Of course, one cannot fully analyze the effects of DBS entry on the characteristics of services offered by competing cable operators using models that assume that DBS and cable offer identical services at any given time. As a result of technology and regulation, DBS and cable cannot at this time offer services with exactly the same characteristics. For example, in most cases cable systems cannot yet offer as many channels as DBS nor the video and audio quality of digital services, while DBS cannot offer local programming services or (for most subscribers) television network programming. Also, technology and regulation aside, DBS and cable operators are able to choose among many possible combinations of programming services and service packages. Fortunately, economists have also developed a number of models that can be used to analyze the effects of entry and greater competition in markets for differentiated products.

## B. Theories in Which Products May Be Differentiated

There are a number of economic models in which each seller offers products with a single set of characteristics but the products offered by different sellers may be differentiated. For example, different suppliers of soup may use different amounts of salt, or different suppliers of cola may use different amounts of sugar and caffeine.

Two opposing incentives may affect the extent to which firms differentiate their products from those of competitors. On the one hand, sellers want to offer products with the characteristics for which there is the greatest demand. This incentive may encourage them to offer similar products. On the other hand, sellers want to differentiate their products in order to reduce the extent to which buyers will switch to competing products in response to price increases, and thereby to reduce price competition. This incentive encourages them to increase the differences—e.g., salt, sugar and caffeine contents—among their products.

The extent of product differentiation in a market that results from balancing these two incentives depends on the number of competitors, consumers' preferences, technology and cost conditions, and regulation. Consequently, the effects of entry and greater competition on the characteristics of products offered by incumbents also depend on these factors. This point will be illustrated using models with differentiated products that are known as location models.

### 1. Hotelling's Location Model

In location models, the characteristics of a product are identified by the product's location in what is called product characteristics space. When products are differentiated by only one characteristic, such as the salt content of soup, the product characteristic space is a straight line (see Figure 1). In the case of soup, the point at the left end of the line represents salt-free soup. Moving to the right along the line, one passes points representing soups with progressively higher salt contents.

Location models can be used to analyze sellers' choices of locations in geographic space as well as in product characteristics space. For example, rather than being used to analyze a soup company's choice of salt content in product characteristic space, the models can be used to analyze the decisions of sellers of milk on where to locate their stores along a street.

Carlton and Perloff explain location models as follows:[24]

> Location models make two key assumptions. First, each firm's product has a particular location in geographic or product (characteristic) space. That is, either the product is sold from a store that is located at a particular address, or the product is "located" at a particular point in characteristics space. The closer two products are to each other in geographic or characteristics space, the better substitutes they are. Second, consumers also have locations in geographic or product space. It costs consumers more to shop at

stores further from home, or they receive less pleasure from products whose characteristics deviate from their ideal.

The simplest location model was introduced by Harold Hotelling in 1929 to investigate the geographic location choices of two sellers, A and B, of a homogeneous product (e.g., milk), the price of which is fixed by regulation. Each seller chooses where to locate a single store in a town that consists of a single street running east and west that is, say, one mile long. Identical consumers, each of whom purchases one gallon of milk a day from the nearest seller, live in houses distributed uniformly along the length of the street. In this case, if seller A is located west of the center of town, seller B will choose to locate just east of seller A, because this location maximizes the number of customers that are closer to B than to A. If seller A can costlessly choose another location, A will move just to the east of B. This process of relocation will continue until A and B are located next to each other in the center of town, with each selling to half the people in town.

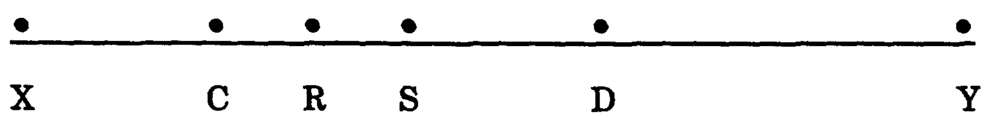
While the preceding model is discussed in terms of choice of geographic location, the model applies equally to choice of location in product characteristics space (e.g., saltiness of soup). Under the assumptions in Hotelling's model, the two sellers will not differentiate their products, even though the ideal products of different consumers are not the same, and even though the costs of supplying different products are the same.[25]

