

# Promotions and product pricing: Parsimony versus *Veblenesque* demand<sup>☆</sup>

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## Abstract

The veracity of the parsimonious law of demand has long been challenged by analyses of the “Veblen effect” and “prestige pricing”. Backward bending “demand” curves often attend discussions of conspicuous consumption. Probing the sociological and psychological intricacies of potential consumer interdependencies, scholars in economics and marketing have overlooked mundane product promotions. For a monopolistic firm, we formalize the relationship between the optimal price/quantity combination and the thoroughness of product promotions. Iterating toward the profit maximizing thoroughness of product promotion, gives rise to a backward bending price/quantity locus. Challenges to the law of demand that ignore product promotions are thereby undercut.

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*Other things equal, a more elaborate model cannot fit the data worse than a specific (restricted) version of it. Occam's razor suggests deleting those extensions of a model that are irrelevant to the aim of the model, examples of aims being description and prediction. (Keuzenkamp and McAleer, 1995, p. 2)*

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<sup>✠</sup> Professor Erdogan Kumcu (1950–2004) died 7 April 2004 due to a recurrence of cancer. His devotion to family, friends, scholarship, and community was undaunted by circumstance. He will be missed.

## 1. Introduction

The law of demand parsimoniously posits that, *ceteris paribus*, more of a good will be purchased as its price falls, and less as price rises. In the vernacular of the lecture hall, “demand slopes downward.” Beginning with Veblen in 1899, more elaborate theories have been offered for “conspicuous consumption” goods<sup>2</sup>; in both marketing and economics, such goods have commonly been referred to as exceptions to the law of demand. These challenges to the law of downward sloping demand have omitted from consideration a commonly observed business activity: luxury items that are considered exceptions to the law of demand are often promoted via demonstrations and/or warranties.

Luxury automobiles, fine diamond jewelry, and high-end women’s cosmetics are goods whose quality is generally promoted by demonstrations and/or warranties. Automobile dealerships offer potential buyers test drives and extensive, long-term warranties. Jewelers offer (1) money back guarantees on the quality of fine jewelry, (2) extended “no questions asked” money back guarantees,<sup>3</sup> and (3) for prospective buyers of fine diamond jewelry, the opportunity to examine the quality of gems under electronic microscopes. Finally, high-priced women’s cosmetics are distinguished from low-priced ones in demonstrations by salespersons who go to great lengths to help customers sample a variety of combinations to achieve the most attractive mix of colors and textures.<sup>4</sup> Whenever products are conspicuously promoted on an individual basis, the *ceteris paribus* clause explicit in the law of demand means that any demand analysis of such products must control for the presence and thoroughness of the promotions.

The model offered in this article formally shows that individual product promotions can cause profit maximizing firms to adjust along price/quantity paths that are backward bending. We argue that variations in the thoroughness of such promotions imply predictable shifts in standard demand and cost curves that trace out a backward bending price/quantity locus that is *not* a demand curve. When product promotions are extensively provided, researchers cannot ignore them, on one hand, and challenge the veracity of the law of demand, on the other. Before we present our model, we will review the literature on Veblen effects and on prestige pricing to place our approach in context.

## 2. A tale of two literatures

The literature on Veblen effects in economics and on prestige pricing in marketing have developed largely independently of one another. There are two commonalities to these literatures: (1) backward bending demand curves are a stock approach, and (2) equivocal empirical evidence is alleged to challenge the veracity of the law of demand, but there has been no attempt to trace out empirically a backward bending demand curve.

<sup>2</sup> In a recent overview of economic theories of consumption, Ackerman (1997, p. 655) sarcastically remarks: “it is remarkable how little of Veblen shines through the dense mathematical thickets of contemporary economics.”

<sup>3</sup> Davis et al. (1995, p. 19) use a monopoly model to demonstrate that money back guarantees are both profitable and welfare enhancing if “the retailer has a salvage value advantage over consumers that is greater in value than the consumer transaction costs of returning the merchandise”.

<sup>4</sup> Estée Lauder is well known for providing “free” demonstrations of their line of cosmetics. The company’s web page is indicative of this; there one finds (1) announcements about appearances by “make-up artists” in various department stores to provide “free” consultations, and (2) a promotion called “The Beautiful Bride” that offers consultations and individual demonstrations of bundles of products that the company offers.

