer's surplus on the old product.

However, the risk-cost factor drives a wedge between consumers' valuations of the challenging product, given pretrial uncertainty about its true merits, and their valuations assuming full posttrial information about its quality. The relevant valuations in these two cases are nothing more or less than consumers' reservation prices for the product in the pre- and posttrial states. As we learned in Chapter 2, a demand curve arrays all products consumed in descending order of consumers' reservation prices. Thus, the would-be seller of a product faces two quite different demand curves, as Figure 16.1 shows: the upper function $V(Q)$, assuming that consumers are fully informed through trial of the well-functioning product's quality, and the lower curve $V(1 - \tau)$, assuming that consumers lack trial information and believe there is a finite probability of a bad consumption experience.

Consider now the behavior of Firm 1, the first to offer a product satisfying the demands of the consumers with tastes described by demand functions $V(Q)$ and

Figure 16.1
Pre- and Post-trial Demand Functions Faced by Pioneer and Late Mover



$V(1 - \tau)$. Before trial has occurred, its demand curve is $V(1 - \tau)$. Suppose the firm makes an introductory trial offer at price OP . Consumers over the output range OQ^* will find their reservation prices (read along $V(1 - \tau)$) to exceed the introductory price and will try the product. Once they do, they will jump to full-information demand curve $V(Q)$ segment JK —knowing that the product is good, they are willing to pay more for it. After the introductory period is over, first moving Firm 1 will take advantage of this demand change, raising its price to OP^* and retaining the consumers it has hooked through its trial offer.

Suppose Firm 2 later markets a product of equal quality whose merits, however, can only be ascertained through trial. It faces two classes of potential customers: those who were not hooked by the first mover (arrayed over output space Q^*M) and those who tried Firm 1's product and liked it (output range OQ^*). Note that Firm 1's introductory offer captured all the consumers with high full-information reservation prices, leaving only less eager would-be consumers unhooked. The only unhooked consumers ceded to Firm 2 have risk-impacted reservation prices arrayed along segment LM of $V(1 - \tau)$. To win any of them, Firm 2

30. Richard Schmalensee, "Product Differentiation Advantages of Pioneering Brands," *American Economic Review*, vol. 72 (June 1982), pp. 348–365. See also Carl Shapiro, "Optimal Pricing of Experience Goods," *Bell Journal of Economics*, vol. 14 (Autumn 1990), pp. 493–507; Cecelia A. Conrad, "The Advantage of Be-

ing First and Competition Between Firms," *International Journal of Industrial Organization*, vol. 1 (December 1983), pp. 353–364; and Paul Klempner, "Entry Deterrence in Markets with Consumer Switching Costs," *Economic Journal*, vol. 97 supplement (1987), pp. 99–117.

must offer an introductory price below the price OP^* charged by the first mover, and to win many of them, the price will have to be much lower. This is one sense in which the second mover operates at a disadvantage. But more importantly, suppose Firm 2 targets its introductory offers at the consumers Firm 1 has already hooked. Before they were hooked, they had no alternatives in the relevant product category, so they were willing to try Firm 1's product as long as the trial price was less than their pretrial reservation prices (read off $V(1 - \gamma)$). But after they are hooked, equation (16.1) (and common sense) tells us, they will try another product only if the trial price is less than their pretrial reservation price *less* the consumer's surplus they would forgo by not consuming Firm 1's tried-and-true product. To illustrate, consider a consumer whose full-information reservation price is located at point A in Figure 16.1. With pretrial reservation price EC, it was easily hooked by Firm 1 at introductory price OP . But despite Firm 1's posttrial price increase, it is enjoying consumer's surplus AB on Firm 1's product, and it will try Firm 2's product only if the price offered by Firm 2 is less than its pretrial reservation price EC *less* surplus AB; that is, at a price of ED or less (where by construction $CD = AB$). Thus, Firm 2 can win away Firm 1's customers only by offering introductory prices lower than those at which Firm 1 won them. This informational asymmetry gives the first mover an advantage over latecomers at the introductory marketing stage. Furthermore, unless Firm 2 offers very low introductory prices (approaching 0N),³¹ it will not be successful in unhooking the customers of Firm 1 who have the highest reservation prices. Thus, even after Firm 2 has made some market inroads, the customers it has captured will tend to be those with less willingness to pay than those patronizing first mover Firm 1, permitting Firm 1 to choose pricing strategies that extract more from consumers than the strategies open to latecomer Firm 2.

An Example: Pharmaceuticals

Schmalensee's model of first-mover pricing advantages and its offspring are starkly simplified, assuming a high degree of consumer rationality, the ability to ascertain quality differences through trial, no risk aversion or habit formation, a limited or unclear role for status considerations, and (among other things) the implicit belief that trying new goods is burdensome, not a pleasurable challenge.³² Our insight into the roots and strength of first-mover advantages can be honed by returning to the case of pharmaceuticals, on which particularly rich evidence exists.

Pharmaceuticals approach an extreme in the extent to which first-mover advantages confer pricing power, at least in part for reasons captured by the Schmalensee model. For one, the cost of a bad consumption experience can be particularly high—for the patient, prolonged illness or adverse side effects, and for the prescribing physician, a malpractice suit. Second, absent information sources to be discussed in a moment, there is considerable ex ante uncertainty as to whether a second-mover (for example, generic) product has the same quality as the extensively tested pioneer drug. But third, pharmaceuticals differ from Schmalensee's experience goods in the extent to which quality can be ascertained through trial. The prescription drug taker commonly lacks the knowledge to evaluate therapeutic efficacy, and placebo effects cloud self-evaluations of both efficacy and contraindications. Prescribing physicians rarely take the time to monitor observable effects, and in many instances, there are no inexpensive means for determining

whether one drug is more effective or safer than another, even when the observer is highly trained. Finally, as a key decision maker in the choice process, the prescription-writing physician bears no financial cost from selecting higher-priced brand names, and the patient with generous health insurance coverage may also be indifferent to the price implications.

For a sample of thirty-seven drugs available from two or more sources, Masson and Steiner found that U.S. retailers' invoice costs for leading branded drugs exceeded the costs of generic substitutes by 83 percent on average.³³ For a sample of twenty-nine drugs that had been patented before becoming multisource, Hurwitz and Caves found the average manufacturer's price to be 127 percent higher for branded leaders than for their late-arriving substitutes.³⁴ Despite these price differentials, the average leader held a market share of 63 percent in the Hurwitz-Caves sample. Regression analyses indicated that an extra year of head start added on average 1.6 percentage points to the first mover's market share. First movers' market shares were sensitive to the size of their price premium over generic substitutes, but not much—a 10 percent increase in the price premium reduced the leader's market share by less than a half percentage point. Hurwitz and Caves found that leaders' market shares rose with their spending on sales promotion (including detailing and advertising). The promotional effect was greater for drugs prescribed only sporadically than for those used to treat chronic conditions, presumably because patients who must refill a prescription regularly become more price-sensitive and less loyal to the best-known product.³⁵ Thus, promotional effort helps preserve first-mover advantages, but with effectiveness varying for economically plausible reasons.

During the 1970s, most states of the United States and all of the Canadian provinces enacted laws permitting the substitution of generic drugs when the physician prescribed a higher-priced branded product. The degree of permissiveness varied widely from state to state and province to province. In Canada, when a branded drug was prescribed, substitution by pharmacists was impermissible only when the physician took the trouble to write, "no substitution" on the prescription form.³⁶ In the United States the physician's action required to bar substitution varied from state to state, but characteristically entailed less effort than in Canada. In the United States during 1980, approximately 80 percent of the prescriptions for drugs with multiple sources were written for a particular brand.³⁷ "No substitution" injunction rates varied widely from state to state, but averaged approximately 10 percent. In Canada, 79 percent of prescriptions were for specific brand names, but only about 1 percent of the prescribers barred substitution.³⁸ One

31. By construction, segment LN subtracts consumers' surplus from $V(1 - \gamma)$ for any given unit of consumption.

32. Compare Tibor Scitovsky, *The Joyless Economy* (New York: Oxford University Press, 1976), pp. 212-215 and 232-276.

33. Alison Masson and Robert L. Steiner, *Generic Substitution and Prescription Drug Prices*, Federal Trade Commission staff report (Washington: October 1985), p. 36. Because surveyed retailers

34. Hurwitz and Caves, "The Importance of Being First: The Case of Prescription Drugs in Canada," *International Journal of Industrial Organization*, vol. 4 (December 1986), p. 377, note 19.

35. Paul K. Goreski, "Regulating the Price of Prescription Drugs in Canada," Technical Report no. 8 of the Economic Council of Canada (Ottawa: May 1981), pp. 15-16.

36. Masson and Steiner, *Generic Substitution*, supra note 33, pp. 24-26.

37. Paul K. Goreski, "The Importance of Being First: The Case of Prescription Drugs in Canada," *International Journal of Industrial Organization*, vol. 4 (December 1986), p. 377, note 19.

38. Paul K. Goreski, "The Importance of Being First: The Case of Prescription Drugs in Canada," *International Journal of Industrial Organization*, vol. 4 (December 1986), p. 377, note 19.

39. Compare Tibor Scitovsky, *The Joyless Economy* (New York: Oxford University Press, 1976), pp. 212-215 and 232-276.

40. Alison Masson and Robert L. Steiner, *Generic Substitution and Prescription Drug Prices*, Federal Trade Commission staff report (Washington: October 1985), p. 36. Because surveyed retailers

41. Hurwitz and Caves, "The Importance of Being First: The Case of Prescription Drugs in Canada," *International Journal of Industrial Organization*, vol. 4 (December 1986), p. 377, note 19.

42. Paul K. Goreski, "Regulating the Price of Prescription Drugs in Canada," Technical Report no. 8 of the Economic Council of Canada (Ottawa: May 1981), pp. 15-16.