### 2. Alternative Assumptions Regarding Costs

The Hotelling model assumes that each seller is able to choose any point along the line, that costs of production are the same for both sellers and at all points along the line, and that sellers bear no costs if they change their locations along the line. In the case of multichannel video programming delivery services, none of these assumptions is appropriate. Cable and DBS have different cost characteristics, and costs for each of these services are affected by choice of location in product characteristics space. Also, cable operators have substantial sunk costs, and repositioning in product characteristics space (for example, adding channels, or switching from analog to digital service) is costly.

To accommodate these supply characteristics for sellers of multichannel video programming services, a few simple changes can be made in the Hotelling model. Suppose product characteristics space consists of the line between X and Y in Figure 1. The points along the line may be considered to differ in a characteristic such as number of channels of programming. Suppose that prior to the availability of DBS, an incumbent cable system has chosen to offer the service represented by point C on the line.

**Figure 1: Product Characteristic Space**




Now suppose that a DBS supplier enters, locating at point D on the line, and that once it has entered it cannot change its location because of its sunk costs (including the fixed characteristics of its satellite). Under the remaining assumptions in the Hotelling model, customers located between point S (which is mid-way between points C and D) and point Y will switch from cable service to DBS unless the cable operator repositions its service closer to point D.

If it were costless for the cable service to reposition, and if its costs were the same at each location, the cable operator would move just to the left of point D. In this case, the repositioning would enable the cable operator to retain the customers located between point S and point D.

However, the costs for the cable operator to reposition and to supply a product with characteristics closer to those offered by the DBS competitor are likely to be greater the closer the cable operator moves to point D. For example, each extra channel offered by the cable operator has an additional cost (for example, foregone analog capacity as the operator shifts bandwidth to digital service). Also, the costs for the cable operator to reposition are likely to be higher in the short-run (when it might shift a limited amount of bandwidth from analog to digital service) than in the long-run (when it might rebuild substantial portions of its system). As a result, at least in the short-run, one would not expect the cable operator to reposition all the way from point C to point D. Rather, the cable operator might move part of the way toward point D, for example, to point R. In some cases, where the cost of relocation would be particularly high, the cable operator might not relocate at all in the short-run. Therefore, one would expect different cable systems to reposition to different extents in response to the entry of DBS.

### C. Other Economic Incentives

All economic models involve simplifications, and thus the two types of models discussed above do not incorporate all the factors that can affect competitive responses to entry in the real world. For example, the preceding models assume that cable companies have complete information about customer preferences as well as other features of the market. In fact, cable companies are likely to have rather incomplete information about the willingness of consumers to pay for programming service options that are not available in the market place. As a result, one important effect of entry by a new competitor, such as a DBS provider, is to reveal to cable operators new information about what appeals to consumers. Naturally, cable operators may respond to what they learn by repositioning their services to appeal to consumers whose willingness to pay has now been revealed. This is likely to be one factor accounting for the repositioning of cable services to more closely resemble DBS offerings along certain dimensions, such as inclusion of additional channels in the standard program packages and increases in channel capacity.

### D. Summary

The economic models discussed in this section demonstrate points that are important in understanding and assessing the responses of cable operators to the entry of DBS competitors. Economic theory does not predict that entry and greater competition will necessarily lead to lower prices. New entrants may provide substantial competition to incumbents, and cause consumers to be better off, even though the prices of incumbents' products or services increase. Incumbents may have a number of incentives to change the characteristics of their products following entry by competitors. Under some circumstances, incumbents can be expected to make their products more attractive to consumers in ways that increase their costs and prices. Under other circumstances, incumbents are likely to reposition their products to more closely resemble those offered by entrants. As a result, when entrants offer products with costs and prices above those of the incumbent, the repositioning of the incumbent in response to greater competition may lead to an increase in the incumbent's costs and prices.