## 2.1. Key discussions of Veblen effects in economics

The economic literature includes a variety of theories about Veblen effects; many, but not all, explicitly admit either backward bending or upward sloping demand curves as a theoretical possibility.<sup>5</sup> Although Leibenstein's (1950) derivation of a backward bending demand curve from a Veblen effect is generally considered seminal in economics, a much earlier appearance of a backward bending demand explanation of conspicuous consumption is found in a 1939 textbook by F.R. Fairchild, E.S. Furniss, and N.S. Buck. Leibenstein (p. 207) distinguishes the "Veblen effect" from "bandwagon" and "snob" effects:

If the Veblen effect is the predominant effect, the demand curve is less elastic than otherwise, and some portions of it may even be positively inclined; whereas if the Veblen effect is absent, the curve will be negatively inclined regardless of the importance of the snob effect in the market.

Only the presence of a "Veblen effect" (when the consumer gains utility by having others see him as having paid a "higher" price<sup>6</sup>) led Leibenstein to a demand with portions that were "positively inclined."<sup>7</sup> His analysis of the "Veblen effect" gives rise to "demand" curves that can be backward bending. It is important to note that Leibenstein also refers to these "demand" curves as "virtual equilibrium" points. This terminology suggests that *changes* in consumers' perceptions are a violation of a strict interpretation of the *ceteris paribus* caveat in the law of demand.

Evidence of Veblen effects has been presented in a variety of ways. Empirical studies on the Veblen effect include a study of durable goods by Basmann et al. (1988) and Chao and Schor's (1998) study of women's cosmetics.<sup>8</sup> Although neither of these articles attempts to establish the existence of a backward bending demand curve, they each make their case that the prices of conspicuously consumed goods lead to Veblenesque empirical results that are absent for the less conspicuous products particular to their studies. For example, Chao and Schor explain that while the law of demand is verified for less conspicuous products, "for lipstick, price is not *even* a significant negative determinant of quantity demanded" (p. 121, emphasis added). Their paper concludes with the following broad challenge: "If additional products yield similar findings, this

<sup>5</sup> Diversity in approaches characterizes articles on fashion cycles for non-durable goods such as clothing: (1) Pesendorfer (1995) adopts a Veblenesque model in that the demand for design has an upward sloping segment, and (2) Frijters' (1998) model gives consumers "perfect information" (p. 503), and Coelho's and McClure's (1993) model assumes an adaptive snob effect that requires neither upward sloping demand nor perfect information. Because non-durable fashion items are not extensively warranted nor promoted on an individual basis, this branch of the Veblen literature is not directly linked to the model developed in the current article.

<sup>6</sup> Bagwell et al. (1996) suggest the following definition as representative of the "modern" body of literature which stems from Leibenstein: "Conspicuous consumption, or Veblen effects, are said to occur when individuals increase their demand for a good simply because it has a higher price." (Creedy and Slottje, 1991; cited in Bagwell and Berheim, p. 349).

<sup>7</sup> A "snob effect" is present when the amount one possesses reduces the marginal valuation to others; a "bandwagon effect" means that the amount that one possesses enhances the marginal value to other consumers. On the *bandwagon effect* for personalized license plates, see Biddle (1991). On the *snob effect* in rare coin markets, see Koford and Tshoegl (1998). See Belk (1995) on "collecting as luxury consumption."

<sup>8</sup> An anonymous referee found these articles unconvincing because: (1) "[the] Basman et al. empirical test for Veblen effects involves estimating a demand system at a high level of aggregation, with a very specific functional form;" and (2) Chao and Schor's evidence is "very equivocal" owing to the "data limitations" in their work. Valid points but up to this time, they have not been raised in print. These articles, which were published in reputable refereed journals, have remained free of published critique. The current article goes beyond the valid, but idiosyncratic shortcomings of the studies and challenges them on the ground that promotional thoroughness is an omitted variable in each.

should prompt researchers to re-think basic assumptions in the field of consumer demand” (p. 128).<sup>9</sup> Also, there are vivid anecdotes about Veblen effects, such as those presented by Bagwell and Bernheim suggesting that “Veblen effects may be empirically significant in marketing for luxury goods” (p. 349). Beyond anecdote, citing Creedy and Slottje, Bagwell and Bernheim also argue that: “Econometric evidence also corroborates the existence of Veblen effects.” (p. 349, footnote omitted)