43. Masson and Steiner, *Generic Substitution*, supra note 33, pp. 24-26.

44. Paul K. Goreski, "The Importance of Being First: The Case of Prescription Drugs in Canada," *International Journal of Industrial Organization*, vol. 4 (December 1986), p. 377, note 19.

apparently because "no substitution" prescribing was unusually commonplace in Saskatchewan.⁵¹

When Quebec shifted from full cost reimbursement for pharmacists to a fixed (median) price rule in 1982, the average market share of late entrants in seven important drug categories jumped in a year's time from 18.7 to 54.7 percent.⁵² Thus, when a profit-conscious entity has to absorb the cost of high-priced brand choices, behavior changes radically. Paul Gorecki reveals the informational and liability-limiting effect of formulary listing through a further analysis.⁵³ Newfoundland and Saskatchewan both had product choice and cost reimbursement rules strongly favoring substitution in 1983. But of seven multisource drugs with generic products listed as interchangeable in Saskatchewan's formulary, three of the generics were not included as authorized substitutes on Newfoundland's list. The reimbursed prescription market shares of the late entrants were as follows for the two provinces:

	Newfoundland	Saskatchewan
Three drugs not listed as interchangeable in Newfoundland but listed in Saskatchewan	9.7%	59.2%
Four drugs listed in both provinces	76.0%	57.2%

Listing made a thumping difference in Newfoundland, but in Saskatchewan, where all seven drugs were listed, the market share differences were trivial. Gorecki repeated the same analysis for New Brunswick and Nova Scotia, where pharmacists are not required to substitute the lowest-priced brand and the costs of high-priced brands were reimbursed. In four product categories, generic substitutes were not included in the New Brunswick formulary, but were included (along with the generics of three other groups) in the Nova Scotia formulary. The late entrants' market shares were:

	New Brunswick	Nova Scotia
Four drugs not listed as interchangeable in New Brunswick but listed in Nova Scotia	3.2%	13.9%
Three drugs listed in both provinces	5.1%	5.8%

Here the most striking statistic is the low share of all generics—the result of weak substitution mandates. Failure to make it into the formulary affects generic sales in the expected direction, but the effect is necessarily small. Thus, legal mandates

might interpret "no substitution" orders as evidence that the prescribing physician had reason to believe the branded product might be superior to generic alternatives. But in the United States, "no substitution" was mandated about as often for drugs that had no substitutes and on prescriptions written in a generic name (for which barring substitution had no effect) as for prescriptions written with a brand name when generic substitutes did exist.⁵⁴ Thus, a more plausible explanation is that physicians prescribe the brand name mainly because it is easier to remember and write—that is, by force of habit or to save a few seconds of valuable time.

Canada provides a natural experiment for testing other determinants of generic substitution because the legal mandates varied unusually widely among provinces and because, between 1969 and 1987, a compulsory licensing law made drugs available for low-price generic sale long before their patents had expired.⁵⁵ The provincial regulations varied in at least three important ways. All provinces permitted substitution, but in Quebec, only with the patient's explicit consent. If substitution occurred, some provinces gave the pharmacist considerable discretion in making the choice, whereas Ontario and New Brunswick required that the lowest-cost substitute be dispensed. Second, most provinces published formularies listing branded and generic drugs certified by an expert panel as being biologically equivalent. But British Columbia had none as of 1986; others began publishing them only during the early 1980s, and the inclusiveness of the formularies varied widely. In most provinces with a formulary, physicians prescribing and pharmacists dispensing generic drugs were exempted from malpractice liability when they chose listed products, but in Quebec, they continued to bear responsibility for any adverse consequences from substitution. Third, under Canada's national health insurance system, provincial governments pay pharmacies directly for the drugs dispensed under many conditions. The rules governing the amount of such payment ranged from full reimbursement of the pharmacist's procurement cost to covering only the cost of the lowest-priced substitute (in all cases, plus a fixed dispensing fee). In minimum-price provinces, the pharmacist who dispensed a high-priced drug when substitution was permitted could expect to be reimbursed less than his or her wholesale cost, and thus had strong incentives to substitute. McRae and Tapon focused their analysis on three provinces, Saskatchewan, with the strongest regulatory inducements for substitution, Ontario, following close behind, and Quebec, with by far the weakest provisions. For twenty-one important drugs with multiple sources, the simple average reimbursed prescription market shares captured by firms other than the branded first mover in the three provinces in 1980 were as follows:

Saskatchewan	61.6 percent
Ontario	82.5 percent
Quebec	23.5 percent

In Quebec, which reimbursed the full cost of even high-priced branded drugs and provided no legal protection for substitutes, first movers were by far quite successful in defending their positions. Although Saskatchewan was predicted to have higher generic inroads than Ontario, the positions were reversed,

51. Mason and Steiner, *Generic Substitution*, p. 25.

52. This analysis is drawn from Gorecki, *Regulating the Price and the Importance of Being First*, pp. 389 and 393.

53. Paul Gorecki, "The Importance of Being First," pp. 390-391.

54. Tapon, "Some Empirical Evidence on Post-Patent Barriers to Entry in the Canadian Pharmaceutical Industry," *Journal of Health Economics*, vol. 4 (March 1985), pp. 43-61.

61. For an explanation, see Gorecki, "The Importance of Being First," pp. 389 and 393.

62. *Ibid.*, pp. 390-391.

63. *Ibid.*, pp. 380-382.

and having to pay for high-priced choices seem to be the most important determinants of generic market shares, but given encouragement for substitution, the information provided by a formulary assumes a crucial role.

The moral to be drawn is that under conditions like those found in pharmaceuticals, first movers have natural product differentiation advantages that permit them to charge high prices and retain substantial market shares—the essence of monopoly power. That power appears to rest as much upon force of habit as upon fears that serious adverse consequences will follow an inappropriate choice. It can be reinforced by advertising. But the power is not impregnable. It can be eroded and perhaps even undermined when two conditions coexist: when consumers have substantial financial incentives to make cost-saving choices, for example, on “big ticket” transactions and purchases repeated sufficiently often that sizable cumulative outlays result; and when objective information about the competing products’ quality is available.

The Role of Market Structure

Establishing a strong brand image creates monopoly power. Advertising expenditures contribute to image formation. Market structure may also affect the level of advertising and other promotional outlays, or it may be affected by them. We proceed to explore the links.

Market Structure and Advertising Outlays

Insight into the profit-maximizing level of advertising (or other product differentiation) outlays is provided by the Dorfman-Steiner theorem and extensions.⁶⁴ Consider a firm that, as a first approximation, monopolizes its market. The quantity of output demanded from it depends functionally upon both price and the dollar volume of advertising A it undertakes:

$$(16.2) \quad Q = q(P, A)$$

The conditions for profit maximization on the price dimension are conventional, as derived in earlier chapters. However, there is in addition a first-order condition indicating the profit-maximizing amount of advertising A^* . Letting $R = PQ$ be the firm's sales revenue, the Dorfman-Steiner result is commonly written as:⁶⁵

$$(16.3) \quad A^* / R = \epsilon_p / \epsilon_p$$

where ϵ_p is the well-known elasticity of demand with respect to price while ϵ_a is the elasticity of quantity demanded with respect to advertising outlays. Intuition is sharpened by recalling from Chapter 2 that the profit-maximizing price-cost margin $(P - MC)/P$ under monopoly (unconstrained *inter alia* by limit-pricing considerations) is equal to the inverse of the price elasticity of demand, that is, $1/\epsilon_p$.⁶⁶ Substituting the inverse price-cost margin for ϵ_p in (16.3), we obtain:

$$(16.4) \quad \frac{A^*}{R} = \epsilon_a \left(\frac{P - MC}{P} \right)$$

Thus, the profit-maximizing ratio of advertising to sales revenue is greater: the wider is the equilibrium gap between price and marginal cost relative to price, and the more responsive the quantity sold is to an increase in advertising outlays.

Advertising in this formulation, and surely also in the real world, acts as a shifter of demand curves. As with other inputs, the purchase of advertising will normally continue into the stage of diminishing marginal returns. For a given ϵ_a and hence a given shift in the quantity demanded from spending a certain amount on advertising, it pays to carry the advertising farther into the diminishing returns stage when the additional sales are highly profitable, that is, with high price-cost margins, than when the marginal sales add only meager contributions to profit.

At the limit, in the purely competitive case, marginal cost is equal to price, so $(P - MC)/P = 0$. From (16.4), the profit-maximizing A^*/R is zero. It does not pay to advertise for a pure competitor because, by definition, the competitor can sell as much or as little as it wants at the market-determined price without advertising. The more conditions depart from pure competition, that is, the larger the equilibrium price-cost ratio, the more intensely firms will advertise.

There is another reason why advertising is inhibited under atomistic competition. If individual sellers' products are essentially undifferentiated, as in the case of Florida oranges, national advertising by any single firm tends to expand the demand for all oranges, and even if the resulting increase in equilibrium prices and quantities is appreciable, the individual advertiser will realize only a tiny fraction of the benefits. The remaining benefits redound as an externality to other growers. To overcome this potential incentive failure, firms join together in trade

64. Robert Dorfman and Peter O. Steiner, "Optimal Advertising and Optimal Quality," *American Economic Review*, vol. 44 (December 1954), pp. 826-836. A dynamic variant focusing on stocks rather than flows is Marc Nerlove and Kenneth J. Arrow, "Optimal Advertising Policy under Dynamic Conditions," *Econometrica*, vol. 29 (May 1962), pp. 129-142.

65. Proof: The firm's objective is to maximize profits, defined

$$(1) \quad \pi = P Q(P) - C(Q) - A,$$

where P is price, Q is quantity sold, $C(Q)$ is total cost except for advertising, and A is advertising expenditure. The first-order conditions with respect to price is:

$$(2) \quad \frac{\partial \pi}{\partial P} = P \left(\frac{\partial Q}{\partial P} \right) + Q - \frac{\partial C}{\partial Q} \frac{\partial Q}{\partial P} = 0.$$

The differentiation is with respect to price rather than the more customary quantity variable, hence the unfamiliar form. The first-order condition with respect to advertising is:

$$(3) \quad \frac{\partial \pi}{\partial A} = P \left(\frac{\partial Q}{\partial A} \right) - \frac{\partial C}{\partial Q} \frac{\partial Q}{\partial A} - 1 = 0.$$

Factoring out the $\partial Q / \partial A$ terms and multiplying both sides by A , we obtain:

$$(4a) \quad A \left[\frac{\partial Q}{\partial A} \right] \left[\frac{P - MC}{P} \right] = A.$$

Multiplying the terms in brackets by Q/Q ($= 1$), we obtain:

$$(4b) \quad \left[\frac{\partial Q}{\partial A} \frac{A}{Q} \right] \left[\frac{PQ - MCQ}{PQ} \right] = A.$$

Note that the first bracketed term is the elasticity of demand with respect to advertising.