## V. Competitive Responses to Entry in Other Industries

Repositionings of products and services by incumbents, along the lines of the repositioning undertaken by cable operators in response to entry by DBS and other factors, are a frequent response to entry. This section provides four illustrative examples of competitive responses to entry in which incumbent suppliers repositioned their products or services, or added new products, with the result that the characteristics of the products or services that incumbents offered more closely resembled those offered by entrants and thus were more attractive to customers that might otherwise have been lost to the entrants.

### A. Repositioning by Manufacturers

Automobiles and ice cream provide two illustrations of markets in which entry by a supplier offering differentiated, higher quality, or for other reasons higher cost products caused incumbents to manufacture products with characteristics more like those made by the entrants.[26]

#### 1. Cars: Responses to Japanese Imports

During the 1970s, Toyota and Honda entered the U.S. market with automobiles that rated above those made by the U.S. auto companies in a number of quality dimensions, including freedom from defects in fits and finishes, new-owner complaints recorded by J. D. Power & Associates, and recalls. With Ford leading the way, U.S. auto makers responded, for example, with more careful assembly and inspection, and their defect and complaint rates declined significantly during the early 1980s.

During the first half of the 1980s, Ford devoted $3 billion to designing and setting up facilities to manufacture the radically styled Taurus/Sable to be "absolutely world-class in terms of quality and customer satisfaction."[27] It was reported that "The new cars reflect the profound changes at Ford that began...in 1980....The corporate soul-searching, similar to efforts at GM and Chrysler, was labeled the Alpha Project at Ford. Its purpose was to find ways to compete against the Japanese."[28] Introduced at the end of 1985, by 1987 the Taurus was the number one selling car in the U.S. In 1987, it was reported that "The Big Three are making better cars than they did in 1980...The tumultuous, expensive revolution in technology, management, labor relations, and corporate culture forced on Detroit by the success of Japan is beginning to pay off."[29]

A recent example of the higher quality of U.S. cars is the Saturn, which ranked fourth (after Lexus, Infinity, and Cadillac) in the 1992 J. D. Power Sales Satisfaction Index. It is reported that "From the beginning, the driving concept behind Saturn was to create a world-class compact car that could match or exceed the Japanese imports such as the Honda Civic and the Toyota Corolla....The quality imperative was one of the defining dimensions of the Saturn corporate culture."[30,31]

Auto makers frequently reposition an automobile brand by upgrading components or features. For example, features that are initially offered as options at additional à la carte prices often are subsequently incorporated in the base vehicle package. *The Wall Street Journal* (Sept. 5, 1984) reported:

> Changes in base prices are often much different from the changes in prices for comparably equipped cars...because of changes in standard equipment. Ford's popular Thunderbird Turbo Coupe now starts at $13,378, 8.3% more than the 1984 model's $12,354 price, thanks partly to the addition of high-performance wheels and tires, power windows, tinted glass and special paint as standard.

The same newspaper later reported that the 1988 model "Taurus now starts at $11,380 compared with $10,650 for the 1987 version, reflecting the addition of special mirrors, tinted glass, AM-FM stereo radio and split bench seat."[32] While such repositioning of a brand naturally tends to result in an increase in the base price, an increase in the base price for an expanded automobile package does not imply that consumers are worse off.

### 2. Ice Cream: Response to Häagen Dazs and Other Suppliers of Superpremium Brands

Superpremium ice cream has a high butterfat and low air content and typically is made without artificial ingredients. Superpremiums cost more than regular ice creams and sell at substantially higher prices.

Between 1980 and 1982, annual sales by superpremium pioneer Häagen Dazs quadrupled from $30 million to $115 million, and during the early and mid-1980s other producers of superpremiums—Steve's, Ben & Jerry's, and Frusen Glädjé—expanded into an increasing number of local markets in the U.S. In response, incumbent suppliers of regular and premium ice cream introduced their own superpremium brands. For example, Blue Bell, which had a 60 percent share of ice cream sales in Dallas-Fort Worth, introduced superpremium ice creams priced at $1.89 a pint compared to their regular ice creams at $3.50 a half gallon. Southland introduced Barricini superpremium ice creams at $2.39 a quart, and Baskin-Robbins introduced superpremium ice creams that were sold for about 25 percent more than its regular line.[33]

Notwithstanding such product line extensions by other ice cream producers, sales by the two most successful superpremium brands—Häagen Dazs and Ben & Jerry's—increased. Each had sales of about $150 million in 1994.[34]

## B. Repositioning by Retailers

Supermarkets and department stores provide illustrations of retailing market segments in which entry by a new retailer offering higher quality goods, more attractive displays, a more pleasant shopping environment, and superior customer service caused incumbents to reposition themselves with respect to both merchandise carried and the shopping environment.

