18 Strategic pricing: an analysis of social influences*

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Abstract

Social factors influence our everyday life in many ways. For example, consumers purchase conspicuous goods to satisfy not only material needs but also social needs such as prestige. In an attempt to meet these social needs, producers of conspicuous goods such as cars, perfumes and watches highlight the exclusivity of their products. In this chapter, we discuss a model of conspicuous consumption and examine how purchase decisions are affected by the desire for exclusivity and conformity. We show that snobs can have an upward-sloping demand curve but only in the presence of consumers who are (weakly) conformists. The influence of these social needs on firms' profits is moderated by the structure of market. In a monopoly, conformism is conducive to profits while snobbishness hurts profits. We find that the results are reversed in a duopoly. We also investigate how social needs may influence the prices and qualities of the products that consumers choose to buy. A series of laboratory tests lends support for our some of model predictions.

1. Introduction

At the very core of social psychological theory and research is the notion that we function in a social context that influences our thoughts, feelings and actions (Ross and Nisbett, 1991; see Taylor, 1998 for a review). While several theories have been advanced on the essence of social being, we focus on two basic social needs: a need for uniqueness and the countervailing need to conform (Fromkin and Snyder, 1980; Brewer, 1991). Consider, for example, the purchase of a conspicuous good. We buy these goods not just to meet our material needs but also to satisfy social needs (see for example Belk, 1988). In an attempt to satisfy such social needs, firms advertise the exclusivity of their products. For example, Ferrari promises that it will not produce more than 4300 vehicles per year despite more than a two-year waiting list for its cars (Betts, 2002). Some firms restrict the availability of their products by using exclusive distribution channels and even legal action. For example, Christian Dior sued supermarkets for carrying its products, fearing that wide availability could hurt its exclusive image (*Marketing Week*, 3 July 1997).

In an effort to understand how social needs may influence firm behavior, we discuss a theoretical model of conspicuous consumption. We capture consumers' desire for exclusivity and conformity by allowing the utility derived from a product to depend not only on its intrinsic value but also on consumption externality. Following Leibenstien (1950), we model snobs as consumers whose utility from a product decreases as more people consume the same product. For example, a BMW in every driveway could dilute the value of the car to potential buyers (cf. Bagwell and Bernheim, 1996). We model conformists as consumers whose utility from a product increases as more people consume the product (Ross et al., 1976; Jones, 1984; also see Becker, 1991 for a similar formulation).

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Teenagers, for example, often view MTV because their friends watch it (Sun and Lull, 1986). For similar reasons, consumers purchase popular books, toys and garments.

Our theoretical analysis suggests that if a market comprises only snobs or conformists, then consumers will not demand more as price increases. However, if a market comprises both snobs and conformists, then more snobs may buy as price increases. Consistent with this result, we find that the demand curve is upward sloping for visible cosmetics such as lipsticks and mascara (Chao and Schor, 1998). Next we show that the profits of a monopolist increase as conformism increases but decline as snobbishness increases. The results, however, are reversed in a duopoly. Finally, we investigate how social factors may influence the quality of the products consumers choose to purchase. We find that sometimes snobs purchase high-quality products not because of snobbishness but despite it.

Our model relies on strong behavioral assumptions such as rational expectations. However, human beings are only boundedly rational. In an attempt to validate the predictions of our model, we subject our monopoly model to a laboratory test. The experimental investigation shows that more snobs buy as price rises, even though the products have neither quality differences nor any signal value. Furthermore, we find some support for the rational expectations framework at the aggregate level. An analysis of the first trial data shows that subjects' behavior is qualitatively consistent with model predictions, and on average subjects were probably capable of three to four steps of iterative reasoning. Their behavior in subsequent trials, however, can be explained using adaptive learning mechanisms.

This chapter draws heavily from the work of Amaldoss and Jain (2005a, 2005b). In Section 2, we review related literature. In Section 3, we describe a model of conspicuous consumption and examine its implications. Section 4 discusses a laboratory test of the model. Finally, Section 5 concludes the chapter by outlining some directions for future research.

2. Literature on social influences

Several researchers have investigated the role of products in expressing an individual's self (Belk, 1988). This body of research has identified the existence of two competing social needs among consumers: a need for uniqueness and a countervailing need for similarity (Brewer, 1991; Fromkin and Snyder, 1980). These needs form the basis of what we refer to as the desire for exclusivity and conformity. Prior research has examined from a psychological perspective how these needs influence consumer choice processes (Lynn, 1991; Snyder, 1992; Simonson and Nowlis, 2000). Another related construct is the notion of reference groups. For example, the elite seek goods that will distinguish them from the masses. But the masses, who look up to the elite, want to emulate their choices (Simmel, 1957; Bourdieu, 1984; Bryson, 1996). Reference group effects have been examined by several marketing researchers. Bearden and Etzel (1982), for example, examined product and brand decisions of a panel of 645 consumers and found that reference group effects are stronger for publicly consumed brands. Childers and Rao (1992) obtained similar results in a sample of 345 American and Thai consumers. This behavioral literature, however, does not examine how social factors influence firm behavior.

A stream of research in economics incorporates social factors in formal economic analysis. Veblen (1899) and Leibenstein (1950) emphasized the importance of studying the role of social factors in consumption. Becker (1991) used conformism to explain why

similar restaurants might eventually experience vastly different sales patterns. Specifically, using a model in which consumers demand increases as the sales of the product increases, he shows that the demand curve for conformists could be upward sloping; but the equilibrium is not stable. Karni and Levin (1994) extend Becker's model by explicitly modeling individual consumer decisions. Basu (1987) proposes a model where consumers' desire for a product increases if there is excess demand for the product. Using this stylized model, he explains why firms may find it unprofitable to raise prices even when there is excess demand for their products.