We similarly rewrite pricing condition (2) to the form:

$$(4) \quad \frac{\partial Q}{\partial P} \left[\frac{P - MC}{P} \right] = -Q.$$

Multiplying both sides by P and the bracketed terms (as before) by Q/Q , we obtain:

$$(4a) \quad \left[\frac{\partial Q}{\partial P} \frac{P}{Q} \right] \left[\frac{PQ - MCQ}{PQ} \right] = -Q,$$

noting that the first bracketed term is the *price* elasticity of demand and the second bracketed term is identical to the second bracketed term of (3b). Dividing (3b) by (4a), we obtain as the profit-maximizing condition for the advertising/sales ratio:

$$(5) \quad \frac{A^*}{PQ} = \left(\frac{\partial Q}{\partial A} \frac{A}{Q} \right) \left[1 - \epsilon_p \right].$$

The minus sign on the left-hand side is transferred to the right-hand side, letting the price elasticity of demand (normally with a negative sign) have a positive value.

66. See p. 33 supra.

associations such as the Florida Citrus Commission and the Sunkist Growers, which undertake collective advertising programs aimed at shifting industrywide demand. The situation is different when roadside stands advertise the availability and price of their oranges in local newspapers, since then the firms are of appreciable size in relation to their natural markets. The stands' offerings are differentiated *inter alia* in terms of locational convenience, so even when there are many vendors, monopolistic competition, not pure competition, prevails. It is also different when, even though there are many firms selling nationally, each firm's products are differentiable in design or image from those of others, as in fashion garment manufacturing. Again, competition is monopolistic, not pure, and if the price-cost margin is not zero, advertising may occur.

Advertising Under Oligopoly

These special cases shade into the general problem of advertising under oligopoly. To investigate incentives for advertising under oligopoly, we must redefine some of the notation in equations (16.2-4) above. Specifically, the output of the i th firm is now q_i . Firm i 's advertising is A_i , its share of total market output $Q = \sum q_i$ (and, assuming symmetry, advertising) is $m_i = (q_i/Q)$, and its demand elasticity with respect to its own advertising becomes ϵ_{A_i} . Then the advertising elasticity ϵ_A in equation (16.4) must be replaced by ϵ_{A_i} . If sellers conform to Cournot-Nash assumptions, expecting rivals' advertising outlays to be unchanged in response to their own outlays, ϵ_{A_i} can be decomposed into two terms:

$$(16.5) \quad \epsilon_{A_i} = \left(\frac{A_i}{Q} \frac{\partial Q}{\partial A_i} \right) + \left(\frac{A_i}{m_i} \frac{\partial m_i}{\partial A_i} \right),$$

where the first term gives the elasticity of Firm i 's output with respect to the industry output-expanding impact of Firm i 's advertising, while the second term is the elasticity of changes in Firm i 's market share to changes in its advertising.⁶⁷ The first term can be called the industry expansion effect, the second term the rivalrous capture effect. Especially when pricing is cooperative, so that price-cost margins remain high, oligopolists have strong dual incentives to advertise. With sizable market shares, they appropriate a substantial fraction of the industrywide benefits from their own advertising, while at the same time, if rivals are not expected to respond effectively to their campaigns, they take away market share from their rivals. As George Washington Hill, swabuckling president of the American Tobacco Company from 1925 to 1946, explained regarding his company's advertising in the highly concentrated cigarette industry, "Of course, you benefit yourself more than the other fellow . . . but you help the whole industry if you do a good job."⁶⁸

If, contrary to the assumptions thus far, rivals are expected to retaliate in kind to increases in advertising, equation (16.5) remains incomplete, requiring a third (negative) term embodying the elasticity of Firm i 's output with respect to the changes in rival advertising induced by changes in Firm i 's advertising. The more one firm's advertising initiatives are expected to be countered by aggressive responses, the weaker oligopolists' incentives to advertise heavily will be, all else equal. When rival reactions are taken into account fully, the second (rivalrous

capture) term in equation (16.5) may be completely offset by the rival retaliation term, and as a result, oligopolists' advertising may be held cooperatively at or near joint profit-maximizing levels.⁶⁹

In Chapters 6 through 8, we saw that Cournot-Nash pricing behavior, that is, ignoring plausible rival countermoves, is fairly unlikely. Rival retaliation to aggressive price cutting is apt to come quickly, and recognizing this, firms in tightly knit oligopolies are often drawn toward policies that are either explicitly cooperative or that emulate the joint profit-maximizing cooperative result. But advertising appears to be different in important respects.⁷⁰ First, price cuts can be matched almost instantaneously as soon as secrecy breaks down, whereas it takes weeks or even months to set a retaliatory nationwide advertising campaign in motion. During the interim, the initiator may enjoy market share and profit gains at the laggard's expense. Second, success in advertising depends at least as much upon the way the appeal is presented as on the amount of money spent. Any fool can match a price cut, but counteracting a clever advertising gambit is far from easy. In this unpredictable clash of creative power, sellers often overestimate their own ability to make market share gains and underestimate their rivals' ability to retaliate successfully, exhibiting little concern for mutual interdependence. Third, since price competition is unappealing in oligopoly, business managers may seek an outlet for their aggressive instincts on nonprice dimensions such as advertising, where the threat to collective profits is less certain. And if prices are held comfortably above marginal production and distribution cost, equation (16.4) amended by (16.5) informs us, the quest for additional orders through non-price rivalry is stimulated.

There is considerable evidence that oligopolists often carry their advertising expenditures beyond the levels at which joint profits would be maximized.⁷¹ In cigarettes, advertising outlays rose from \$4.3 million in 1910 to \$13.8 million in 1913 after the American Tobacco Company, with 90 percent of the U.S. market,

67. Alternatively, the first term in parentheses can be written

$$\left(\frac{\sum A_i}{\sum q_i} \frac{\partial \sum q_i}{\partial A_i} \right) \frac{A_i}{\sum A_i}$$

where the $\sum q_i$ indicate industry sums, so that the first term (in parentheses) is the elasticity of industry output with respect to total industry advertising, and the second term is firm i 's share of industry advertising (or output). Here we follow Michael Waterman, *Economic Theory of the Industry* (Cambridge: Cambridge University Press, 1984), p. 132.

68. Quoted in William H. Nicholls, *Price Policies in the Cigarette Industry* (Nashville: Vanderbilt University Press, 1951), p. 60.

69. We ignore the scale economy and diversity effects from dividing up advertising efforts among several oligopolists rather than having a single entity do the entire job. If scale economies are sacrificed, joint profit-maximizing outlays may be excessive; if greater diversity of approaches under oligopoly stimulates industrywide demand more effectively than a monolithic campaign, joint profits may be higher under oligopoly than monopoly.

70. For diverse views, see William Fellner, *Competition Among the*

Few (New York: Knopf, 1949), pp. 183-191; Nicholls, *Price Policies*, supra note 68, pp. 187-203; Alexander Henderson, "The Theory of Duopoly," *Quarterly Journal of Economics*, vol. 69 (November 1954), pp. 360-381; James M. Ferguson, *Advertising and Competition: Theory, Measurement, Fear* (Cambridge: Ballinger, 1974), pp. 21-27; Simon, *Issues*, supra note 33, pp. 93-103; Dixit and Norman, "Advertising and Welfare," supra note 32, pp. 2-6; and James W. Friedman, "Advertising and Oligopolistic Equilibrium," *Bell Journal of Economics*, vol. 14 (Autumn 1983), pp. 464-473.

71. Sales promotion by retailers through the use of trading stamps, premiums, and sweepstakes tickets may be subject to similar dynamics. See, for example, the Federal Trade Commission staff report, *On the Use and Abuse of Significance of Trading Stamps* (Washington: USGPO, 1960); E. M. Lalonde and J. Hermiter, "The Effect of Trading Stamp Discontinuance on Supermarket Performance," *Journal of Marketing Research*, vol. 7 (May 1970), pp. 205-209; and E. M. Tauber, "The Oligopolistic Lock-In," *Applied Economics*, vol. 2, no. 3 (1977), pp. 225-229.

was broken into several pieces under an antitrust judgment.⁷² Further escalation followed during the 1920s as American attempted to regain industry leadership through an all-out promotional assault. Advertising spending settled down during the 1930s and 1940s, only to rise sharply in the 1950s as new filter tip and king-size brands were introduced, upsetting the prior market share equilibrium.⁷³ After a new plateau was attained, Congress banned cigarette advertising on television (until then, the most heavily used medium) and radio beginning in January 1971. Total outlays dropped from \$315 million in 1970 to \$252 million in 1971 while profits rose commensurately.⁷⁴ For three years expenditures hovered near that lower figure, but then there was another escalation, accompanied by unusually costly free sample distribution. That repeated rivalrous escalations of cigarette advertising have carried outlays far beyond the short-run joint profit-maximizing point seems indisputable. It is less certain whether long-run profits have been sacrificed or whether, by stimulating consumption, higher advertising outlays have more than paid their way. The weight of evidence indicates that the long-run growth attributable to advertising has been modest, and thus that much of the industry's advertising is self-cancelling and unprofitable even in the long run.⁷⁵

In the soap industry, the principal savings anticipated by Lord Leverhulme from his 1906 proposal to create a soap monopoly in Great Britain were to be realized by eliminating "the frenzied competitive advertising" undertaken by competing producers.⁷⁶ A study of several U.S. small-town motion picture markets found that total display ad lineage fell significantly when the number of theaters was reduced from two to only one.⁷⁷ Another U.S. study found that the ratio of advertising and other promotional expenses to sales was higher in markets with two private electric utilities than in markets with a municipally owned monopoly.⁷⁸ And although U.S. cement manufacturers successfully enforced agreements to avoid price and quality competition, they found themselves "helpless in combating excessive selling costs" during the 1930s, with outlays covering salesmen's compensation, entertainment, gifts for cement buyers, and other nonfreight distribution costs amounting to 16 percent of net sales in 1939.⁷⁹

More generally, from an ambitious econometric analysis of advertising behavior in sixteen consumer goods product lines across diverse European national markets, Lambin found that in many cases observed levels of advertising might be consistent with profit maximization, short-run or long-run. But for others, and particularly for gasoline, coffee, yogurt, insecticides, deodorants, detergents, (less clearly) soft drinks, he concluded:

The limited capacity of advertising to increase primary demand, the reciprocal cancellation of brand advertising effects combined with the interdependence of advertising policies leading to an escalation in advertising expenditures constitute a built-in mechanism of advertising competition which has undesirable effects from the consumer point of view. . . . [T]his [advertising] duplication does not benefit the consumer in the long run, as does a price war or technological race.⁸⁰

Nevertheless, exceptions can be found to the tendency for advertising rivalry to be noncooperative. During the 1960s, the U.S. cigarette manufacturers, following prodding by the Federal Trade Commission, collectively adhered to an advertising code discouraging claims with respect to product tar and nicotine content.