In light of the ways in which incumbents repositioned, it is reasonable to conclude that the price for the average bundle of goods sold to customers increased, reflecting both the higher quality merchandise and the higher level of customer service.

### 1. Supermarkets: Responses to Fresh Fields

By 1994, the Fresh Fields and Whole Foods Market (including Whole Foods, Bread & Circus, Mrs. Gooch, and Wellspring Grocery stores) supermarket chains, which focus on natural foods, had launched stores in a number of markets in the U.S. and had scheduled launches in additional markets. Incumbent supermarkets responded during 1994 and 1995 to actual, scheduled and anticipated entry by natural foods supermarkets by increasing their own offerings of natural, organic and perishable foods generally and devoting more space to these in new and remodeled stores. For example, it was reported that in 1995 Fresh Fields planned to open at least four stores in the New Jersey territory of Kings Super Markets, and that in anticipation "Kings Super Markets has introduced a broad line of natural food products that cuts across all fresh departments, and sets the tone for a battle this summer against health food supermarket chain Fresh Fields. The line, called Kings Naturally, already encompasses more than 700 items."[35] Incumbents also stepped up nutritional education and promotion of natural foods and produce.

Natural foods chains have encouraged repositioning by incumbent supermarkets even though only a small percentage of households shop at natural foods chains where they are available. It was reported that Peter Roy, president and chief operating officer of Whole Foods Market, "estimates that natural foods stores appeal to 5% to 10% of the population, with a growth factor of about 12% a year since 1987." In 1994, Whole Foods

Market operated 35 stores in eight states, and Fresh Fields operated 14 stores.[36]

Natural foods, organic foods, and fresh perishable foods cost more than traditional alternatives. As a result, one can infer that the repositioning of incumbent supermarkets in response to the entry of natural foods supermarkets was accompanied by an increase in both the quality and cost of grocery bundles purchased at incumbent supermarkets by many shoppers.

### 2. Department Stores: Responses to Nordstrom

Nordstrom, a Seattle-based upscale fashion specialty store chain featuring high quality apparel, footwear, and softgoods, and with a reputation for large inventories and outstanding service, entered California in the late 1970s, with ten stores there by the end of 1984. It was reported that "With the ever-increasing presence in California of Nordstrom,...other retailers have been forced to modify their buying and marketing strategies to compete....One effect the company is now having on California retailing is the expansion and upgrading of competing department stores located in 'Nordstrom Country.'"[37] At Tysons Corner, the Hecht Company scheduled the grand reopening of its store after $16 million worth of expansion and modernization for the day before Nordstrom unveiled its East Coast outlet."[38] It is also reported that "To stay competitive, Macy's and Emporium-Capwell have spruced up stores and stocked up inventories for better customer selection."[39]

There are many reports that incumbent department stores also responded to Nordstrom's entry by upgrading customer service. It was reported that "Since West Coast retailer Nordstrom brought its renowned customer service to Washington two summers ago [that is, in 1988], area retailers have quietly moved to improve their own service....Area retailers are paying more attention to their service, from pushing sales personnel to be more service-oriented to offering sales commissions to hiring piano players."[40] According to another account, "competitors are scrambling to mimic Nordstrom's service and panache—a phenomenon industry insiders brand the 'Nordstromization' of retailing.

### C. Summary

This section provides four illustrative examples of responses by incumbents to entry by competitors. The examples were drawn from a wide range of markets to illustrate important points about competitive responses of incumbents to entry. The examples illustrate the fact that incumbents often respond to entry by repositioning their products or by introducing new products that extend their product ranges. The examples also illustrate the fact that incumbents often respond to entry by taking steps to reduce the extent of product differentiation between what they and new entrants offer. The result of the repositioning is that incumbents' costs and therefore prices may increase, and new products that are introduced may be added at the high end of the price range. Such observations do not imply that consumers are worse off as a result of the changes made by incumbents. The very reason for the changes is to attract customers.