Breaking from “what typifies modern discussion,” Bagwell and Bernheim (p. 349) begin with a definition of Veblen effects that they maintain is truer to Veblen’s writings: “‘Veblen effects’ are said to exist when consumers exhibit a willingness to pay a higher price for a functionally equivalent good.”<sup>10</sup> Their model proves the existence of a set of conditions in which high resource households might use purchases at high prices of functionally equivalent goods to signal their wealth levels. Interestingly, their model does not stipulate a backward bending demand curve. Another strength of their approach is that it highlights the “sensitivity” of policy recommendations to the particulars of the model from which the demand for luxuries derives.<sup>11</sup>

## 2.2. Key discussions of prestige pricing in marketing

In marketing there has been a consistent and ongoing interest in backward bending demand curves as an explanation of prestige good pricing.<sup>12</sup> Such curves have appeared consistently in marketing textbooks over the years since Hawkins (1954) wrote about them in *The Journal of Marketing*.<sup>13</sup> For example, Perrault and McCarthy (2002, p. 537) in their 14th edition text explain the pricing of “prestige” goods as follows:

*Prestige pricing* is setting a rather high price to suggest high quality or high status. Some target customers want the best, so they will buy at a high price. But if the price seems cheap, they worry about quality and don’t buy.

Accompanying this explanation on the same page is a diagram (not shown here) of a backward bending “demand” curve; it is upward sloping at low prices and downward sloping at high prices. Perreault and McCarthy’s text is representative.<sup>14</sup>

Literature citations raising doubts about the law of demand are generally found in the footnotes of these marketing textbooks; Monroe’s (1973) article is one that has remained widely cited since

<sup>9</sup> It is unclear exactly which “basic assumptions” in consumer demand theory they are challenging. Given their presentation of the insignificant price coefficient, one has to wonder if the law of demand is on the list of basics to be challenged.

<sup>10</sup> Refer back to footnote 7 to compare this definition to the one that Bagwell and Bernheim cite as indicative of the modern literature on Veblen effects.

<sup>11</sup> Bagwell and Bernheim generate a demand for luxury brands that is “highly price elastic” (p. 368). On page 369, they contrast this with Ng’s (1987) formulation in which a change in the price of a “diamond good” does not alter the consumer’s utility. This difference leads them (pp. 368–369) to challenge the notion that the optimal tax rate on “diamond goods” is infinite.

<sup>12</sup> The internet provides the following interesting comparison. A Google search (2003a) of the internet for the term “prestige pricing” returned over 55,000 hits. A Google search (2003b) for the term “Veblen effects” returned far fewer hits, just over 8000. By this comparison, it appears that the former term has gained much greater notoriety than the latter.

<sup>13</sup> Hawkins cites the textbook of Fairchild et al. (1939) as authoritative.

<sup>14</sup> See, for example, Berkowitz et al. (2000), Evans and Berman (1995), Pride and Ferrel (2003), and Solomon and Stuart (1997). Kotler’s (2000) text is an exception; for alternative undergraduate pedagogy also see Kumcu and McClure (2003).

its publication.<sup>15</sup> One “*purpose*” (p. 77–78) of Monroe was to challenge the veracity of law of demand:

The purpose of this article has been to organize existing research on buyer’s subjective perceptions of price, contrasting existing research knowledge and current pricing practices with the unknown knowledge on buyer’s price perceptions, and to shake the belief that the inverse price–demand relationship is “one of the best substantiated findings in economics” [... Palda, 1971, p. 26].

Monroe characterized the literature as “inconclusive” (p. 78) on the shape of demand.<sup>16</sup> However, regarding the law of demand, Monroe is convinced by the empirical results in Gardner (1971), McConnell (1968a,b), and Peterson (1970) that “at least over some range of prices, demand is greater for higher prices, and the demand curve has a positive slope” (p. 73). Monroe is representative of the marketing literature’s emphasis upon the presence of possibly upward sloping ranges rather than the exact shape of entire demand curves.<sup>17</sup>

What evidence suggests a violation of the law of demand to marketers? The use of price as a quality cue is generally viewed as suggesting a violation. Leavitt (1954), Gabor and Granger (1961, 1964, 1966), and Tull et al. (1964) are “classic” references to “single-cue” experiments where price is the only quality cue. These studies indicate that participants who are given “free” choices (that is, where purchases are made by experiments’ participants) between similar goods labeled with different prices tend to choose and perceive greater satisfaction from those goods that are labeled with higher prices.<sup>18</sup>