However, in 1966 the Commission reversed its stance, and immediately thereafter, with the sales of its Kent cigarettes falling, P. Lorillard Co. withdrew from the code despite industry opposition. Others soon followed suit.⁸¹ In 1957, the U.S. auto producers agreed to deemphasize horsepower in their advertisements and to refrain from direct participation in auto racing, ostensibly as a public service gesture but no doubt also to slow the growth of advertising outlays. The agreement was subsequently honored more in the breach than the keeping. They experienced somewhat greater success in avoiding competitive advertising of safety features.⁸² Whether this reflects a spirit of oligopolistic forbearance, or merely the belief (based upon Ford's experience during the 1950s) that advertising safety features didn't pay, is unclear.⁸³ Still these cases appear to be exceptional. As Fellner suggests, nonrivalrous handling of advertising expenditures is most apt to be seen in relatively rare mature oligopolies, where the strategy options of member firms have been reduced to a matter of routine and demand is fairly stable.⁸⁴

72. See Borden, *The Economic Effects*, supra note 12, pp. 212-216. Likewise, the entry of a second firm into the Australian cigarette industry in 1956 led to a tripling of advertising outlays in the first year of entry and 22 to 48 percent increases in each of the next four years. M. A. Alenson, "Advertising and the Nature of Competition in Oligopoly over Time," *Economic Journal*, vol. 80 (June 1970), p. 293.

73. See Lester G. Telser, "Advertising and Cigarettes," *Journal of Political Economy*, vol. 70 (October 1962), pp. 494-498; and Henry G. Grabowski and Dennis C. Mueller, "Imitative Advertising in the Cigarette Industry," *Antitrust Bulletin*, vol. 16 (Summer 1971), pp. 237-292.

74. Federal Trade Commission, *Report to Congress pursuant to Public Health Cigarette Smoking Act* (Washington: USGPO, December 31, 1970), Statistical supplement Table 1.

The ban on such advertising, which had been accompanied by counter advertising emphasizing health hazards (some of which helped "switch" consumers to low-tar brands), is believed to have slowed the movement away from smoking. See, for example, James L. Hamilton, "The Demand for Cigarettes, Advertising, the Health Scare, and the Cigarette Advertising Ban," *Review of Economics and Statistics*, vol. 54 (November 1972), pp. 401-411; Eugene M. Levitt, Douglas Coate, and Michael Grossman, "The Effects of Government Regulation on Teenage Smoking," and Lynne Schneider, Benjamin Klein, and Kevin Murphy, "Governmental Regulation of Cigarette Health Information," both in *Journal of Law & Economics*, vol. 24 (December 1981), pp. 345-612; and John E. Calfee, "Cigarette Advertising, Health Information and Regulation before 1970," Federal Trade Commission Bureau of Economics working paper no. 194 (December 1985). The Calfee paper contains a particularly thorough bibliography of the extensive literature.

75. Compare Simon, *Issues*, supra note 33, pp. 104-105; Schmalensee, *The Economics of Advertising*, supra note 33, pp. 187-215; Telser, "Advertising and Cigarettes," pp. 498-499; Schneider et al., "Governmental Regulation," p. 594; M. M.

Mervally, "Advertising and Competitive Behavior of Selected Australian Firms," *Review of Economics and Statistics*, vol. 57 (November 1975), pp. 417-427; and "Ad Ban Might Help Cigarette Makers," *New York Times*, January 2, 1989, p. 33.

76. P. Lesley Cook, *Effects of Mergers* (London: George Allen & Unwin, 1958), p. 233.

77. Simon, *Issues*, supra note 33, pp. 108-109.

78. Walter J. Primeaux, "An Assessment of the Effect of Competition on Advertising Intensity," *Economic Inquiry*, vol. 19 (October 1981), pp. 613-625.

79. Samuel M. Leecher, *Imperfect Collusion in the Cement Industry* (Cambridge: Harvard University Press, 1959), pp. 135-136 and 213-216. In 1977, by which time the cartel agreements were ancient history, the cement industry's total selling expenses were 2.9 percent of sales. Federal Trade Commission, *Statistical Report*, supra note 3, p. 33.

80. Jean Jacques Lambin, *Advertising, Competition and Market Conduct in Oligopoly over Time* (Amsterdam: North-Holland, 1976), p. 167. See also pp. 107-113 and 141-147. For similar U.S. results see Jeffrey M. Netter, "Excessive Advertising: An Empirical Analysis," *Journal of Industrial Economics*, vol. 30 (June 1982), pp. 361-373.

81. Calfee, "Cigarette Advertising," supra note 74, pp. 41-57. 82. "The Race for Safety Is On," *Business Week*, June 11, 1966, pp. 186-190. Asked by a reporter whether Ford would capitalize in its advertising on safety features its rivals lacked, president Arjay Miller replied, "Probably not. It wouldn't be far because the others are not antisafety. They'll move as fast as they can. But we plan to compete like hell on the safety features themselves."

83. As industry wags put it at the time, "McNamara (at the time, head of Ford's U.S. auto operations and later U.S. Secretary of Defense) is selling safety, but Chevy is selling cars." See Dan Cordtz, "The Face in the Mirror at General Motors," *Forbes*, August 1966, p. 208.

84. *Competition Among the Firms*, supra note 70, pp. 188-189.

Advertising and Monopoly Power, and Profitability

The simple monopoly version of equation (16.4) implies that advertising/sales ratios should be larger, all else equal, as market structures move from competition (with low price-cost margins) to monopoly (with high margins). When the possibility that oligopolists can capture market share from their rivals through advertising is recognized, one might anticipate a nonlinear, inverted U-shaped relationship between advertising/sales ratios and concentration, with peak advertising intensities occurring under more or less tight oligopoly rather than monopoly.⁸⁵

There have been numerous statistical tests of this hypothesis. Virtually all such studies using data of reasonable quality have discovered advertising/sales ratios and seller concentration ratios to be positively correlated, at least in consumer goods industries.⁸⁶ The relationship also appears to hold for selling expenditures other than advertising.⁸⁷ Those who have tested for a nonlinear Ω -shaped relationship have found it, with peak advertising/sales ratios occurring at four-seller concentration ratios in the range of 46 to 53 (for the United States) and 64 percent (for the United Kingdom).⁸⁸

Other analyses have shown that consumer goods market shares and industry concentration ratios tend to be more variable over time in advertising-intensive lines.⁸⁹ This relationship has been interpreted by some scholars as evidence of weak or non-existent monopoly power in high-advertising industries. However, the conclusion does not follow. As we have seen, any fool can match a price cut, whereas a successful advertising campaign may be difficult to duplicate, leading to rapid market share gains whose beneficiary enjoys appreciable pricing discretion, at least until the equilibrium is disrupted by another innovation.

Intensive advertising can also have feedback effects on market structure. Accelerated market share turnover could, under most variants of Gibrat's law, lead to increasing concentration over time.⁹⁰ Economies of scale in advertising could have the same effect. On the other hand, if advertising facilitates entry by helping newcomers make their products known quickly, the concentration-increasing effect of turnover could be dissipated or even reversed.⁹¹ The U.S. evidence reviewed in Chapter 4 suggests that the balance lies on the side of rising concentration over time with more intense advertising, especially for industries relying heavily upon television advertising.⁹²

One of the more durable empirical relationships uncovered in statistical investigations of firm and industry profitability, we discovered in Chapter 11, is the tendency for profitability to be relatively high in high-advertising consumer goods industries. We reconsider those results now in the light of what we have learned here.

Image advantages associated more or less closely with being a first mover almost surely underlie much of what has been observed. An image advantage is an asymmetry that presents a barrier to the entry of new firms and a barrier to the upward mobility of less-favored existing firms. It allows its possessor to charge prices higher than those of rivals without ceding market share. Image advantages can also raise the productivity of their possessor's advertising or, by enlarging market shares, permit the realization of advertising scale economies, in both instances letting sellers maintain their market positions at lower advertising/sales

ratios than those of less-favored firms.⁹³ Both the price-raising and cost-saving implications are consistent with evidence that industry advertising/sales ratios are correlated with profitability mainly for leading firms, and not for followers.⁹⁴

Exactly what role advertising per se plays in this chain of causation remains imprecisely illuminated. The qualitative evidence reviewed earlier suggests that intensive advertising contributed to the achievement of first-mover images in at least some important cases. Once a superior image is attained, prices can be held above costs, and under the Dorfman-Steiner theorem, more intensive advertising is encouraged. Such advertising in turn reinforces and prolongs the image advantage. Thus, high advertising is related to superior profitability both as cause and effect.