## VI. EFFECTS OF ENTRANTS WITH SMALL SHARES ON INCUMBENTS WITH LARGE SHARES

The fact that the number of subscribers to cable service is presently on the order of a dozen times the number of subscribers to DBS service does not imply that DBS does not exert substantial competitive pressure on cable operators. Entrants with small shares of sales may have an important competitive effect on incumbents with much larger shares. As an illustration, this section discusses the responses of Eastman Kodak to

Fuji's entry into the U.S. market for photographic film and single-use cameras. Notwithstanding Kodak's responses, Fuji's market share has expanded steadily, and Polaroid has entered with similar products.

Fuji began serious marketing of its film in the U.S. in 1978, and its market share increased from an estimated 2 percent in 1978 to 5 percent in 1982.[41] Once Fuji's share exceeded 5 percent, Kodak reacted in a number of ways to competition from Fuji. Kodak quickly matched Fuji's products, including new films and single-use cameras. In 1984, it was reported that "when Fuji, last year, proudly unveiled its high resolution film, which produces a finer grain at higher speeds of shooting, Kodak immediately snapped back with similar technology." Also, "Fuji has tried to price its film 10% to 15% less than Kodak's, but has found that the aroused giant has quickly matched its offering." After Fuji introduced cents-off coupons, Kodak did the same. When Fuji became an official sponsor of the 1984 Olympic Games, Kodak became ABC's television sponsor for the Games.[42]

Later in the 1980s, it was reported that "Fuji has introduced a whole new line of 35 mm films, claiming numerous technical improvements" and that Kodak made technical improvements to its Gold line of 35 mm films.[43]

In spite of Kodak's responses, Fuji's market share increased and Kodak's share declined. Kodak had a market share of about 85 percent for U.S. film sales in 1984, while Fuji's share was 8 percent. In 1992, Kodak and Fuji had 70 percent and 20 percent shares, respectively, for single-use cameras.[44] Recently, *The Wall Street Journal* (July 17, 1997, p. A2) reported that Kodak and Fuji had shares of 70-75 percent and in the "mid teens," respectively, for film:

> ...the Rochester, N.Y., photographic giant is losing U.S. share for its core film business. To stem the slide, Kodak may cut its film prices, said Chief Financial Officer Harry Kavetas, a move that could

> intensify an already bloody price war. Mr. Kavetas said Kodak lost one to two percentage points of the U.S. film market from May 1996 to May 1997, although several analysts place Kodak's share loss at four to six percentage points. Kodak is estimated to have 70% to 75% of the U.S. film market. Analysts say rival Fuji Photo Film Co. of Japan, which began making film in the U.S. this year, is picking up share from Kodak. They expect Fuji to become even more aggressive in pricing as that plant comes fully on line later this year. Fuji's share has climbed to the mid teens.

Furthermore, the trade press suggested that "Fuji's momentum could be one of the reasons behind Polaroid's (Cambridge, Mass.) announcement earlier this year [1988] that it would enter the 35-millimeter film business sometime in the near future."[45] Polaroid launched its One Film in early 1989. During 1992-93, Polaroid introduced another 35 mm film, called High Definition, and a single-use camera.[46]

## VII. CONCLUSION

This report has provided a review of some of the responses of cable operators to the entry of DBS competitors as well as to other changes affecting the marketplace for delivery of video programming. Cable systems have added popular, previously pay programming services such as The Disney Channel and regional sports channels to their expanded basic services, taken steps to expand channel capacity, accelerated the introduction of high quality digital service, and taken steps to improve customer service. These responses provide evidence that DBS serves as a significant competitive constraint on cable operators. Kodak's responses to Fuji's entry and continual expansion of market share provides an additional illustration of the point that an entrant does not have to have a large market share to have an important impact on competition and on incumbents.