The importance of this evidence as a challenge to the law of demand is eviscerated because the experiments involve no actual purchases; the participants merely indicated their intentions about purchases. The law of demand is, after all, a proposition about the quantities that consumers *purchase* in the face of various prices. To overcome this difficulty, the aforementioned McConnell articles (1968a,b) reported on experiments in which participants made “purchases” of ostensibly different brands of beer that, in actuality, differed only by having different observable labels and prices. McConnell’s (1968a,b) contingency table calculations indicated that participants were significantly more likely to purchase higher priced “brands” and to perceive them to be of higher quality. From the professional attention his works garnered, both in terms of journal pages and prominent citations, McConnell’s beer buying experiments were heralded as path breaking.

<sup>15</sup> Searching the *ISI Web of Science* (2003) (a database containing the *Social Science*, *Science*, and *Arts and Humanities Citation Indexes*), we found that Monroe’s article had been cited a total of 165 times since 1975 (the first year in which the database can find citations). Additionally, it is cited in numerous marketing textbooks. The most recent literature citation was in 2003, and 13 of the cites were for the years 2000–2003. For a same year comparison, Nobelist Spence’s (1973) seminal article on job market signaling article in economics yielded 495 literature citations since 1975.

<sup>16</sup> Leibenstein’s theory of “the Veblen effect” is also inconclusive on the shape of demand; his diagrams (p. 204) show (1) a backward bending curve, and (2) an inverted S-shaped curve containing a backward bending segment. If incomplete information leads quality to depend on price, Stiglitz (1987) argues that “demand curves may, under quite plausible conditions, not be downward sloping” (p. 3) although he acknowledges that the models he is reviewing “have not been the subject of extensive empirical testing” (p. 42, footnote omitted).

<sup>17</sup> Extending the discussion of footnote 16, Leibenstein’s discussion also emphasized the possibility of upward sloping demand over particular ranges.

<sup>18</sup> In a savage critique of the price/perceived quality literature in marketing, Bowbrick (1980) observes that “Surprisingly, of the many hundreds of references quoted there are only one or two to the economics of information, which has analysed in depth the causes and effects of treating price as an indicator of quality. *Less surprisingly*, the literature on the economics of information ignores this research programme.” (p. 469, emphasis added).

However a reexamination of McConnell's results by Riesz (1980) invalidated these experiments by revealing that McConnell's experiments yielded no statistically significant findings. Despite McConnell's (1980, p. 263) unambiguous admission that Reisz was correct ("There is no escaping the fact that a computational error is present. . ."), McConnell's (1968a) paper has been cited 13 times in the *Web of Science*, while Reisz's critique of it has been cited *only once* by Rao (1984).<sup>19</sup> This together with the widespread and continuing citation of Monroe (who relies upon McConnell to challenge the veracity of the law of demand) raises doubts about the existence of any real support for the claims of marketing textbook writers that the demand for prestige goods is backward bending.<sup>20</sup>

Absent a persuasive alternative, the willingness of marketers to ignore the inadequacies of the literature being cited to rationalize textbook presentations of backward bending curves suggests a continuation of the *status quo*. Commenting upon the deficiencies of this branch of the marketing literature, Bowbrick gave this assessment:

In spite of 35 years of research on the subject no more is known than in 1945. This must be blamed on poor scientific method, trivial hypotheses and a lack of interest in the needs of industry and the relationship of the results to the real world. (p. 468)

Perhaps the citation evidence presented in this review together with our formalization of individual product promotions in the next section will jar the mind-set in marketing that cites straw man empirics as a basis for textbook assertions that the demand for conspicuous consumption goods (i.e., luxuries) is backward bending.

### 3. A model of product promotion and optimal pricing

The individualized promotions that accompany many conspicuous consumption goods are promotions that shift both consumer demand and the firm's marginal cost. Because of these shifts, such promotions bear directly on the price and quantity that maximizes the firm's profits. Our explanation of prestige pricing derives from the impact that individualized promotional efforts (demonstrations<sup>21</sup> and/or warranties<sup>22</sup>) have on consumer demand and on the firm's costs and profitability.

<sup>19</sup> Amplifying our point here, the *Web of Science* indicates that there were eleven citations to McConnell's paper after 1984, and the most recent citation to it is in Erevelles et al. (2001).