Two caveats to this general line of reasoning remain to be evaluated. First, whether one concludes that profitability is correlated with advertising intensity depends in part upon the depreciation rates applied to good will stocks built up through advertising.⁹⁵ It might be urged that the high profit returns found in advertising-prone industries occur because the seminal advertising took place in earlier, nonobserved periods, and if that early advertising had been capitalized and then depreciated in the periods under observation, supra-normal profit returns would fall or even vanish. This argument is implausible when applied to specific cases. It seems undeniable that success in achieving a strongly differentiated product image can yield properly discounted returns on investment far above competitive norms. A more telling criticism is raised by Glazer, who argues that correlations of profitability with first-mover assessments impose a selection bias,

ing, Competition, and Market Share Stability," *Journal of Business*, vol. 60 (October 1984), pp. 539-552.

90. See pp. 143-146 *supra*.

91. For evidence that conflicts, but favoring a conclusion that entry rates are lower in high-advertising industries, see Daniel Shapiro and R. S. Khomani, "The Determinants of Entry and Exit Reconsidered," Joachim Schwalbach, "Entry by Diversified Firms into German Industries," and Richard Highfield and Robert Smiley, "New Business Starts and Economic Activity," all in the *International Journal of Industrial Organization*, vol. 5 (March 1987); Ionnis N. Kessides, "Advertising, Sunk Costs, and Barriers to Entry," *Review of Economics and Statistics*, vol. 68 (February 1986), pp. 84-95; and Zoltan Acs and David Audretsch, "Small-Firm Entry into U.S. Manufacturing," *Economica* (forthcoming in 1989).

92. See pp. 137-138 *supra*.

93. See pp. 131-134 *supra*, and note 48 *supra* in this chapter.

94. See John E. Kwoka and David J. Ravenscraft, "Cooperation vs. Rivalry: Price-Cost Margins by Line of Business," *Economia*, vol. 55 (August 1986), pp. 559-580; and Lawrence J. Gromer, "The Competitive and Anticompetitive Theories of Advertising: An Empirical Analysis," *Applied Economics*, vol. 18 (June 1986), pp. 599-613.

95. See pp. 420-436 *supra*.

85. See, for example, John Cable, "Market Structure, Advertising and Intermarket Differences in Advertising Intensity," in Keith Cowling, ed., *Market Structure and Corporate Behaviour* (London: Gray-Mills, 1972), pp. 111-124.

86. See John R. Meisel, "Demand and Supply Determinants of Advertising Intensity Among Convenience Goods," *Swedish Economic Journal*, vol. 46 (July 1979), pp. 233-243; and Ralph M. Bradburd, "Advertising and Market Concentration: A Re-examination of Ormstein's Spurious Correlation Hypothesis," *Swedish Economic Journal*, vol. 47 (October 1980), pp. 531-539.

87. Weiss et al., "The Size of Selling Costs," *supra* note 3, p. 67.

88. Stephen Martin, "Advertising, Concentration, and Profitability: The Simultaneity Problem," *Bell Journal of Economics*, vol. 10 (Autumn 1979), pp. 639-647; A. J. Buxton, S. W. Davies, and B. R. Lyons, "Concentration and Advertising in Consumer and Producer Markets," *Journal of Industrial Economics*, vol. 32 (June 1984), pp. 451-464; and Noel D. Uri, "A Re-Examination of the Advertising and Industry Concentration Relationship," *Applied Economics*, vol. 19 (April 1987), pp. 427-435.

89. See Lester G. Telser, "Advertising and Competition," *Journal of Political Economy*, vol. 72 (December 1964), pp. 547-551; Richard E. Caves and Michael E. Porter, "Market Structure, Oligopoly, and Stability of Market Shares," *Journal of Industrial Economics*, vol. 26 (June 1978), p. 308; and E. Woodrow Eckard, "Advertis-

counting only the firms that succeeded in building premium images and overlooking the many firms that tried to do so, invested money in the process, but failed.⁹⁶ It is questionable whether in any single product category, the losses of those who failed offset with any precision the supra-normal profits of those who succeeded, since an early (perhaps lucky) success may create such strategic asymmetries that latecomers are discouraged from spending heavily on their own innovations and then, by failing, dissipating the winners' gains. However, it is conceivable that, averaging across all industries, the losses from product differentiation failures do roughly offset the gains of those who succeed. J. A. Schumpeter may have captured the essence of dynamic capitalism in observing that:

Spectacular prizes much greater than would have been necessary to call forth the particular effort are thrown to a small minority of winners, thus propelling much more efficaciously than a more equal and more "just" distribution would, the activity of that large majority of businessmen who receive in return very modest compensation or nothing or less than nothing, and yet do their utmost because they have the big prizes before their eyes and overrate their chances of doing equally well.⁹⁷

How the profits of the winners and losers in this broader sense balance out, we simply do not know.

It has also been argued that advertising leads to supra-normal profitability by building brand loyalty. The semantic distinction between an image advantage and brand loyalty is far from clear. Presumably, the latter is more ephemeral and based less on having been a pioneer. If advertising is an effective instrument for creating profitable brand loyalty, one must ask why *all* sellers do not advertise to establish their own specialized monopoly franchises, through their actions fragmenting markets and driving costs up until a profitless Chamberlinian equilibrium emerges. Something more—that is, something like first-mover advantages—is needed to explain the persistence of supra-normal profits where advertising is high. Also, there is reason to question whether high advertising/sales ratios are associated in any simple way with strong brand loyalty. In his econometric study of sixteen European consumer product lines, Lambin found *negative* but weak correlations between a measure of consumers' loyalty to particular brands and three different indices of advertising intensity.⁹⁸

Advertising could lead to elevated profitability because it generates barriers to entry other than those embodied in the asymmetry of first-mover images and other brand loyalties. If advertising helps entrants become recognized, intensive counter advertising by incumbents has been known to drown out entrants' messages, lessening the volume of sales they can capture.⁹⁹ By raising required entry costs or leaving smaller niches for outsiders to fill, advertising can make markets too crowded to sustain profitable entry.¹⁰⁰ And as we have seen in Chapter 4, there may be economies of scale that give leading advertisers a cost and hence profit advantage over smaller firms. Still these hypotheses almost surely have less power in explaining the observed advertising-profitability associations than image advantages linked to some kind of innovative behavior.

Market Structure and Product Variety

We advance now to the important question of whether other dimensions of product differentiation—for example, in physical product features, convenience, and

service—are systematically linked to differences in market structure. As E. H. Chamberlin emphasized long ago, consumers have varied tastes, and to satisfy those tastes necessitates variety in the menu of goods and services offered.¹⁰¹ But variety imposes costs of two main kinds. Product differentiation gives sellers some control over price, and hence leads to monopolistic resource misallocation. Perhaps more significant, carrying the quest for variety very far conflicts with the realization of scale economies in production and marketing. Were it not for scale economies, every street corner would have its own conveniently located grocery, pharmacy, and lumber yard, and every household would brew its own beer to taste and weave its own blue denim in the precisely desired texture and weight. Within certain bounds, then, a tradeoff must be struck among variety, cost, and price. The question we explore here is, How do diverse market structures affect the outcome of that tradeoff?

One facet that imparts complexity to the problem is the diversity of structural and behavioral assumptions one might make. Plausible candidates for investigation include monopoly with blockaded entry; monopolists deterring entry through either pricing or investment policy (for example, on the latter, as they choose how many product variants to offer and how densely to pack geographic space with plants); unfettered oligopolistic nonprice rivalry with cooperation in pricing; rivalry among firms ignoring their interdependence on both price and quality dimensions, that is, classic Chamberlinian monopolistic competition; and various "ideal" cases in which monopolists or monopolistic competitors are induced by diverse government interventions (such as subsidies or controls) to behave optimally in both price and quality decisions. Not all of these cases and their manifold variants have been explored theoretically. Nevertheless, a good deal can be said about some of the most interesting cases.

Some Examples

One of the surest ways to call forth the wrong amount of variety is to set, either through governmental regulation or a rigid cartel mechanism, a uniformly high monopoly price and then let individual producers compete for business on non-price bases. Two kinds of distortions result, both of which are illustrated by U.S. airline regulation during the 1960s and early 1970s.¹⁰² First, the offering of

96. Anshel Ghaer, "The Advantages of Being First," *American Economic Review*, vol. 75 (June 1985), pp. 473-490.

97. Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy*, 3d ed. (New York: Harper, 1950), pp. 73-74.

98. *Advertising*, supra note 80, pp. 115-118.

99. See John C. Hille and Philip B. Nelson, "Noisy Advertising and the Predation Rule in Antitrust Analysis," *American Economic Review*, vol. 74 (May 1984), pp. 367-371; and Charles F. Mason, "Predation by Noisy Advertising," *Review of Industrial Organization*, vol. 1, no. 1 (1986), pp. 78-88. For an application to political advertising, see Jeffrey M. Neider, "Political Competition and Advertising as a Barrier to Entry," *Student Economic Journal*, vol. 50 (October 1983), pp. 510-520.

100. See John Cubbin, "Advertising and the Theory of Entry Barriers," *Economics*, vol. 48 (August 1981), who argues that there is a reason for such entry-detering tendencies to be correlated with advertising intensity.

101. *The Theory of Monopolistic Competition*, supra note 11. See also pp. 32-33 supra.

102. On the experience before deregulation, see George W. Douglas and James C. Miller, III, *Economic Regulation of Domestic Air Transport* (Washington: Brookings, 1974), Chapters 4-6; and Lawrence J. White, "Quality, Competition, and Regulation: Evidence from the Airline Industry," in Richard E. Caves and Marc Roberts, eds., *Regulating the Product: Quality and Variety Considerations* (Harvard University Press, 1975), pp. 17-35. On the experience after deregulation, see D. R. Graham, D. P. Kaplan, and D. S. Sibley, "Efficiency and Competition in the Airline Industry," *Bell Journal of Economics*, vol. 14 (Spring 1983), pp. 118-138; and Steven Morrison and Clifford Winston, *The Economic Effect of Airline Deregulation* (Washington: Brookings, 1986).

no-frills flights with high seating density was discouraged, and so consumers who preferred to sacrifice convenience or luxury to save money were badly served. Second, even for the average consumer, the level of quality was often not optimal. Under the prevailing regulated, cartelized rate structure, price-cost margins tended to rise with distance. This encouraged airlines to offer too many flights over long hauls and too few on short hauls relative to the flight frequency — fare preferences of the average air traveler. After the Airline Deregulation Act of 1978 was implemented, both problems were largely solved, and although other new problems emerged, the consensus is that consumers were for the most part substantially better served under deregulated rate-setting and flight scheduling.