The repositioning of cable services can be further understood by considering models that economists use to analyze the effects of entry and greater competition on product characteristics as well as prices. These models illustrate that, in response to entry, incumbents seeking to attract customers may reposition their products. This is true under a variety of conditions relating to the nature of consumers' preferences, the product characteristics offered by new entrants, the costs to incumbents of repositioning, and the amount of new information about the market obtained by incumbents as a result of observing new entrants.

The fact that repositionings by incumbents involving new product characteristics is a frequent response to entry is illustrated by reviews of the responses of U.S. auto makers to Japanese imports, of incumbent ice cream producers to entry by superpremium brands, of supermarkets to Fresh Fields, and of department stores to Nordstrom. Because the driving force in all these repositionings was the incentive of incumbents to increase the attractiveness of their products and services to reduce the loss of customers to entrants, it is evident that the new offerings from incumbents made consumers better off. This conclusion is not contradicted by the fact that in some cases the incumbents' new products or services had higher costs and therefore presumably higher prices than would otherwise have been the case.

# Notes

1 *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Docket No. 96-133, Third Annual Report, FCC 96-496 (Jan. 2, 1997) ("*1996 Competition Report*").

2 See also *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Docket No. 95-61, Second Annual Report, 11 FCC Rcd 2060 (1996), ¶¶134-138.

3 *SkyREPORT Newsletter*, June 1997; P. Colman, "A Mixed Bag for DBS," *Broadcasting & Cable*, June 9, 1997, p. 41, based on Carmel Group, industry sources; Paul Kagan Associates, *The DBS Report*, April 17, 1997.

4 Warren Publishing, *Television & Cable Factbook*, Services Vol. 65, 1997, p. I-81. Data are for Oct. 1, 1996.

5 DirecTV offers The Disney Channel in its $14.99/month package, and it offers The Disney Channel East (TDCE), The Disney Channel West (TDCW), and one regional sports channel in its $29.99/month package. PrimeStar offers TDCE, TDCW, and one regional sports channel in its $24.99/month package. EchoStar offers TDCE and TDCW in its $19.99/month package, and it offers both these and a regional sports channel in its $26.99/month package.

6 According to HBO, use of premium movie channels by DBS subscribers is twice that of equivalent cable households. J. McConville, "DBS Looks at 20 Million Subs by 2000," *Broadcasting & Cable*, Sept. 30, 1996, pp. 81-82. While Paul Kagan Associates (*The Kagan Media Index*, May 31, 1997, p. 3) reports that 50 percent of basic cable subscribers also subscribed to pay service in 1996, USSB reports that 75 percent of subscribers to DirecTV and/or USSB who were cable subscribers formerly purchased premium cable programming. USSB 10-K, fiscal year ending June 30, 1996, p. 3.

The difference between average cable and DBS subscribers is also suggested by the difference between average revenues per subscriber for cable and DBS. Based on data in Paul Kagan Associates, *The Cable TV Financial Databook*, 1996, p. 10, during 1995 average monthly basic plus pay subscription revenue per basic cable subscriber was $29.36. Average monthly revenue per subscriber was reported to be about $55 for DSS (including about $42 for DirecTV and $24-$25 for USSB), $40-plus for PrimeStar (excluding a $10 equipment rental fee), and around $40 for EchoStar at the end of May 1997. P. Colman, "A Mixed Bag for DBS," *Broadcasting & Cable*, June 9, 1997, p. 41, based on Carmel Group, industry sources. In addition, according to an industry estimate, 30 percent of DBS subscribers also subscribe to some cable service. J. McConville, "DBS Looks at 20 Million Subs by 2000," *Broadcasting & Cable*, September 30, 1996, pp. 81-82, citing the Satellite Broadcasting and Communications Association.

7 "The Comeback of Cable TV," *Fortune*, July 7, 1997, p. 27 (interview with Brian Roberts).

8 "Cable '97 News & Notes," *European Media Business & Finance*, March 24, 1997.

9 C. Paikert, "More MSOs Play Name Game," *Multichannel News*, June 9, 1997, p. 3.

10 "Not Dead Yet," *Barron's*, Dec. 2, 1996, p. 24.