There are several signaling models on conspicuous consumption. In these models consumers purchase certain goods to signal their status or wealth. For example, consumers who have higher income could purchase more expensive items and thereby signal their wealth. This need to signal could lead to behavior which looks as if consumers are conformists. Bernheim (1994), for example, showed that when status is sufficiently important relative to intrinsic utility, many individuals conform to a single standard of behavior, despite heterogeneous underlying preferences. Bagwell and Bernheim (1996) examine whether a desire to signal status could lead to the Veblen effect. In other words, can the desire to achieve status lead to consumers' demand curve to be upward sloping? They find that these effects cannot arise under the usual 'single-crossing' condition. However, if this condition fails, then Veblen effects could arise. Corneo and Jeanne (1997) consider a model in which consumers could engage in conspicuous consumption to signal their wealth. They show that under a signaling framework, snobbish behavior cannot lead to an upward-sloping demand curve. The intuition for this result is that if more consumers buy the good, then the signal value of the good must decrease for snobs. Consequently, the firm needs to reduce prices in order to increase demand, implying a downward-sloping demand curve. Pesendorfer (1995) shows that the desire to signal status could lead to fashion cycles. These cycles are induced as new designs dilute the signal value of old designs and make them obsolete. Stock and Balachander (2005) show that excess demand for a product could be a signal of quality. Consequently, we may observe firm-induced scarcity.

Another stream of research in economics investigates herding behavior (e.g. Banerjee, 1992; Bikhchandani et al., 1992). In these models, consumers observe the actions of other consumers and then infer the (unknown) quality of the product. In such a sequential decision-making context, Banerjee (1992) shows that rational consumers may follow the actions of other consumers even when their private information would suggest that they should not do so. Consequently, we may observe informational cascades; but these cascades may be fragile (Bikhchandani et al., 1992).

Word of mouth can be a useful vehicle for transmitting product knowledge within a social network. Godes and Mayzlin (2004) show that online chats can be an effective indicator of word-of-mouth effects. Mayzlin (2006) shows online chats can be persuasive and may encourage firms to spend more on promoting inferior goods. This stream of research, however, is yet to examine the impact of word-of-mouth behavior on pricing.[1] Next we discuss a model of conspicuous consumption and its implications

[1] A related stream of research is the work on diffusion, which implicitly considers positive word-of-mouth effects. This research has examined the issue of optimal pricing (see for example Kalish, 1985).

3. A model of conspicuous consumption

Using a monopoly model, we delineate the effect of prices on demand. Then we examine how the degree of consumer desire for uniqueness or conformism influences equilibrium prices and profits. We explore this issue in the context of a duopoly and contrast our findings with the results obtained in a monopoly model. This analysis sheds light on the role of market structure in equilibrium behavior. Third, we examine how social factors may moderate the effect of product quality on prices and profits.

Effect of prices on demand

Consider a market comprising one seller and two types of consumers. We label the two types of consumers snobs and conformists. Snobs value exclusivity, and consequently the utility they derive from a product depends not only on its base value but also on the number of people expected to purchase the product. Hence the expected (indirect) utility of purchasing a product is given by

$$U(z^e, p) = v - p - g(z^e) \tag{18.1}$$

where v is the base valuation, p is the price for the product, and z^e is the expected number of buyers. Note that snobs value the product less as more people buy it. We capture this characteristic of snobs by assuming that $g(0) = 0, g(z^e) \geq 0 \; \forall z^e > 0, g(1) < \infty$, and $g'(\cdot) \geq 0$. We assume that each consumer purchases at most one unit of the product. This is a reasonable assumption for many durable conspicuous goods such as cars. Further, assume that v is distributed in the population according to a continuous distribution $F_s(\cdot)$ with pdf $f_s(\cdot)$.

We model conformists as consumers who like to follow others. The expected (indirect) utility of such a consumer is given by

$$U(z^e, p) = v - p + h(z^e) \tag{18.2}$$

where $h(0) = 0, h(1) < \infty, h(\cdot) \geq 0$ and $h' \geq 0$. Thus conformists value a product more as more people purchase it. We assume that the valuations of conformists are drawn from a continuous distribution $F_c(\cdot)$ with pdf $f_c(\cdot)$. Further, these value distributions are common knowledge. Note that in our formulation we allow for the possibility that the two groups of consumers could have different value distributions.

The snobs account for $\beta \in [0, 1]$ fraction of the consumers and the remaining $(1 - \beta)$ consumers are assumed to be conformists. Thus the number of snobs who will buy the product is given by

$$x = \beta \, (1 - F_s(p + g(z^e))) \tag{18.3}$$

where z^e is the expected sales of the product. Similarly, the number of conformists who buy the product is given by

$$y = (1 - \beta) \, (1 - F_c(p - h(z^e))) \tag{18.4}$$

Using (18.3) and (18.4), we obtain the total demand z for the product:

$$z = \beta(1 - F_s(p + g(z^e))) + (1 - \beta)(1 - F_c(p - h(z^e))) \tag{18.5}$$

We assume that consumers form expectations about the number of people who will buy the product. Further, these expectations are rational, implying that they are correct in equilibrium (see for example Becker, 1991; Katz and Shapiro, 1985). Thus

$$z - z^e = 0. \tag{18.6}$$

Now using (18.5) and (18.6) we obtain

$$\Lambda_1(z) = z - \beta(1 - F_s(p + g(z))) + (1 - \beta)(1 - F_c(p - h(z))) = 0 \tag{18.7}$$

Equation (18.7) implicitly describes the total demand $z(p)$ under the rational expectations equilibrium. If equation (18.7) defines a unique z for a given p, then it follows from (18.4) and (18.5) that for any given price p there will be unique numbers x and y which will define the sales to the snobs and the conformists, respectively. The proofs for the different results in this chapter can be seen in Amaldoss and Jain (2005a, 2005b). The following lemma establishes the condition for existence and uniqueness.

Lemma 18.1 *There exists a rational expectations equilibrium that satisfies (18.7). The equilibrium is unique if and only if (iff)*

$$h'(z)f_2[p - h(z)] < \frac{1 + \beta f_1[p + g(z)]g'(z)}{(1 - \beta)} \tag{18.8}$$

where z is the equilibrium total demand at price p.

Note that the condition included in the above lemma imposes an upper bound on the size of conformism, namely $h'(\cdot)$ When conformism grows very large, we may observe bandwagons wherein all consumers buy or none buys the product. Further, we may face multiple equilibria in such situations. However, if conformism is absent we will still obtain a unique rational expectations equilibrium. Note that the lemma places no upper bound on the level of snobbishness. In fact, a higher desire for exclusivity will make it easier to satisfy condition (18.8).