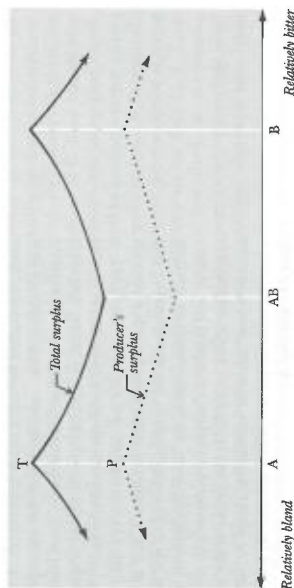
More generally, society is usually better off when consumers enjoy a wide range of choices between high-quality, high-priced and low-quality, low-priced opportunities than when they face a severely restricted choice set. Something approximating the desired level of variety in this sense is likely to emerge whenever entry is relatively easy, as it is, for example, in most of the retail trades. Thus, if the typical consumer can choose among several well-stocked, price-competitive supermarkets within ten minutes' driving distance from home and friendly but high-priced "Mom and Pop" grocery and drug stores within a few blocks' walking distance; or between a low-priced, minimum-service gasoline station and a high-priced station offering advertised brands, accepting credit cards, and checking tire air pressure, the state of welfare can hardly be seriously anis.

The Theory of Optimal Product Variety

A more general perspective on the links between market structure and product variety can be gained by extending the analogy introduced in Chapter 10 between product characteristics space and geographic space.¹⁰³ Most products and services have multidimensional characteristics, but the essence of the matter can be grasped by considering a situation in which there is only one more or less continuously variable characteristic — for example, the maneuverability of a car, or the color of a garment (varying over a spectrum), or the speed of a restaurant's service. Figure 16.2 provides the initial framework. The horizontal axis represents a one-dimensional space over which real or perceived product characteristics can vary. Consumers' preferences are mapped by their location in product characteristics space. If, for example, the relevant dimension is the bitterness of a beer, derived from the amount and type of hops used, consumers whose most favored beers are relatively bitter (for example, Pilseners) would have their preferences located farther to the right on the diagram, while those preferring blander beers would be located more to the left. We assume without serious loss of generality a uniform distribution and intensity of preferences over the relevant portion of product characteristics space.

Figure 16.2 looks somewhat like the geographic pricing diagrams presented in Chapters 10 and 13, but its vertical dimension is quite different conceptually. It measures not prices, but consumers' and producers' surpluses. Concretely, the upper (solid) tent-shaped line shows at any abscissa point the total surplus, consumers' plus producers', realized from sales to consumers with preferences located at the corresponding point in horizontal characteristics space.¹⁰⁴ The lower (dotted) line shows the producers' surplus, and so the vertical distance between the upper and lower functions reveals the total consumers' surplus derived by consumers at any given point in product characteristics space.

Figure 16.2
The Surplus Implications of
Product Location in
Characteristics Space



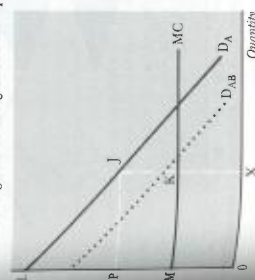
In Figure 16.2, the supply of only two product variants, A and B, is assumed. These products have characteristics exactly matching the preferences of consumers located at points A and B in characteristics space. By assumption, however, consumer preferences are distributed uniformly over space. Those whose preferences are imperfectly satisfied by A or B must either buy A or B or spend more of their income on unrepresented (perhaps quite different) products — for example, wine, or orange juice, or sleeping pills. The loss of utility experienced by consumers at, say, boundary point AB from having to make do with imperfect substitutes A or B leads to a lower quantity demanded. Demand is choked off

103. This analysis is drawn with only minor modifications from F. M. Scherer, "The Welfare Economics of Product Variety: An Application to the Ready-To-Eat Cereals Industry," *Journal of Industrial Economics*, vol. 28 (December 1979), pp. 113-134.

104. Concretely, let D_A below be the conventional demand function for consumers whose preferences are located exactly at point A in Figure 16.2. Then the length of the line AT is equal to the total surplus area MKJLM in the demand diagram below, where OP is the price charged, OM is marginal cost, and quantity OX is supplied. The line segment TP in Figure 16.2 corresponds to con-

sumers' surplus area LJP and the line segment PA in Figure 16.2 to producer's surplus area PJKM. For a different consumer located at point AB in Figure 16.2, the corresponding demand curve below would be D_{AB} , with appropriately reduced surpluses (assuming the same price OP to be paid). The areas under the curves in Figures 16.2 and 16.3 sum (integrate) the surplus areas under all such demand curves for consumers located at all points in characteristics space.

For the mathematics of mapping from individual demand curves to surplus curves like those in Figures 16.2 and 16.3, see Steven S. Wildman, "A Note on Measuring Surplus Attributable to Differentiated Products," *Journal of Industrial Economics*, vol. 33 (September 1984), pp. 123-132. See also Alan Randall and John R. Stoll, "Consumer's Surplus in Commodity Space," *American Economic Review*, vol. 70 (June 1980), pp. 449-455.



more, the farther the consumer's preferences lie from the characteristics of available products. This, combined with the assumption of a uniform distribution of preferences over characteristics space, gives rise to the tent shape of the surplus functions, whose maximums are the points in space where product characteristics exactly match some consumers' preferences.

Let us consider now the introduction of a third product, C, at the point in characteristics space intermediate between A and B, as in Figure 16.3. This means that consumers in the neighborhood of C will be satisfied better, leading to an increase in consumption by those consumers, and hence to increases in consumers' and producers' surplus represented by the new tent-shaped functions with maximums above point C. If the prices of the various products are equal, consumers whose tastes lie within the range AC to CB will buy product C; those whose tastes lie to the left of CB will buy B, and those who prefer a beer blander than AC will buy A.

Whether or not product C will be offered depends critically upon the fixed costs of supplying it—that is, the required investment in research, development, plant and equipment, and introductory marketing—and upon market structure. Market structure matters in the following way. If the market is at least locally monopolized and entry by outsiders at C is blocked, the relevant gross payoff to the producer of A and B contemplating the introduction of C is the diamond-shaped area consisting of triangles T_A and T_B .¹⁰⁵ Assuming the variable unit production and distribution costs of C to be the same as for A and B, T_A and T_B represent increased contributions to profits from the producer's perspective, although as Figure 16.3 is drawn, they are actually redistributions from what would be consumers' surplus in the absence of C to producers' surplus. If the sum of T_A plus T_B exceeds the fixed cost of supplying C, our monopolist will offer C; if fixed costs exceed $T_A + T_B$, C will not be offered, at least under the monopoly conditions postulated.

Let us however relax the assumption that entry is blocked. A monopolistic competitor considering offering C in competition with other sellers' products A

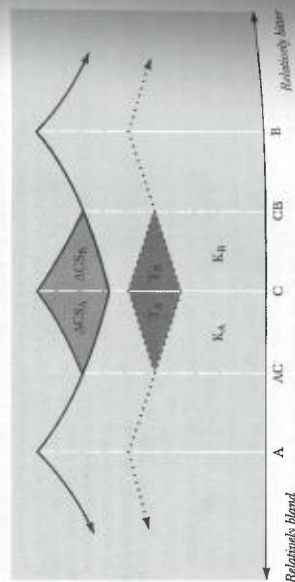


Figure 16.3
Consequences of Introducing
an Additional Product
Variant C

and B and assuming, Bertrand-like, that C is priced at the same level as the unchanged prices of A and B,¹⁰⁶ perceives itself as gaining the diamond-shaped surplus $T_A + T_B$ plus the surpluses K_A and K_B , which are transfers of producers' surplus from the maker(s) of A and B to the producer of C. Such transfers are sometimes referred to as *canibalization*. The monopolistic competitor unconcerned about whence K_A and K_B come views itself as gaining a larger surplus through product introduction than does the monopolist of A and B. It is entirely possible that fixed costs exceed $T_A + T_B$, in which case the monopolist enjoying blockaded entry will not launch product C, while they are less than $T_A + T_B + K_A + K_B$, in which case a monopolistic competitor will offer C. Such reasoning lies at the heart of economists' conclusion that a greater variety of substitute products is likely to appear under monopolistic competition, with entry open, than under monopoly with closed entry.¹⁰⁷

If there is monopoly but entry into space C is open, the monopolist may choose also to offer C and preempt entry that would otherwise cause it to lose surpluses K_A and K_B . If so, as much product variety may arise under such entry-detering monopoly (or oligopoly) as under monopolistic competition, other things (such as pre- and postentry prices) being equal.

This seeming virtue of monopolistic competition and entry-detering monopoly can be carried so far that it becomes a vice. From the standpoint of society as a whole, assuming that a dollar's worth of costs, consumers' surplus, or producers' surplus are equally valued, a new product *should* be introduced if its net addition to surplus—that is, $CS_A + CS_B$ in Figure 16.3—exceeds the fixed cost of introduction. (T_A , T_B , K_A , and K_B are irrelevant to the calculation of social benefit because, as transfers, they cancel out.) The diamond-shaped consumers' surplus addition may be either larger or smaller than the wall tent-shaped surplus guiding the decisions of monopolistic competitors or entry-detering monopolists. As Figure 16.3 is drawn, $CS_A + CS_B$ is considerably smaller than $T_A + T_B + K_A + K_B$, and so if fixed costs are substantial (that is, greater than $CS_A + CS_B$), but less than the T , K sum, monopolistic competition is likely to lead to *too much* product variety relative to the social welfare-maximizing level.

How can one tell whether the optimal amount of product variety will be overshoot in this way? Two sets of considerations provide guidance.

First, the relative flatness or steepness of the surplus functions matters. With relatively flat surplus functions, the net social gain $CS_A + CS_B$ is likely to be small

105. To be more precise, the producer will view as its gross benefit from introducing C the discounted present value of the surpluses T_A and T_B over all years in which product C is expected to be sold.