<sup>20</sup> It should be noted that multi-cue experiments in marketing offer similarly "inconclusive" results: "the evidence of a generalized price-perceived quality relationship is inconclusive." (Zeithaml, 1988; p. 17).

<sup>21</sup> Demonstrations are recognized in marketing as a standard tool for reducing consumer uncertainty about "experience goods." On optimal demonstration length, see Heiman and Muller (1996).

<sup>22</sup> Warranties take many forms and economic models detail many of these. For example, Dybvig and Lutz (1993) explain how bounded warranties can result when there is a "two-sided moral hazard problem," and Mann and Wissink (1990) analyse "money back" versus "replacement" warranties. Other key references include Cooper and Ross (1985), Lutz (1989), and Spence (1977). We abstract from such details in order to focus on how product price varies in response to a "generic" sort of warranty whose thoroughness (1) creates consumer value at a diminishing marginal rate and (2) imposes cost on producers at an increasing marginal rate. A similar approach is taken by Emons (1989) in his analysis of optimal warranty duration. In marketing, there are numerous empirical studies indicating that warranties are reliable and accurate signals of product quality enhancing consumer value; see Boulding and Kirmani (1993), Kelley (1988), and Wiener (1985).

### 3.1. Demand, costs, and profits

Suppose that the market demand curve facing a price searching seller of some luxury good takes the simple linear form,<sup>23</sup>

$$P = a + bQ, \quad \text{where } Q \text{ is quantity, } a > 0, \quad \text{and } b < 0. \quad (1)$$

Additionally assume that the choke price parameter “ $a$ ” is an increasing function of the promotional thoroughness, “ $t$ ,” applied to each unit sold.<sup>24</sup> Promotional thoroughness is increased, for example, by (1) providing customers with longer and/or more extensive product warranties or (2) providing customers with more hands on experience with the product they are interested in buying. Additionally, we assume that promotional thoroughness is valued by consumers, but at a diminishing marginal rate. Formally, the impact of this thoroughness on demand is expressed as follows:

$$a = a(t), \quad \text{where } \frac{da}{dt} > 0, \quad \text{and } \frac{d^2a}{dt^2} < 0. \quad (2)$$

Note that in order to isolate the impact of individual product promotions on monopoly pricing,<sup>25</sup> Eq. (1) has abstracted away from a number of other possible influences that might be affecting consumer valuation such as price signaling, status seeking, and the snob or bandwagon effects.<sup>26</sup>

On the supply side of the problem, assume that the cost function for producing the good is the simple linear function<sup>27</sup>

$$C = f + kQ, \quad \text{where } f > 0, \quad \text{and } k > 0. \quad (3)$$

<sup>23</sup> Again, the Veblen effect has been used to rationalize backward bending demand. The presence of such an effect would require making the parameter “ $b$ ” in equation (1) a positive number in some price range(s). Setting  $b < 0$  means that our model maintains the law of demand.

<sup>24</sup> Our model considers only “informative” quality assurance activities. On “uninformative” advertising, see Milgrom and Roberts (1986). Lancaster (1966) posited that when a purchase is made, it is really a bundle of attributes that is being purchased. In keeping with this, because a “car,” for example, that comes with a warranty is a different bundle from a “car” that comes without one, the position of the demand curve for “cars” in our model changes depending upon the thoroughness of the warranty. For the case of cars and warranties, our model follows the longstanding convention of measuring numbers of cars along the horizontal axis and shifting the demand curve as the thoroughness of the warranty changes.

<sup>25</sup> In a monopoly model, individual product promotions can be introduced without assumptions about (1) the actions and reactions of other firms selling substitute goods (perfect and/or imperfect substitutes) and (2) the heterogeneity, preferences, and distributions of individual consumers buying the various substitutes. As the anonymous referees noted, there is nothing particularly novel about an economist debunking an alleged exception to the law of demand on the grounds that one or another of the standard set of shift variables. They saw the innovation of this paper as being the introduction of a new shift factor, the thoroughness of individual product promotion, that appears to be central to the sale of a variety of luxury goods. As one wrote: “Casual empiricism also suggests that they [individual product promotions] are more important in the same sorts of markets that are commonly identified as places in which Veblen or prestige effects might be thought to exist, that is, markets for luxury goods.”