Assuming that the condition specified in Lemma 18.1 is satisfied, we analyzed how changes in price affect the aggregate demand as well as the demand from snobs and conformists. A key finding is summarized in the following proposition:

Proposition 18.1 *If the market consists of only snobs or conformists, then the market demand always decreases with price. However, if the market consists of both snobs and conformists, then the demand from snobs will increase with price iff*

$$(1 - \beta)f_2[p - h(z)](h'(z) + g'(z)) > 1. \tag{18.9}$$

However, the demand curve for conformists and the total demand curve are downward sloping.

This finding is very different from the results reported in the network externality or congestion externality literature, which has traditionally examined only one type

of externality. In the presence of only one type of externality, we will only observe a downward-sloping demand curve according to Proposition 18.1. However, in a model that includes both negative and positive externalities, consumers experiencing negative externalities can have an upward-sloping demand curve. To clarify the intuition for this proposition, we first study a market consisting only of snobs ($\beta = 1$). Then we consider a market consisting of both snobs and conformists, that is $\beta \in (0, 1)$.

According to Proposition 18.1, if the market comprises only snobs ($\beta = 1$), then demand will decline as price rises. Note that if $\beta = 1$, then $z^e = x^e$. In this case, the utility that a snob receives from consuming a product is

$$U_s = v - p - g(x^e) \tag{18.10}$$

The impact of price on the consumer's utility is given by

$$\frac{\partial U_s}{\partial p} = -1 - g'(x^e)\frac{\partial x^e}{\partial p} \tag{18.11}$$

Consumers' expectations are likely to be shaped by what they observe in their everyday lives. For example, the sales of typical grocery items decline when price increases. If so, consumers are likely to expect demand to decline as price rises, implying that $\partial x^e/\partial p$ will be negative. Further, if $g'(\cdot)$ is sufficiently large, then consumer utility may increase with price. Consequently, as the price increases, the total number of consumers who will buy the product would increase – thus giving rise to an upward-sloping demand curve, that is $\partial x/\partial p > 0$. Note that there is an internal inconsistency in this line of reasoning. Specifically, if consumers expect $\partial x^e/\partial p < 0$, the outcome will lead to $\partial x^e/\partial p > 0$, contradicting the requirement for a rational expectations equilibrium. Therefore the only equilibrium that is consistent with the rational expectations equilibrium in this case is the one in which demand is downward sloping ($\partial x/\partial p < 0$). A similar argument can establish that if the market consists of only conformists, then the demand curve will again be downward sloping.

Now consider a market that consists of both snobs and conformists, that is $\beta \in (0, 1)$. On examining the effect of price on utility derived by snobs, we find that

$$\frac{\partial U_s}{\partial p} = -1 - g'(z^e)\frac{\partial z^e}{\partial p} \tag{18.12}$$

If the consumer expects the total demand to drop as price increases, then for a sufficiently large $g'(\cdot)$ consumer utility may increase with price, implying an upward-sloping demand curve for snobs. Thus it is possible that the total demand curve is downward sloping ($\partial z^e/\partial p < 0$), while the demand from snobs is growing as price increases. To illustrate the possibility that there exist situations in which (18.8) and (18.9) are satisfied, consider the case where $f_1(\cdot)$ and $f_2(\cdot)$are uniform with range (0, 1), $\beta = 1/2$ and $g(\cdot)$ and $h(\cdot)$ are linear with $g' \equiv \lambda_1 = 0.8$ and $h' \equiv \lambda_2$. In this case it can be shown that (18.8) is always satisfied and furthermore (18.9) will be satisfied as long as $\lambda_2 > 1.2$.

Conventional wisdom suggests that snobs (not conformists) will demand more as price increases. Proposition 18.1 offers a potential basis for this common belief: the demand curve can be upward sloping at the equilibrium price for snobs, but not for conformists. Further, an upward-sloping demand curve for snobs is likely to be observed only when

the market includes a group of consumers who are (weakly) conformists. Specifically, the demand curve for snobs could be upward sloping even if $h' \equiv 0$; that is, there exists a segment of consumers whose utility is unaffected by the choices of other consumers. Our finding goes against the grain of Leibenstein's claim (1950) that the demand curve for snobs will always be downward sloping.

Interestingly, the demand curve for conspicuous cosmetics such as lipsticks, mascara and eyeshadow is upward sloping for college-educated women (Chao and Schor, 1998). Specifically, for women with a college degree the price coefficient is +0.117. However, the price coefficient for the overall market is −0.157. It is useful to note that the correlation between quality and price in this category is zero, implying that price is probably not a signal of quality. Similar results were observed in the case of mascara and eyeshadow. To the extent that college-educated women are more likely to be status conscious and desire exclusivity, these empirical findings are consistent with our theoretical results.

Effect of snobbishness and conformism

Next we investigate how the degree of snobbishness or conformism influences equilibrium profits. To help us better appreciate how the nature of competition can potentially moderate these effects, we first study a duopoly model. Later we contrast the duopoly results with those obtained in a monopoly model.

Consider a duopoly where firms are located at the opposite ends of a Hotelling line, with firm 1 positioned at 0 and firm 2 at 1. As discussed earlier, the market comprises snobs and conformists, with snobs accounting for β fraction of the consumers.

Consider a snob located at θ on the Hotelling line. The (expected) indirect utility derived by this snob on purchasing product 1 is given by

$$U_s(z_1^e, p_1) = \omega_s v_1 - p_1 - \theta t_s - \lambda_s z_1^e, \tag{18.13}$$

where v_1 is the base quality level for firm 1's product, p_1 is the price for product 1, and z_1^e is the expected total number of buyers for product 1. In this utility formulation ω_s reflects the extent to which snobs are sensitive to quality, while t_s captures the sensitivity of snobs to product characteristics (Grossman and Shapiro, 1984). The degree to which the consumers desire uniqueness is reflected in $\lambda_s \geq 0$. As λ_s increases, the consumer values uniqueness more. The corresponding indirect utility derived by the consumer from buying product 2 is given by

$$U_s(z_2^e, p_2) = \omega_s v_2 - p_2 - (1 - \theta) t_s - \lambda_s z_2^e \tag{18.14}$$

As in the monopoly model, we denote the value distribution for snobs by a continuous distribution $F_s(\cdot)$ with a corresponding pdf $f_s(\cdot)$. Further, each consumer buys at most one unit of the product. Therefore, the number of snobs who will buy product 1 is

$$x_1 = \beta F_s(\theta_s(z_1^e)) \tag{18.15}$$

where $\theta_s(z_1^e)$ is the location of the snob who is indifferent between the two products for a given sales expectation z_1^e. $\theta_s(z_1^e)$ is given by

$$\theta_s(z_1^e) = \frac{t_s + \omega_s(v_1 - v_2) + (p_2 - p_1) + \lambda_s(1 - 2z_1^e)}{2t_s} \tag{18.16}$$