106. On alternative pricing assumptions, see Steven C. Salop, "Monopolistic Competition with Outside Goods," *Bell Journal of Economics*, vol. 10 (Spring 1979), pp. 141–156; and Motohige Itoh, "Monopoly, Production Differentiation, and Economic Welfare," *Journal of Economic Theory*, vol. 31 (October 1983), pp. 88–104.

107. See Kelvin Lancaster, "Socially Optimal Product Differentiation," *American Economic Review*, vol. 65 (September 1975), pp.

580–585; Michael Spence, "Product Selection, Fixed Costs, and Monopolistic Competition," *Review of Economic Studies*, vol. 43 (June 1976), pp. 217–235; Michael C. Lovell, "Product Differentiation and Market Structure," *Western Economic Journal*, vol. 8 (June 1970), pp. 137–159; J. E. Meade, "The Optimal Balance Between Economies of Scale and Variety of Products," *Economia*, vol. 41 (November 1974), pp. 359–367; Roger W. Korniker and Martin K. Perry, "Product Differentiation, Monopolistic Competition, and Public Policy," *Bell Journal of Economics*, vol. 12 (Spring 1981), pp. 217–231; and Norman J. Ireland, "Product Diversity and Monopolistic Competition under Uncertainty," *Journal of Industrial Economics*, vol. 33 (June 1985), pp. 301–313.

relative to the amount of cannibalization $K_A + K_B$, and so excessive product proliferation is apt to be encouraged. The surplus function slopes cannot be measured directly, but they have observable correlates. A steep surplus function slope means that people shun products located some distance from their most preferred characteristics; a flat slope means that consumers readily substitute a product of less than ideal characteristics if they cannot get exactly what they want. Strong qualitative preferences imply steep slopes and sizable consumers' surplus gains; fickleness among consumers toward substitutes implies small gains. Also, with steep surplus function slopes, the net noncannibalized sales (or more precisely, gross margin) increase $T_A + T_B$ that results from introducing a new product is likely to be relatively large.

Second, cannibalization will be greater, all else held equal, the higher the elevation of the producers' surplus functions (dotted lines) is in relation to the total surplus functions (solid lines), or more simply, the greater is the ratio of producers' surplus to consumers' surplus. This in turn depends upon two factors. If producers maximize profit in the short-run sense, setting marginal cost equal to marginal revenue, the ratio of producers' surplus to consumers' surplus will be higher when the demand function for an individual product is concave downward (that is, with a relatively flat top) than when it is convex downward.¹⁰⁸ With concave downward demand functions, it should be noted, the quantity of a product demanded falls off sharply as the product's price is increased, holding the prices of substitute products constant, which means that the products are relatively close substitutes, and hence that one product is likely to cannibalize considerable surplus from the other. Producer's surplus is also apt to be relatively high when the oligopolistic sellers of substitute products respect their mutual interdependence in pricing, cooperating in a joint profit-maximizing policy, as compared to behaving in the Cournot-like manner of monopolistic competitors.

In sum, excessive product variety is most likely to be forthcoming when there is open entry or the threat of entry that insiders choose to preempt; high substitutability among product variants; relatively high gross profit margins (that is, before the deduction of fixed costs); modest sales growth as a consequence of adding an additional product to the existing set; and fixed product introduction costs that are substantial but less than the amount of potential producers' surplus cannibalization. There is little systematic evidence on how frequently this constellation of conditions occurs. It is certainly possible to find cases in which product proliferation appears to have been carried beyond the point at which marginal social benefits equaled social costs. The U.S. ready-to-eat cereal industry during the 1960s, with close respect for mutual interdependence in pricing, price-manufacturing cost margins in excess of 50 percent, fickle consumers, and modest (noncannibalized) growth despite intensive launching of new products, is a real (noncannibalized) example.¹⁰⁹ So is the U.S. soft drink industry during the 1980s, in which numerous new low-calorie and decaffeinated products cannibalized each other's surpluses extensively.¹¹⁰ Exploring a wide range of parameters with a simple partial equilibrium simulation model, Michael Spence found a tendency for the number of product variants under monopolistic competition to exceed the social optimum in all cases except those with both high fixed product launching costs and low

cross elasticities of demand (that is, poor substitutability).¹¹¹ How general his results are is unclear. On this important question, more theoretical and (especially) empirical research is needed.¹¹²

Product Standardization

Variety is not always a good thing. Wholly apart from the cost savings attainable through longer production runs, there are cases in which standardization serves consumers better than diversity. The adoption of common technical standards for records and compact discs, so that any product can be played on any manufacturer's audio equipment, is one example. Similarly, typewriter keyboards are standardized on the QWERTY system so that users can move easily from one machine to another, even though appropriately trained persons could type much faster on alternative keyboard layouts.¹¹³ The use of computers would be facilitated in numerous applications if compatible data coding conventions and programming languages were adopted, although in 1989, the computer world remained a Tower of Babel despite occasional standardization attempts.¹¹⁴

Convergence upon a common industry standard can be difficult when early adopters incur costs, or lose sales to rivals, as a result of pioneering the way.¹¹⁵ Once they are established, standards may persist beyond their useful lives because the first firms to change encounter resistance from already committed users and are unable to capture the benefits accruing to the customers of rivals who might follow suit. Recognizing the difficulties of standard changing, industry members often form cooperative standards committees to coordinate product specifications and interfaces. These can have negative as well as positive effects; for example, they may serve as a forum for collusion, or insiders may influence the standards adopted so as to make entry more difficult for outsiders.¹¹⁶ Even without such formal coordination, entrenched incumbents may, by preempting the announcement of new standards or taking predatory actions inhibiting the growth of smaller

108. See Spence, "Product Selection," pp. 224-225.

109. See Scherer, "The Welfare Economics," supra note 103; and Richard Schmalensee, "Entry Deterrence in the Ready-To-Eat Breakfast Cereal Industry," *Bell Journal of Economics*, vol. 9 (Autumn 1978), pp. 305-327. For an industry analysis that draws no welfare conclusions, see R. W. Shaw, "Product Proliferation in Characteristic Space: The UK Fertiliser Industry," *Journal of Industrial Economics*, vol. 31 (September/December 1982), pp. 44-51.

110. See "Coke's Big Marketing Blitz," *Business Week*, May 30, 1983, p. 61, in which 30 to 35 percent of the sales of Diet Coke were found to have come from Coca-Cola's own previous brand, 7-Up, in addition to cannibalizing Diet Pepsi sales. See also "It's Coke vs. Pepsi - Again," *Business Week*, August 2, 1982, p. 65, in which it was predicted that one-fourth of Diet Coke's sales would come by cannibalizing Coca-Cola products and three-fourths from somebody else's.

111. Michael Spence, "Product Differentiation and Welfare," *American Economic Review*, vol. 66 (May 1976), pp. 407-414.

112. Marketing researchers have begun to analyze the sales of specific new products in the framework of characteristics space

models. See John Hauser, "Theory and Application of Defensive Strategy," in L. G. Thomas, ed., *The Economics of Strategic Planning* (Lexington: Heath-Lexington, 1986), pp. 113-139.

113. See Paul David, "Clio and the Economics of QWERTY," *American Economic Review*, vol. 73 (May 1983), pp. 332-337.

114. See "Computer Gang's Stake Out Turf: Each Hopes To Set Industry Standards," *New York Times*, December 13, 1988, p. D1.

115. See Joseph Farrell and Garth Saloner, "Standardization, Compatibility, and Innovation," *Rand Journal of Economics*, vol. 16 (Spring 1985), pp. 70-89; and idem, "Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation," *American Economic Review*, vol. 76 (December 1986), pp. 940-955.

116. A standards committee's exclusion of newcomers with an allegedly superior solid-state circuitry approach to fluorescent lamp ballasts was a central issue in an antitrust case, *L.M.P. Corp. et al. v. Universal Manufacturing Corp. et al.*, Superior Court of the State of California, Alameda County, no. 590001-7, filed in 1987. See also Federal Trade Commission Bureau of Consumer Protection, final staff report, *Standards and Certification* (Washington: April 1983).

Market Structure and Product Durability

ivals, prevent the emergence of standards that would prove to be superior if they could gain a sufficient foothold. Little is known about the distribution of benefits and costs from such standard-setting activities under diverse market structural conditions.

In addition to determining how many product variants to offer, sellers must decide how much quality to build into a given product. Among other things, this entails a choice as to how durable the product will be. As a rule, it costs more to produce a more durable product, but the product then yields its services to buyers over a longer period of time, which means that the seller must wait longer for replacement sales. Does market structure affect the tradeoff sellers make on this point?

Perhaps the most interesting point of departure is the work of Peter Swan, who, after correcting important omissions in earlier analyses, concluded that with perfect foresight, perfect capital markets, and the absence of either economies or diseconomies of scale in production, monopolists and competitors would choose identical product durability.¹¹⁷ The essence of his argument is best captured by considering separately the cases in which durable goods are leased or rented out by the producer, as compared to selling them outright.

In the leasing case, how often the good wears out and has to be replaced is mainly a concern of the lessor. Ignoring possible disruption costs while the good is replaced, durability should be a matter of indifference to the lessee. A monopolistic lessor will of course restrict the supply of its durable good's services more than a set of competitive lessors would, but that classic monopoly restriction is effected by setting the rental rate higher than the competitive rate. Given the choice of price and service levels over time, both the competitor and the monopolist maximize their profits by choosing the degree of durability that minimizes the discounted cost of providing the chosen stream of durable good services. And with no economies or diseconomies of scale, that cost-minimizing durability level will be the same under either market structure.

Results for the sales case follow from the leasing logic. With perfect capital markets and foresight, the profit-maximizing sales price for a durable good will equal the discounted present value of the benefits to marginal users under an optimally priced leasing policy.¹¹⁸ Ignoring complications to be introduced in a moment, the producer under either monopoly or competition should therefore be indifferent between selling and leasing, and the optimal level of durability is therefore the same when the product is sold as when it is leased. And that choice, to repeat, is the same with either market structure.