<sup>26</sup> Key references on status effects include Duesenberry (1949), Packard (1959), Hirsch (1978), Brenner (1983), and Frank (1985a, 1985b, 1988). Stiglitz (1987) presents a detailed and insightful review of the literature on prices as quality signals; other key references in this area include Klein and Leffler (1981) and Bagwell and Riordan (1991). In an interesting experiment, Chang and Wildt (1996) found that the importance of price as a signal plummeted as greater alternative cues about product quality became available. This suggests that when demonstrations and warranties are extensively present, price signaling may be unimportant.

<sup>27</sup> A linear cost function has been assumed to simplify the diagrammatics used later. The use of a more complicated function would not have altered any of our substantive conclusions.

Additionally we will assume that the parameter  $k$ , the marginal cost, is an increasing function of the thoroughness of the firm's promotional efforts and that promotional costs rise at an increasing rate. Formally, we assume that:

$$k = k(t), \quad \text{where} \quad \frac{dk}{dt} > 0, \quad \text{and} \quad \frac{d^2k}{dt^2} > 0. \quad (4)$$

To reemphasize a previous point, keep in mind that we are modeling individualized product promotion (such as individual product warranties and individual product demonstrations); this is the reason that the parameter  $k$  has been made a function of the thoroughness level of individual product promotion. In the standard analysis of advertising, the parameter “ $f$ ” in Eq. (2) is assumed to be an increasing function of advertising effort.<sup>28</sup> In such an analysis, advertising effort is “broad-based” rather than individualized. An example would be a magazine advertisement showing a particular brand of car and extolling the brand's virtue. This has very different implications for cost analysis than when a firm, for example, promotes a particular car on a show room floor via inspection or a longer warranty.<sup>29</sup> For broad-based advertising and promotion, the firm's efforts are analysed as one would analyse a change in fixed costs (if generalized promotion rises, then average costs but not marginal costs will rise), but when individualized product quality demonstrations or warranties are increased in thoroughness or length, both marginal cost and average cost will rise. Hence, for such individualized promotions, the marginal cost parameter,  $k$ , rather than fixed cost parameter,  $f$ , is a function of promotional thoroughness,  $t$ .<sup>30</sup>

Combining Eqs. (1) and (3), one finds the equation for the profits,  $\pi$ , of the firm as

$$\pi = [a(t) + bQ] \times Q - [f + k(t)Q]. \quad (5)$$

The firm will choose the output quantity ( $Q$ ), and the level of promotional thoroughness ( $t$ ) that maximize its profit ( $\pi$ ). The two necessary conditions for profit maximization are

$$\frac{\partial \pi}{\partial Q} = a(t) - 2bQ - k(t) = 0, \quad (6)$$

$$\frac{\partial \pi}{\partial t} = \left( \frac{da}{dt} - \frac{dk}{dt} \right) Q = 0. \quad (7)$$

Eq. (6) is the familiar condition equating marginal revenue and marginal cost. Eq. (7) requires that promotion thoroughness be increased to the point where it raises the height of demand by the same amount that it raises the height of marginal cost. The second order conditions for maximization follow easily, given the specifications in Eq. (1) through Eq. (4).

### 3.2. An alternative explanation of the price path of quality-assured luxuries

Our model above provides a straightforward explanation for observing a backward bending pattern of prices and quantities by firms that provide individual product promotions. Consider the

<sup>28</sup> See Pindyck and Rubinfeld (2001, pp. 403–407) for an example of an analysis of generalized advertising appearing in a popular intermediate microeconomic text. For an academic treatise on the economics of advertising, see Bagwell (2003).

<sup>29</sup> Demonstrations are sometimes extensive for new products (and lesser known brands), regardless of whether or not they are luxuries; see Heiman and Muller. Thus, the fact that lesser-known Hyundai provides some of the longest auto warranties (pointed out to us by an anonymous referee) is, in this light, not all that surprising.

<sup>30</sup> Our search uncovered many papers on broad-based advertising, but none on the impact that individual product promotions have on the optimal prices and quantities of luxuries.