The other group of consumers in the market is labelled conformists. The indirect utility derived from product 1 by a conformist located at θ is

$$U_c(z_1^e, p_1) = \omega_c v_1 - p_1 - \theta t_c + \lambda_c z_1^e \tag{18.17}$$

where v_1 is the base quality level, p_1 is the price for product 1, and z_1^e is the expected number of buyers for product 1. The parameters ω_c and t_c reflect the sensitivity of conformists to the quality and horizontal differentiation of a product, respectively, whereas $\lambda_c(\lambda_c \geq 0)$ captures the degree of consumer desire for conformity. Similarly, the utility of buying product 2 is given by

$$U_c(z_2^e, p_2) = \omega_c v_2 - p_2 - (1 - \theta)t_c + \lambda_c z_2^e \tag{18.18}$$

Assume that the value distribution for conformists is given by a continuous distribution $F_c(\cdot)$ with a corresponding pdf $f_c(\cdot)$, and that the full market is covered. Then the number of conformists who will buy product 1 is given by

$$y_1 = (1 - \beta)F_c(\theta_c(z_1^e)) \tag{18.19}$$

where $\theta_c(z_1^e)$ is the location of the conformist who is indifferent between the two products for a given expectation z_1^e, and $\theta_c(z_1^e)$ is given by

$$\theta_c(z_1^e) = \frac{t_c + \omega_c(v_1 - v_2) + (p_2 - p_1) - \lambda_c(1 - 2z_1^e)}{2t_c} \tag{18.20}$$

On assuming that consumers are forming rational expectations, we have

$$z_1 = x_1 + y_1 = z_1^e \tag{18.21}$$

Using (18.15), (18.19) and (18.21), we derive the rational expectations equilibrium. The relevant equation is

$$\Omega(z_1) = \beta F_s\left(\frac{t_s + \omega_s(v_1 - v_2) + (p_2 - p_1) + \lambda_s(1 - 2z_1)}{2t_s}\right) + (1 - \beta)F_c\left(\frac{t_c + \omega_c(v_1 - v_2) + (p_2 - p_1) - \lambda_c(1 - 2z_1)}{2t_c}\right) - z_1 = 0 \tag{18.22}$$

Note that equation (18.22) implicitly describes the demand $z_1(p_1, p_2)$ if consumers form rational expectations. The following lemma establishes the condition under which there exists a unique rational expectations equilibrium for any price pair (p_1, p_2).

Lemma 18.2 *There exists a unique rational expectations equilibrium for any given pair of prices* (p_1, p_2) *if and only if*

$$-\frac{\beta\lambda_s f_s(\theta_s)}{t_s} + \frac{(1 - \beta)\lambda_c f_c(\theta_c)}{t_c} - 1 < 0 \tag{18.23}$$

at the equilibrium point where

$$\theta_s = \frac{t_s + \omega_s(v_1 - v_2) + (p_2 - p_1) + \lambda_s(1 - 2z_1)}{2t_s} \tag{18.24}$$

$$\theta_c = \frac{t_c + \omega_c(v_1 - v_2) + (p_2 - p_1) - \lambda_c(1 - 2z_1)}{2t_c} \tag{18.25}$$

Condition (18.23) suggests that there is a unique rational expectations equilibrium if the net conformism effect, which is $(1 - \beta)\lambda_c f_c/t_c$, is small. It is easy to see that the net conformism effect will become small if the proportion of snobs in the population (β) and the horizontal differentiation (t_c) increase. The net conformism effect would also decrease if λ_c and $f_c(\cdot)$ diminish.[2] Lemma 18.1 raises a natural question: what would happen if the net conformism effect were large? In such a case, even a small change in price could induce a bandwagon effect, and we would have multiple Nash equilibria. More precisely, when condition (18.23) is not satisfied, then we may obtain corner solutions that are asymmetric solutions, even when the firms are completely symmetric *a priori*. For example, consider the case when the market consists of only conformists ($\beta = 0$). Also assume that $t_c = 1$ and f_c is uniform (0,1) and prices are the same. In this case, if $\lambda_c > 1$, then the condition in Lemma 18.1 is violated. In such a situation, one firm sells to the entire market and the other firm has zero sales. We confine our attention to cases where (18.23) holds, so that we have a unique rational expectations equilibrium.

For analytical tractability, we assume that f_s and f_c are uniform. Although this assumption guarantees the existence of a unique Nash equilibrium in prices, it is not a necessary condition. In fact, a weaker condition that ensures that the solutions are unique and stable is that $|\partial^2\Pi_i/\partial p_i^2| > |\partial^2\Pi_i/\partial p_i \partial p_j|$ and $\partial^2\Pi_i/\partial p_i^2 < 0$. These conditions imply that the profit functions are concave and that own-price effects are stronger than cross-price effects. Such conditions on the reduced-form profit functions hold for a wide variety of models.

We also assume that the marginal costs for both products are the same and equate them to zero. Note that, in our model, f_s and f_c could be different, implying that snobs could have a higher mean valuation for the products than conformists and vice versa. Also, as before, snobs and conformists could differ in their sensitivity to quality and horizontal product differentiation.

Now on studying how equilibrium profits and prices are affected by snobbishness and conformity in a monopoly as well as a duopoly, we have the following result:

Proposition 18.2 *In a monopoly, the equilibrium profits are increasing in conformity and decreasing in snobbishness. In a duopoly, however, the results are reversed.*

The intuition for the first part of the proposition is easy to appreciate. Note that in a monopoly, as snobbishness increases, each additional sale exerts a greater negative externality on the sale of other units. Further, we know that

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[2] For example, if $f_c(\cdot)$ is uniform, then the conformism effect decreases when the range of the uniform distribution increases

$$\frac{\partial \Pi^*}{\partial \lambda_s} = p\frac{\partial z}{\partial \lambda_s} < 0. \tag{18.26}$$

Thus the monopolist's profits are hurt by the negative impact of snobbish behavior on the demand. Similarly,

$$\frac{\partial \Pi^*}{\partial \lambda_c} = p\frac{\partial z}{\partial \lambda_c} > 0. \tag{18.27}$$

Thus, as conformism has a positive effect on demand, it helps to improve monopolists' profits.[3]

The duopoly results are different from the monopoly results. The intuition for this can be understood by noting how conformity and snobbishness change the complexion of competition. First, consider the impact of conformity. As the number of consumers who buy product 1 grows, the value of the product increases for the conformists and therefore the relative value of product 2 decreases. This implies that a unit reduction in price by firm 1 affects its total demand in two ways. First, the price reduction makes firm 1's product relatively more attractive than firm 2's product, and so the demand for product 1 increases. Second, as the consumers can rationally expect the demand for product 1 to increase, the value of the product for the conformists increases, and therefore they find it even more attractive to buy product 1. Thus, as the degree of conformity increases, duopolists are lured to cut prices. The ensuing price competition causes the equilibrium prices to drop.