These conclusions do not survive the modification of important assumptions, especially when there are reasons why durable goods producers must sell their products rather than leasing them. For one, when capital markets are imperfect and durable good buyers have a higher discount (that is, interest) rate than producers, durability will be lower under monopoly than under competition.¹¹⁹ This is so because future replacement outlays are discounted more heavily by buyers than by sellers, and a monopolist will take advantage of this asymmetry by reducing durability to stimulate replacement sales. Second, if buyers fear that the durable good seller will reduce the value of their purchases by flooding the market, the

will restrict their purchases, and the durable goods seller reacts by slanting its production decisions toward lower durability than it would choose as a lessor.¹²⁰ Third, the Swan analysis ignores the possibility that buyers incur maintenance costs to prolong the life of their equipment. If the cost of maintenance is beyond the durable good supplier's control, the ratio of the cost of an hour's maintenance effort to the cost of the good will be lower under monopoly (with elevated goods sale prices) than under competition. Thus, relatively more maintenance will be done under monopoly and the good's life will be extended, *ceteris paribus*. Taking this into account, the monopolist is likely to adjust its choices in the direction of reduced durability (and lower prices).¹²¹ Finally, it is common for the costs of using a durable good to rise over time as the good gradually deteriorates. The more frequently the durable good is replaced, the lower average operating costs will be, but the higher capital (that is, replacement purchase) costs will be. Under a high-price monopoly, this tradeoff will be biased more toward later replacement than under competitive pricing.¹²² Recognizing this, the monopolist seller will adjust its durability choice, although the direction of the change cannot be predicted unambiguously without additional information on the pattern of operating costs.

Because the pure monopolies assumed in these models are rare in the real world, it is difficult to find evidence permitting a clear-cut test of the theory. One illustration is AT & T's shift, forced by the Federal Communications Commission in 1981, from leasing to selling its telephone handsets. Durability clearly fell, although it is unclear how much of the change was attributable to the move from leasing to selling and how much to the concomitant transition from monopoly to competition.¹²³ Robert Avinger reports four cases—electric lamps, phonograph stylus, stainless steel razor blades, and electronic vacuum tubes—consistent with the hypothesis that monopoly considerations inhibited the introduction of more durable product variants.¹²⁴ However, product durability limitations were arguably attributable at least as much to the complexities of coordination in cartelized

117. Peter L. Swan, "Durability of Consumption Goods," *American Economic Review*, vol. 60 (December 1970), pp. 884-894; and E. Sieper and Peter L. Swan, "Monopoly and Competition in the Market for Durable Goods," *Review of Economic Studies*, vol. 40 (July 1973), pp. 333-351.

118. Among other things, arbitrage by firms buying durable goods and then leasing them competitively will help ensure this result. For instance, when IBM reduced the sales prices of its System 360 computers by 6 percent relative to lease prices in 1966, it induced the rapid expansion of computer leasing companies who ultimately brought competitive pressure to bear on IBM's lease rates.

119. See, for example, Robert J. Barro, "Monopoly and Competitive Depreciation," *Journal of Political Economy*, vol. 80 (May/June 1972), pp. 598-602.

120. See Jeremy J. Bulow, "Durable-Goods Monopolists," *Journal of Political Economy*, vol. 90 (April 1982), pp. 314-332.

121. See Richard Schmalensee, "Market Structure, Durability, and Maintenance Effort," *Review of Economic Studies*, vol. 41 (April 1974), pp. 277-286. See also S. J. Liebowitz, "Durability, Mar-

ket Structure, and New-Used Goods Models," *American Economic Review*, vol. 72 (September 1982), pp. 816-824; and John Rust, "When Is It Optimal To Kill Off the Market for Used Durable Goods?" *Econometrica*, vol. 54 (January 1986), pp. 65-86.

122. In this and the next case, the monopolist would prefer to lease, all else equal, which would permit undistorted durability choices. The problems here are analogous to those under which vertical integration by a monopolist whose product has imperfect downstream substitutes improves the efficiency of downstream production. See Chapter 14 *supra*.

123. Teddy T. Siu, "Durability of Consumption Goods Reconsidered," *American Economic Review*, vol. 65 (March 1975), pp. 148-157.

124. In an unpublished speech, an AT&T official observed that one of the most difficult lessons the company had to learn following various deregulation measures was how to make a telephone that lasted only three years.

124. Robert L. Avinger, "Product Durability and Market Structure: Some Evidence," *Journal of Industrial Economics*, vol. 29 (June 1981), pp. 357-374.

Conclusion

oligopoly structures as to the kinds of reasoning assumed in the pure monopoly vs. competition theories. On this question, as on how market structure affects the provision of product variety, much remains to be learned.

Product differentiation is both desirable and inescapable. Yet advertising and product proliferation can be overdone, and that is cause for concern. Advertising campaigns can be carried far beyond the point where they are informative or add spice to consumption, serving merely to barrage the consumer with mutually conflicting or even misleading claims. Image differentiation reinforced through intensive advertising can be an important barrier to entry, permitting the sustained realization of monopoly profits. Product varieties can be proliferated until launching costs outweigh the gains from the more complete satisfaction of diverse consumer demands. Thus, high prices, waste, resource misallocation, and income redistribution are the consequences of excessive product differentiation.

The market system has no fully satisfactory built-in mechanism for curbing advertising abuses and the provision of defective goods and services. At the local community level, agencies such as Better Business Bureaus attempt to mediate complaints on a voluntary basis. In the mid-1970s, the Better Business Bureau of New Haven, Connecticut, received approximately one complaint per year for each 500 resident citizens. The highest complaint frequencies were recorded in home furnishings, automobile sales and service, floor coverings, and roofing. Eighty percent of the complaints were reported to have been settled.¹²⁵ At the national level in the United States, claims that advertising is deceptive can be referred either to a voluntary business group, the National Advertising Division of the Council of Better Business Bureaus, which investigates 100 to 150 cases per year,¹²⁶ or to the government's Federal Trade Commission. The FTC can enjoin misleading practices, compel corrective advertising, and in extreme cases, seek fines against repeat violators. There is evidence that formal FTC legal actions have sharp "teeth," reducing complained-of companies' stock market values and (less consistently) market shares appreciably.¹²⁷ The Commission's task is not an easy one, for the line between misleading and merely persuading is fuzzy, and too heavy a hand at the controls could suppress desirable initiative and creativity.

In cases where advertising is patently excessive, the government might intervene to induce a reduction. The 1971 ban on television and radio advertising of cigarettes is an example, but not a successful one. A considerable volume of expenditures was deflected into other media, and an important source of health hazards and warnings was eliminated. There is little reason to believe that cigarette consumption fell as intended. Another example was set in 1966 when the British Monopolies Commission recommended a 40 percent cut in advertising by Unilever and Procter & Gamble accompanied by a 20 percent reduction in household detergent prices.¹²⁸ However, the government settled for a milder compromise under which the two companies agreed to introduce new, less heavily promoted products priced 20 percent lower than existing brands. The effort is said to have accomplished little, largely because the companies refused to admit that the unadvertised products' quality was equivalent to that of their main brands. As a result,

consumers showed little interest in purchasing the new products. Other expenditure-discouraging policy alternatives include imposing a progressive excise tax on advertising, requiring advertisers to capitalize and then depreciate their advertising outlays in computing income taxes rather than writing them off in the year they are incurred,¹²⁹ or attacking under the price discrimination laws the quantity discounts received by large advertisers. All such policies run the risk of evasion and evoking undesirable side effects. It is difficult to be sanguine about the ability of government staff charged with policy enforcement to outwit their business counterparts and ensure that after companies have taken adaptive steps, the situation is significantly improved.¹³⁰

The adverse effects of advertising can be mitigated by making available to consumers objective information on the relative qualities of competing products. Much is already done along these lines; part of the problem is simply to do it better. The government might subsidize the activities of such organizations as the Consumers Union, permitting them to conduct more frequent and extensive product tests and to disseminate reports to a broader audience.¹³¹ The wider implementation of uniform quality grading systems, enforced through inspection and supplemented by programs to inform the consumer, might be encouraged. Reports of quality and suitability tests conducted on thousands of consumer items by federal procurement agencies could be published and distributed on a massive scale. And finally, appropriate government agencies might take the more radical step of subpoenaing the extensive consumer panel test information in company files and making it available to the press and public in comprehensible form.

Whether problems of excessive product proliferation or insufficient product durability can be corrected through governmental action is debatable. As we have seen, product durability can be optimal or downward-biased under monopoly, and market processes can lead to too much, too little, or the right amount of product variety. The key question is, Can government agencies or courts outperform the market in determining how much variety or durability is correct? Considerable skepticism seems warranted. Intervention is best saved for the most severe market failures—for example, as in the U.S. government's actions during the early 1970s to require automobile bumper designs sufficiently durable to withstand specified crash impacts, or the Air Force's insistence in 1987 that all computers purchased under its \$4.2 billion modernization program use the Unix operating system.

125. Sharon Oster, "The Determinants of Consumer Complaints," *Review of Economics and Statistics*, vol. 62 (November 1980), pp. 602-609.

126. "In Advertising, It's No More Mr. Nice Guy," *Philadelphia Inquirer*, Sept. 21, 1986, p. 9-D. For comparisons to other nations, see J.J. Boddewyn, *Advertising Self-Regulation and Outside Participation: A Multinational Comparison* (New York: Quorum, 1988).

127. Sam Peltzman, "The Effects of FTC Advertising Regulation," *Journal of Law & Economics*, vol. 24 (December 1981), pp. 403-448. That issue of the *Journal* is devoted entirely to consumer protection regulatory questions. See also Pauline Ippolito and David Scheffman, eds., *Consumer Protection Economics*, Federal Trade Commission conference report (Washington: 1986).

128. Monopolies Commission report, *Household Detergents* (London: HMSO, 1966). See also "Britain and 2 Soap Makers End Price Battle with Compromise," *New York Times*, April 2, 1967, p. 65.

129. See "Curb on Ad Write-Offs Is Opposed," *New York Times*, March 8, 1986, p. 35.

130. For a case study in chronic failure, see Mann and Plummer, "The Big Headache," *supra* note 43.

131. During the mid-1980s, *Consumer Reports* had nearly three million subscribers.