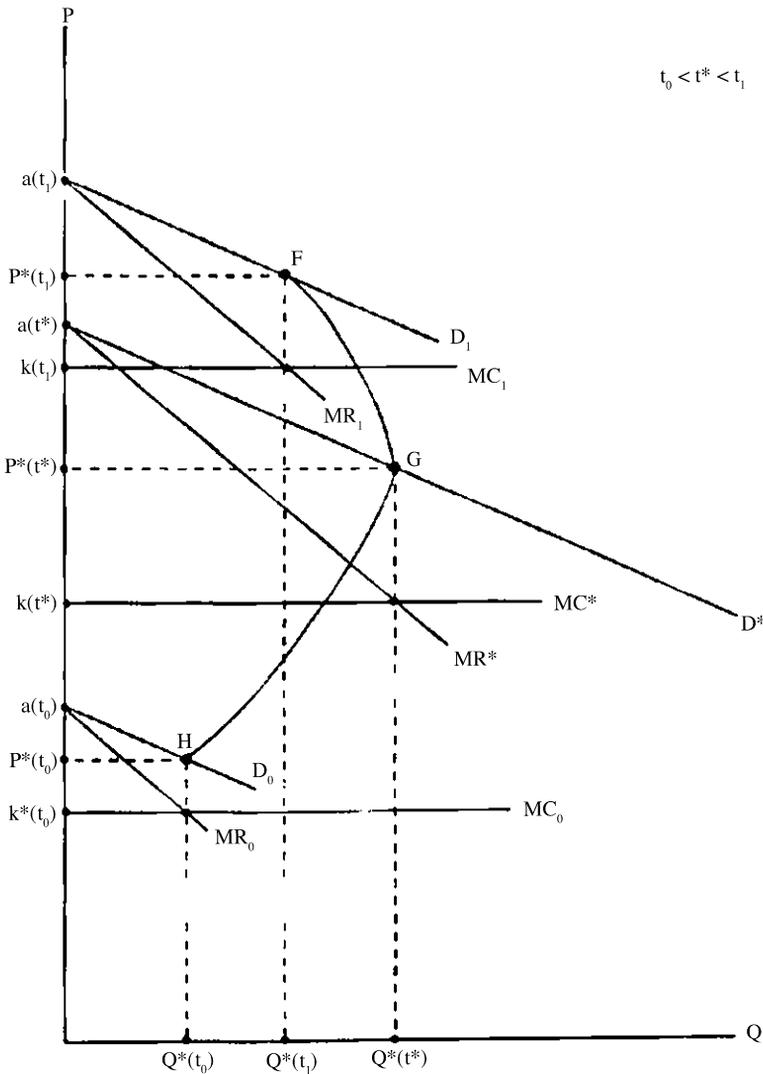


Fig. 1. Optimal price and quantity locus as promotional thoroughness varies.

price and quantity choices made by a firm owner who does not have enough information to solve for the profit maximizing level of promotional thoroughness,  $t$ . Our model allows us to determine for any  $t$  the optimal price/quantity combination. Fig. 1 illustrates the optimal price/quantity combinations for various values of  $t$ . In the figure,  $t^*$  is the globally optimal thoroughness level. When  $t = t^*$ : demand is  $D^*$ , marginal revenue is  $MR^*$ , and marginal cost is  $MC^*$ . For this value of  $t$ , the firm achieves its globally maximum profit of

$$\pi(t^*) = [P^*(t^*) - k(t^*)] \times Q^*(t^*) - f \tag{8}$$

By construction, at any value of  $t$  other than  $t^*$ , the firm will achieve a lower profit. In Fig. 1, we show the most profitable price/quantity combinations associated with suboptimal values of

thoroughness that are either greater or less than  $t^*$ . If thoroughness is  $t = t_1$ , a value that is greater than  $t^*$ , then demand is  $D_1$ , marginal revenue is  $MR_1$ , and marginal cost is  $MC_1$ .<sup>31</sup> Given that  $t = t_1$ , the largest profit possible is

$$\pi(t_1) = [P^*(t_1) - k(t_1)]Q^*(t_1) - f \quad (9)$$

Consistent with the notion that  $\pi(t^*)$  is the globally maximal profit level, inspection of Fig. 1 makes it clear that  $\pi(t_1) < \pi(t^*)$ .

What if  $t = t_0$ , a level of thoroughness below  $t^*$ ? In this case, demand becomes  $D_0$ , marginal revenue becomes  $MR_0$ , and marginal cost becomes  $MC_0$ .<sup>32</sup> Based on these curves, the largest profit the firm can earn is

$$\pi(t_0) = [P^*(t_0) - k(t_0)] \times Q^*(t_0) - f \quad (10)$$

Again, consistent with the notion that  $\pi(t^*)$  is the globally maximal profit level, inspection of Fig. 1 makes it clear that  $\pi(t_0) < \pi(t^*)$ .