Next let us understand how increased snobbishness affects a duopolist's profits. Now if firm 1 decreases its prices, it expects to get more consumers. However, this increase in demand reduces the value of the product for the snobs, and they are less likely to buy the product. Therefore, as the degree of snobbishness increases, reducing prices becomes less attractive to both the firms. The consequent reduction in price competition helps firms to charge higher prices and make more profits. Next we proceed to understand how quality difference between the firms in a duopoly affects equilibrium behavior.[4]

Effect of quality differences

Assume that the base quality of product 2 is better than that of product 1 ($v_1 < v_2$). To facilitate exposition, we first consider the case where both snobs and conformists value quality equally ($\omega_s = \omega_c$) and the marginal costs of the two products are the same ($c_1 = c_2$). Later, we study the case where snobs value quality more than conformists. We have

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[3] In order to see this consider the following numerical example. Assume $\beta = 1/2$ and that the value distribution is uniform with range (0,1). In this case, absent social effects, a monopolist (who does not serve the full market) will charge a price 1/2 and make profits of 1/4. However, if $\lambda_s = 0.2$, $\lambda_c = 0$, the profits are reduced to 0.22 while the profits are 0.27 if $\lambda_c = 0.2$, $\lambda_s = 0$.

[4] To see this, assume that $\beta = 1/2$ and v is sufficiently large so that the market is fully covered. In this case, absent social effects, a duopolist will charge a price 1 and make profits of 1/2. However, if $\lambda_c = 0.2$, $\lambda_s = 0$, the prices and profits reduce to 0.90 and 0.45 respectively. On the other hand, if $\lambda_s = 0.2$, $\lambda_c = 0$, then prices and profits increase to 0.55 and 1.1 respectively.

Proposition 18.3 *If $v_1 < v_2$ and $\omega_s = \omega_c$, then:*
(a) The higher-quality firm charges a higher price and has a larger total market share. Furthermore, as λ_c increases (or λ_s decreases), the higher-quality firm's market share increases.
(b) The higher-quality firm has a larger market share among conformists.
(c) There exists a λ_s^* such that if $\lambda_s > \lambda_s^*$, then the higher-quality firm has a lower market share among snobs.

The above result shows that the higher-quality firm charges a higher price and has a larger total market share. Thus increased conformism makes it profitable for the high-quality firm to pursue market share. On the other hand, increased snobbishness reduces market share differences between the firms. This is because snobbishness motivates the higher-quality firm to raise prices rather than go after market share.

Further, if snobbishness is sufficiently large, then a majority of the snobs may purchase the low-quality product. It is important to note that, in our model, snobs prefer higher-quality products to lower-quality products keeping all other things constant. Thus, as a product becomes more attractive due to its improved quality, the snobs correctly expect more consumers to buy the product. Hence the high-quality product becomes less attractive to snobs. Consequently, snobs may well buy a lower-quality product to differentiate themselves from others.

As this finding is very counterintuitive, we explore the conditions under which this result may hold. Note that Proposition 18.3 assumes that the snobs and conformists value quality equally and that the costs for each firm are the same even though they have different qualities. Next we examine whether demand-side effects, such as differences in consumer valuation for quality, can reverse the result. Later we study how supply-side effects, such as differences in manufacturing costs, could potentially change our results.

Proposition 18.4 *If $v_1 < v_2$ and $\omega_s > \omega_c$, then for sufficiently low values of λ_c and λ_s and high values of ω_s, we find that the high-quality firm has a lower market share among the conformists and a higher market share among the snobs.*

The intuition for this finding is that, if snobs value quality highly, they will be willing to pay such a high price for the product that the product will become unattractive to the conformists, who value quality less. Consequently, in contexts where snobs have a strong preference for quality, most of the snobs will buy the higher-quality product at a higher price whereas the conformists may purchase the lower-quality product at a lower price.

To explore whether supply-side factors can reverse the results in Proposition 3, consider the case where the costs for the two products are different and it costs more to produce a higher quality product. Specifically, assume that the marginal cost for producing a product of quality v is $c(v)$ where $c'(\cdot) \geq 0$. Further assume that the fixed costs for producing a product of quality v is $C(v)$ with $C'(\cdot) \geq 0$. We have

Proposition 18.5 *If $v_1 < v_2$ and $\omega_s = \omega_c = \omega$, then the high-quality firm has a smaller market share among snobs and a larger market share among the conformists if $\lambda_s > \lambda_s^*$, as long as $\omega \geq c'(v_1)$. If $\omega < c'(v_1)$ and $\lambda_s > \lambda_s^*$, then the higher-quality firm has a higher market share among snobs and a lower market share among the conformists.*

It is useful to note that in Proposition 18.3, $c'(\cdot) = 0$. The preceding result clarifies that the results of Proposition 18.3 would be reversed by cost effects only under the rather strong condition that the marginal costs of quality are higher than the marginal value of quality to the consumer. To the extent that this condition is unlikely to be satisfied, this result adds strength to the claim made in Proposition 18.3.[5]

It is commonly believed that snobs tend to buy high-quality products at high prices. Propositions 18.3, 18.4 and 18.5 provide a useful clarification of the theoretical basis for such a behavior. We are likely to observe such behavior when snobs value quality much more than others. In reality, it is quite likely that ω_s is higher than ω_c in many contexts. So we might often see snobs buying high-quality products at high prices. It is useful to note that our results suggest that snobs purchase high-quality products despite snobbishness and not because of it.