11 J. M. Higgins, "Malone's Turnaround Plan," *Multichannel News*, Nov. 4, 1996, p. 1.

12 J. M. Higgins, "TCI Spells Out All TV," *Multichannel News*, Feb. 10, 1997, p. 1; G. Avalos, "TCI Plans a Speedy Launch of All TV Product," *Contra Costa Times*, May 1, 1997.

13 G. Avalos, "TCI Plans a Speedy Launch of All TV Product," *Contra Costa Times*, May 1, 1997.

14 S. Hettrick, "TCI Plugs Back into Digital TV," *Hollywood Reporter*, May 1, 1997, p. 1. Another press report states that "TCI executives flatly declined to discuss launch locations, saying that they did not want to tip off direct-broadcast satellite competitors." J. M. Higgins and L. Ellis, "Hindery Tweaks All TV Rollout," *Multichannel News*, April 7, 1997, p. 1.

15 C. Paikert, "Disney Move to Basic Keys System Campaigns," *Multichannel News*, Feb. 17, 1997, p. 54. See also Paul Kagan Associates, "Golf Channel, Disney Channel Now More Basic Than Pay," *Cable TV Programming*, June 30, 1996.

16 "Basic Sports Will Switch Its Regional Sports Pay Services of SportsChannel Regional Network to Expanded Basic," *Cable World*, Feb. 13, 1995, p. 18; "Comcast Adds Home Team Sports to Full Standard Service," *PR Newswire*, Dec. 1, 1995; R. Brown and J. McConville, "SportsChannel Reaches 3 Million Mark," *Broadcasting & Cable*, April 8, 1996, p. 53; R. Brown, "Sports Nets Make Move to Basic," *Broadcasting & Cable*, April 15, 1996, p. 71; R. Brown, "SportsChannel Back to Basics: More Than a Million Subscribers Will Be Repositioned," *Broadcasting & Cable*, Jan. 6, 1997, p. 114; "TCI Cablevision Announces SportsChannel Pacific Repositioning," *PR Newswire*, April 24, 1997; R. T. Umstead, "SportsChannel Networks Winning Battle to Basic," *Multichannel News*, Jan. 13, 1997, p. 28. Subscriber data are from *CableVision*, Sept. 20, 1993, p. 43, and the *CableVision* database at http://www.cvmag.com (July 1997).

17 These figures are based on a casual random sampling of à la carte pay service prices for the six channels in question for systems listed in Warren Publishing, *Television & Cable Factbook*, Cable Vol. 65, 1997.

18 Data include satellite homes. M. Katz, "Golf, Disney Have Dual Personalities," *Broadcasting & Cable*, Sept. 30, 1996, p. 70; Paul Kagan Associates, *The Pay TV Newsletter*, May 31, 1997. *CableVision*, Sept. 4, 1993, p. 42, and April 16, 1996, p. 134,

report 7.1 million and 16.1 million subscribers to The Disney Channel, respectively; CableVision had not updated the latter figure in the database at http://www.cvmag.com as of July 1997.

19 Paul Kagan Associates, *The Pay TV Newsletter*, May 31, 1997, p. 6. A casual random sampling of à la carte pay service prices for The Disney Channel for systems listed in Warren Publishing, *Television & Cable Factbook*, Cable Vol. 65, 1997, produced a range of monthly prices from $4.95 to $13.95 with a median of $8.75.

20 The numbers were 1990, 33 channels; 1992, 37; 1994, 43; 1996, 53. Paul Kagan Associates, *The Kagan Media Index*, April 25, 1996, p. 2, and *Cable TV Programming*, July 31, 1996, p. 1.

21 Warren Publishing, *Television & Cable Factbook*, Cable & Services Vol. 59, 1991, p. C-389; Services Vol. 62, 1994, p. I-69; Services Vol. 63, 1995, p. I-77; and Services Vol. 65, 1997, p. I-81.

22 Paul Kagan Associates, *The Kagan Media Index*, April 25, 1996, p. 2, and May 31, 1997, p. 5. See also the discussion above of TCI's All TV digital service.