Refer again to Fig. 1 and note the positions of the optimal price/quantity combinations for the three values of  $t$ : point  $H$  denotes the optimal price and quantity for  $t = t_0$ ; point  $G$  denotes the optimal price and quantity for  $t = t^*$ , and point  $F$  denotes the optimal price and quantity for  $t = t_1$ . The curve connecting these points represents the locus of optimal price/quantity combinations for promotional thoroughness levels ranging from  $t_0$  to  $t_1$ . The important thing to notice is that the locus is backward bending.

Our model implies that the actions of a firm owner who determines the optimal thoroughness of his individualized promotion via iterative experimentation over time will trace out a backward bending price/quantity locus.<sup>33</sup> This locus is not a demand curve, but the pattern of prices and quantities it traces out might be misinterpreted as such by researchers who do not take quality assurance into account.

<sup>31</sup> The curves' positions were determined relative to  $D^*$ ,  $MR^*$ , and  $MC^*$ . According to the maximization model, an increase in the value of  $t$  above  $t^*$  shifts demand upward by less than it shifts marginal cost upward. This is because (1) at  $t^*$  Eq. (5) implies  $da/dt = dk/dt$  and (2) it has been assumed that  $d^2a/dt^2 < 0$  and that  $d^2k/dt^2 > 0$ . Fig. 1 shows that demand has been shifted up by only  $[a(t_1) - a(t^*)]$ , whereas marginal cost has been shifted up by the larger amount of  $[k(t_1) - k(t^*)]$ .

<sup>32</sup> As in footnote 31, the curves' positions are relative to  $D^*$ ,  $MR^*$ , and  $MC^*$ . If promotion is decreased from  $t^*$  to a lower value, demand shifts downward by a larger amount than the concurrent downward shift in marginal cost. In Fig. 1, notice that  $[a(t^*) - a(t_0)] < [k(t^*) - k(t_0)]$ .

<sup>33</sup> Recall the key assumptions: (1) individual product promotions are present, (2) the firm has enough monopoly power so that other firms' reactions can be ignored, and (3) the firm, absent perfect information, uses price iteration to find the optimal level of promotion. As noted in footnote 25, individual product promotions are prominent for a variety of luxuries. The existence of imperfect price discrimination in many of these cases suggests the presence of monopoly power and an absence of perfect information. Beyond our alternative to the backward bending demand for luxuries, an anonymous referee suggested that studying individual product promotions might address another kind of challenge to the law of demand in *competitive markets*. We use a simpler example, but we are fully indebted to him/her for the point: assume that the same brand of beer is sold competitively by different types of restaurant/bars. Suppose type A firms serve beer in chilled mugs with complimentary snacks while type B firms sell the same brand at a lower price, but in plastic cups without "free" snacks. The positions of the downward sloping market demands facing the firms depend on the distributions of consumer preferences. If enough people prefer chilled mugs and "free" snacks with sufficient intensity, more beer will be sold at type A firms, where it is pricier. This illustrates that in competitive markets, what may seem to be upward sloping demand may actually be due to nothing more than the presence of differences in the thoroughness of promotions across firms *in conjunction with* sufficiently high consumer preference for more thoroughly promoted goods.

#### 4. Summary and future research directions

Thorstein Veblen's (1899; 1994 ed.) treatise on the behavioral propensities of the "leisure class" has spawned elaborate analyses in both economics and marketing that challenge the parsimonious law of demand. In these fields one finds analyses of luxury good pricing that feature backward bending demand curves. Although scholars in both fields recognize individual product promotions (such as demonstrations and warranties) as important and worthy of study, they have failed to recognize that such promotions often attend the sale of goods alleged to be exceptions to the law of demand.

This article formally incorporates individual product promotions into a theory of luxury good pricing. In our model, a monopolistic seller of a luxury good with imperfect information traces out a backward bending price/quantity locus as he iterates toward the optimal combination of quantity, price and promotional thoroughness. This locus is an alternative to the backward bending demand curves that are found in the economics literature on the Veblen effect and in marketing texts' analyses of prestige pricing. Clarity and parsimony are strengths of our model, but its simplicity leaves a number of issues unaddressed. Two such issues remain for future research on luxuries: (1) the relative importance that various types of individual product promotions play in the pricing of luxuries and (2) the optimal mix of different types of individual luxury good promotions. These issues, and others arising outside of the monopoly model we explored, remain for future reflection and research.

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