Now we examine how sensitivity to product quality, either among snobs or conformists, affects firms' profits.

Proposition 18.6 *If $v_1 < v_2$, then as ω_1 or ω_2 increases the profits of firm 1 decrease and the profits of firm 2 increase.*

The result is intuitive. As expected, a firm with a quality advantage benefits as consumers become more sensitive to quality.

Discussion We have analyzed how some social factors such as desire for uniqueness and conformism may influence the behavior of firms and consumers. First we established that more snobs may purchase a conspicuous good when its price increases. However, the overall demand and the demand from conformists decline as price increases. This finding also holds in the case of a duopoly (see Amaldoss and Jain, 2005b), implying that market structure does not drive this result. On the other hand, the effect of snobbishness and conformism on equilibrium profits is moderated by market structure. In a monopoly, profits increase with conformism but decline with snobbishness. The converse holds in the case of a duopoly. Finally, we found that the firm offering a higher-quality product is likely to charge a higher price and gain a larger market share, especially among conformists. But when snobbishness is sufficiently high the snobs may well buy the lower-quality product. Our analysis also clarifies that snobs may purchase a high-quality product not because of their snobbishness but despite it.

A central assumption of our theoretical model is that consumers form rational expectations. Simple introspection tells us that it not easy for individuals to do so. Further, several studies reject the possibility that individual people can form rational expectations (Schmalensee, 1976; Garner, 1982; Williams, 1987; Smith et al., 1988). Market-level experimental studies, however, suggest that people can form adaptive expectations and still move toward the rational expectations equilibrium (see Sunder, 1995 for a review). A related question is whether individuals merely forming adaptive expectations can converge to the rational expectations equilibrium predictions of our model. To explore

[5] To see why this condition is too strong, consider the case when $c'(v_1) > \omega$. It can then be shown that firm 1 can benefit by choosing a lower quality.

this issue theoretically, we studied the case where consumers form adaptive beliefs using the Cournot learning process. Our analysis shows that if consumers play according to Cournot dynamics, then the equilibrium demand converges to that under the rational expectations equilibrium (see Amaldoss and Jain, 2005a for more details).

Note that experimental economics literature suggests that consumer learning is often not purely guided by a belief-based mechanism (e.g. Cournot mechanism). Learning could well be influenced by reinforcement of past choices. The experience-weighted attraction (EWA) learning model proposed by Camerer and Ho (1999) is a hybrid model that includes features of both reinforcement and belief learning. On using EWA parameter estimates of 4×4 constant sum games reported in Camerer and Ho (1999, p. 852, column 3), we find that adaptive learning can converge toward the rational expectations equilibrium. This raises hope that our equilibrium predictions may survive in a market despite the bounded rationality of consumers.

4. Model validation

It is a challenge to test our model in a field setting because consumers may not be forthcoming with their social preferences. Alternatively, we can estimate the social effects from the actions of consumers. This avenue faces several econometric issues. For example, the simultaneity in the actions of strategic players makes it difficult to separate the endogenous and exogenous interactions in the model. Furthermore, unobserved group characteristics may be correlated with the exogenous variables. In an attempt to circumvent such econometric issues and directly test the model, we pursue a different path. In the tradition of experimental economics literature, we test our model under controlled laboratory conditions. The experimental investigation addresses two key questions:

1. *Do more snobs buy as price increases?* In our laboratory test, more snobs purchased the product when price increased. In addition to finding strong support for the qualitative predictions of the model, we have moderate support for the point predictions. Our theory also predicts that the demand curves for conformists and the total market should be downward sloping, and we also find support for this claim.
2. *Are the expectations of subjects consistent with the rational expectations model?* We tracked the beliefs that guided the purchase decisions of subjects in every trial of the experiment. On average, the expected demand was consistent with the actual demand and the rational expectations equilibrium predictions. We observe variation in the behavior of individual subjects, implying that the model prediction survives at the aggregate level rather than at the individual level.

Our analytical model assumes a continuous distribution in values, but it is difficult to validate such a model in a laboratory setting with a small sample of subjects. As our theory does not crucially depend on the continuity assumption, we next outline a discrete version of our model and test its predictions.

Empirical model

We use a discrete distribution of valuations that is conducive to test the model with a population of 20 subjects. The approach of testing a continuous model using a discrete version is common in experimental economics (e.g. Smith, 1982). Table 18.1 presents the

Table 18.1 Value distribution for the empirical model

	S_1^A	S_2^A	S_3^A	S_4^A	S_5^A	S_6^A	S_7^A	S_8^A	S_9^A	S_{10}^A
Type A	2	3	4	5	6	9.5	10.1	10.6	11.2	11.4
	S_1^B	S_2^B	S_3^B	S_4^B	S_5^B	S_6^B	S_7^B	S_8^B	S_9^B	S_{10}^B
Type B	0.1	0.2	0.5	0.55	0.7	1.5	2	2.5	3.5	5

Note: S_j^i refers to Subject j of Type i.

distribution of valuations for ten snobs (labeled Type A buyers in our experiment) and ten conformists (Type B buyers in our experiment).[6] We used $g(z) = 0.5z$ and $h(z) = 0.6z$. The resulting equilibrium demand curve for snobs is (weakly) upward sloping, while it is (weakly) downward sloping for conformists and the total market. In our initial study, we use two price points to trace the slope of the demand curve. Later, in Studies 2 and 3, we will use three price points to trace the demand curve.

Procedure

To test the model, we used a within-subject design with two levels of prices. Using price points 5.9 and 6.9 francs, we traced the changes in demand among snobs and conformists. We ran two groups comprising 20 subjects each. In Group 1 the price was low in the first 30 trials and high in the next 30 trials. In Group 2 the order of price presentation was reversed.

We recruited business school students for the study promising them a show-up fee of $5 and additional monetary reward contingent on their performance. All transactions were in an experimental currency called 'francs' which were converted into US dollars at the end of the experiment.

In our experiment, we simulated the retail market environment where the seller posts price and promises to supply its product to all buyers who are willing to pay the posted price (see Smith, 1982 for a discussion on the posted prices market, and its implications for market efficiency). The computer played the role of seller, and buyers could not negotiate the price with the seller.