23 For examples of this literature, see Keith B. Leffler, "Ambiguous Changes in Product Quality," *American Economic Review*, Dec. 1982, pp. 956-67, and the articles referenced by that paper.

24 D. W. Carlson and J. M. Perloff, *Modern Industrial Organization*, 1990, p. 332.

25 This outcome depends on the assumptions in the Hotelling model, including the assumption that prices are set by regulation. If each seller is free to choose both its product characteristic and its price, an equilibrium outcome cannot be determined without additional assumptions, for example, about transportation costs (in the geographic version of the model) or about consumer preferences (in the product characteristics version). If transportation costs are assumed to be a quadratic function of distance (for example, the cost of traveling a distance 2x is 4 times the cost of traveling a distance x), the two sellers will locate at the two ends of the city. Going a step further, a model by Steven Salop analyzes locations around a circle, rather than along a line that has ends. With quadratic transportation costs, this model yields outcomes in which the sellers are spaced equally around the circle. As additional sellers enter, the sellers reposition themselves so that they remain equidistant from each other. See Carlton and Perloff, pp. 334-42.

26 In addition to automobiles and ice cream, a less known example involves haircoloring products. There is a distinction between haircolors used by salons and those sold for use in the home. During the early 1980s, a number of suppliers of imported European salon haircolor, including Framesi, Goldwell, L'Oréal, and Schwarzkopf, entered the U.S. market. These companies offered creme haircolors supplied in tubes and applied with a brush, in contrast to the liquid haircolors supplied in bottles that were the norm in the U.S. The imported creme haircolors were priced above the liquid haircolors and required more skill on the part of salon personnel. For example, Framesi was a "high

end...classy coloring line from Italy," which was marketed as "state-of-the-art." E. Patrick, "Creating a Furor," *Executive Report*, June 1988, p. 19; J. Molyneaux, "New Owner Styles Roffler for Market Growth, *Pittsburgh Business Times & Journal*, Sept. 10, 1990, p. 1.

In the 1980s, the Clairol division of Bristol-Myers was the largest supplier of haircolor in the U.S. Beginning in the mid-1980s, Clairol responded to the imports of European haircolors by introducing its premium Logics Colorcreme brand of creme salon haircolors, which was positioned above its Miss Clairol brand of liquid salon haircolors. Thus, entry by suppliers of premium salon haircolors from Europe caused the major incumbent U.S. seller of haircolors to extend its salon product line into a higher-priced category.

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[28] A. B. Fisher, "Ford is Back on the Track," *Fortune*, Dec. 23, 1985, pp. 18-22.

[29] J. Main, "Detroit's Cars Really Are Getting Better," *Fortune*, Feb. 2, 1987, pp. 90-98.

[30] D. A. Aaker, "Building a Brand: The Saturn Story," *California Management Review*, Winter 1994, pp. 114-33.

[31] The Japanese companies also had lower costs measured in worker hours per car and dollars, and the U.S. auto makers responded with substantial efforts to cut costs. J. Main, "Ford's Drive for Quality," *Fortune*, April 18, 1983, pp. 62ff; C. G. Burck, "Will Success Spoil General Motors?," *Fortune*, Aug. 23, 1983, pp. 94-104; A. B. Fisher, "Behind the Hype at GM's Saturn," *Fortune*, Nov. 11, 1995, pp. 34-49.

[32] *The Wall Street Journal*, Oct. 29, 1987. Similarly, *The Wall Street Journal* (April 5, 1985) reported that "Ford said the Escort and Lynx price increases are justified because of new or improved equipment on the redesigned cars. A new, more powerful engine accounts for $108 of the increases, while new seats account for $33. The remaining $95 results from making power brakes, which had been an option, standard on the cars, Ford said." *Automotive News* (Oct. 6, 1986, p. 6) reported that "Ford Motor has announced an average 2.3% price hike for its model year 1987 cars, which includes addition of many options as standard features. Power steering has become standard on Ford Tempo and Mercury Topaz while 5-speed transmission, electric remote control mirrors, center console and an electronic radio have been added to the Mustang LX. A comparison of 1986 and 1987 base sticker prices shows increases of $600, $800 and many over $1,300, which is closer to a 10-14% increase."

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