Each subject was randomly assigned to play the role of either a Type A or Type B buyer. Type A buyers value the product less when more people own the product. Consequently, the actual value of the product systematically drops below the base value when more people choose to buy it. For example, consider the Type A buyer whose base valuation for the product is 9.5 francs. If a total of five Type A and Type B buyers purchase the product, the actual value of the product will fall to 7 francs (that is, $9.5 - (0.5 \times 5) = 7$).

On the other hand, Type B buyers value the product more when more people own it. Hence the actual value of the product rises above the base value when more people choose to buy it. For example, consider the Type B buyer whose base valuation is 2 francs. If

[6] We named the two types of buyers as Type A and Type B buyers, rather than as snobs and conformists, so that the behavior of subjects is guided purely by the negative and positive externality captured in our model.

a total of five Type A and Type B buyers purchase the product, the actual value of the product will increase to 5 francs (that is, $2 + (0.6 \times 5) = 5$).

At the start of every trial, subjects were endowed with 7 francs so that they had sufficient funds to afford the product. As our model is a complete information game, subjects were informed of $g(z)$, $h(z)$, the value distributions, and price of the product. Detailed instructions can be seen in Amaldoss and Jain (2005a). The type of subjects, the total number of subjects and the base valuations remained fixed in all trials.

In every trial, each subject had to decide whether or not to purchase the product. Subjects were asked to provide demand projections. Then, using these demand projections, the computer showed the expected value of the product. Subjects could revise their demand projections, and obtain new estimates of the likely value of the product. We used the demand projections to track the expectations that guided the decisions of the subjects.

After all the buyers had made their decisions, the computer counted the total number of subjects who purchased the product. Then, based on this, the actual value of the product for each subject was assessed. The payoff to a subject who bought the product was obtained by adding the endowment to the actual value of the product and then deducting the price paid. The subjects who did not buy the product kept the endowment. At the end of every trial, each subject was informed of the number of Type A and Type B buyers who purchased the product, and the payoff for the trial.

In order to make subjects familiar with the structure of the game, they were allowed to play three practice trials for which they received no monetary reward. Then they played 60 trials, and the price condition changed after 30 trials. At the end of 60 trials, subjects were paid according to their cumulative earnings. Finally, they were debriefed and dismissed.

Results

First, we study the quantity demanded by snobs and conformists. Then we investigate the expectations that could have shaped the decisions of our subjects. The experimental results are consistent with the predictions of the model. We observe an upward-sloping demand curve for Type A buyers (snobs), and a downward-sloping demand curve for Type B buyers (conformists). On average, the expected demand is also consistent with the rational expectations equilibrium solution. However, we observe variations in the beliefs and actions of individual subjects.

Analysis of aggregate demand The empirical results are consistent with the qualitative predictions of the equilibrium solution. However, we see some departures from the point predictions of the model. Also, there is a significant trend in the demand pattern over the several iterations of the game. Table 18.2 presents the mean quantity demanded by the two types of buyers, and the corresponding equilibrium predictions.

QUALITATIVE PREDICTIONS The model makes four qualitative predictions. First, the demand for the product among Type A buyers (snobs) should grow as the price increases. The average demand was 1.53 units, when the product was priced 5.9 francs. But when the price increased to 6.9 francs, the demand rose to 3.57 units. We can reject the null hypothesis that these demand levels are the same ($F_{(1,118)} = 92.83$, $p < 0.0001$). We obtain

Table 18.2 Mean demand

Price	Type A buyers (snobs)				Type B buyers (conformists)			
	Actual demand			Prediction	Actual demand			Prediction
	Group 1	Group 2	Both		Group 1	Group 2	Both	
5.9	1.33 (0.78)	1.93 (1.08)	1.53 (1.02)	1	9.03 (0.67)	9.2 (0.87)	9.12 (0.78)	10
6.9	3.43 (1.04)	3.70 (1.49)	3.57 (1.28)	4	2.90 (1.02)	3.26 (2.31)	3.08 (1.79)	2

Note: The standard deviations are presented in parentheses.

similar results in each of the two groups. In Group 1, the average demand grew from 1.33 to 3.43 units, as the price rose from 5.9 to 6.9 francs, and this difference in demand is significant ($F_{(1,58)} = 94.25$, $p < 0.0001$). In Group 2, the mean demand correspondingly increased from 1.93 to 3.7 units ($F_{(1,58)} = 27.66$, $p < 0.0001$).

Second, in equilibrium the Type B buyers (conformists) should demand less as the price increases. In actuality, the average demand of Type B buyers across the two groups declined from 9.12 to 3.08 units, when the price rose from 5.9 to 6.9 francs. This shift in demand is significant ($F_{(1,118)} = 573.31$, $p < 0.0001$). We see similar results at the level of individual groups. In Group 1, on average the demand dropped from 9.03 to 2.9 units ($F_{(1,58)} = 749.48$, $p < 0.0001$). In Group 2, the demand declined from 9.2 to 3.26 units, as the price increased ($F_{(1,58)} = 171$, $p < 0.0001$).

Third, the model predicts that the overall demand should fall as price increases. The mean actual demand dropped from 10.65 to 6.65 units, when price rose from 5.9 to 6.9. This change in average demand is significant ($F_{(1,118)} = 199.93$, $p < 0.0001$). We obtain similar results in each of the two groups (Group 1: $F_{(1,58)} = 134.81$, $p < 0.0001$; Group 2: $F_{(1,58)} = 89.67$, $p < 0.0001$).

Fourth, when the price is 5.9 francs, conformists should demand the product more than snobs. Consistent with this prediction, the conformists demanded on average 9.12 units across both groups. On average, snobs demanded only 1.53 units. A paired comparison of the units demanded by snobs and conformists reveals that the observed difference in demands is significant ($t = 42.15$, $p < 0.0001$). We observe similar results in both Group 1 and Group 2. In Group 1, the average demand of conformists was 9.03, which is more than the 1.13 units demanded by snobs ($t = 45.10$, $p < 0.0001$). In Group 2, the conformists and snobs bought on the average 9.2 and 1.93 units, respectively ($t = 23.69$, $p < 0.0001$).

Finally, when the price is 6.9 francs, snobs should demand more than conformists. On average across the two groups, snobs and conformists bought 3.56 and 3.08 units, respectively. We cannot reject the null hypothesis that these quantities are the same ($t = 1.5$, $p > 0.13$). On closer examination, we note that the difference in demand is marginally significant in Group 1, but not in Group 2. In Group 1, the mean quantity purchased by snobs and conformists is 3.43 and 2.9 units, respectively ($t = 1.97$, $p < 0.058$). In Group 2, snobs and conformists purchased 3.7 and 3.26 units, respectively ($t = 0.73$, $p > 0.2$).

DISTRIBUTION OF AGGREGATE DEMAND The equilibrium solution provides point predictions about demand, but the actual demand varies over the several trials of the experiment.

The model predicts that if the price is 5.9 francs, then one snob should buy the product. Over the 60 trials across the two groups, the actual quantity demanded ranges from 0 to 4, with mean = 1.53, median = 2 and mode = 2. But if the price rises to 6.9 francs, then in theory four snobs should buy the product. We observe that the actual demand ranges from 1 to 6, with mean = 3.56, median = 4 and mode = 4.

In equilibrium, the conformists should demand ten units when the price is 5.9 francs. The actual demand ranged from 7 to 10 units, with mean = 9.11, median = 9 and mode = 9. If the price is increased to 6.9 francs, then in theory the demand should drop to 2 units. The observed demand ranged from 0 to 8 units, with mean = 3.08, median = 3 and mode = 2. This suggests that, although the observed behavior is consistent with the qualitative predictions of the model, there are departures from the point predictions of the equilibrium solution.

TRENDS IN AGGREGATE DEMAND In the analyses discussed above, we have aggregated the demand across groups and trials, which could mask trends in demand. Now we compute the mean for each block of five trials across the two groups. These block means were computed across the two groups. Statistical analysis of the block means suggests that conformists evince a significant trend in demand, when the price is 6.9 francs ($F_{(5,20)} = 9.76$, $p < 0.0001$), but only a marginal trend when the price is 5.9 francs ($F_{(5,20)} = 2.34$, $p < 0.08$). The trends in the demand pattern of snobs are much weaker. It is marginally significant at 6.9 francs ($F_{(5,20)} = 2.87$, $p < 0.05$), and not significant at 5.9 francs ($p < 0.2$). This suggests that we observe some learning in the experiment.

These trends raise an interesting question: how did our subjects behave in the very first trial? We find that three Type A buyers and two Type B buyers bought the product at 6.9 francs in Group 1. In the other group, three buyers of each type purchased the product at 6.9 francs. Thus the actual aggregate demand was quite close to the predicted total demand of six units. When the price was 5.9, we find that one Type A buyer and nine Type B buyers bought the product in the first trial in Group 1, whereas three Type A and eight Type B buyers purchased the product in Group 2. Again, the actual total demand is not very different from the predicted demand of eleven units. On examining the segment-level demand, we see some departures from the predicted behavior. However, the demand patterns are directionally consistent with the predictions of the theory. In particular, the average demand from Type A buyers (snobs) increased from two to three units as price increased, while the demand from conformists decreased from 8.5 to 2.5 as price increased. This informal analysis of the first trial data suggests that through introspection subjects were able to behave in a manner consistent with the aggregate equilibrium predictions. The purchases in the subsequent trials could be tracked by adaptive decision-making. Amaldoss and Jain (2005a) provide more details on how well adaptive learning models can be fitted to our data.

VARIATION BY VALUATION Whether or not a subject buys the product depends on her base valuation and the number of people she expects to buy the product. In equilibrium, each player should play a pure strategy, and that strategy changes with the base value of the product. For instance, when the price is 5.9 francs, only the Type A buyer with a base value of 11.4 francs should buy the product. All others should not buy the product. On the other hand, when the price is 6.9 francs, only the Type A buyers with the four top base valuations should buy the product. Subjects did not always play the predicted strategies,

Table 18.3 Mean expected demand

Price	Type A buyers (snobs)				Type B buyers (conformists)			
	Expected demand			Prediction	Expected demand			Prediction
	Group 1	Group 2	Both		Group 1	Group 2	Both	
5.9	1.40 (1.19)	1.86 (1.59)	1.63 (1.42)	1	8.82 (1.34)	7.35 (3.52)	8.08 (2.76)	10
6.9	3.56 (1.24)	3.20 (1.72)	3.38 (1.51)	4	3.17 (1.40)	3.86 (2.47)	3.52 (2.04)	2

Note: The standard deviations are presented in parentheses.

as predicted. Yet the aggregate behavior is directionally consistent with the model prediction. We observe similar behavior among Type B buyers.

Analysis of expectations Thus far we have examined how purchase behavior conforms to the rational expectations equilibrium solution. In every trial of the experiment, subjects were asked to guess the number of Type A and Type B buyers who might purchase the product. Using these demand projections, we can explore whether the expectations of our subjects are consistent with the outcomes and the equilibrium solution. Note that each subject forecast the number of Type A and Type B buyers who would purchase the product. The mean expected demand is computed by averaging the expectations of all the subjects. Table 18.3 presents the mean expected demand, along with the rational expectations equilibrium solution. It is reassuring to observe that the expected demand is congruent with the observed outcomes and the qualitative predictions of the model, but there is a wide variation in expectations. Further, we discern a trend in expectations over multiple iterations of the game.

QUALITATIVE PREDICTIONS In keeping with the theory, our subjects expected snobs to buy more when the price was high. Across the two groups, the mean expected demand of snobs increased from 1.63 to 3.38 units as the price rose from 5.9 to 6.9 francs ($F_{(1,2398)} = 853.65$, $p < 0.0001$). On the other hand, conformists were expected to buy less as the price rose. The average expected demand dropped from 8.08 to 3.52 units as the price increased ($F_{(1,2398)} = 2126.39$, $p < 0.0001$). The changes in expected demand follow a similar pattern within each group. Finally, consistent with theory, the mean aggregate demand was expected to drop as price increased ($F_{(1,2398)} = 554.01$, $p < 0.0001$). The results are similar within each group.

The model assumes that expectations are correct; that is, the actual demand and the expected demand are the same. Indeed, the mean observed demand and the expected demands are similar. When the price was 6.9 francs, the average actual and expected total demands were 6.65 and 6.89 units, respectively. We cannot reject the null hypothesis that these demands are the same ($t = 0.11$, $p > 0.2$). When the price dropped to 5.9 francs, the actual and expected demand were on average 8.45 and 9.11 units, respectively. Again, we cannot reject the null hypothesis that these demands are the same ($t = 0.39$, $p > 0.2$).

DISTRIBUTION OF EXPECTATIONS In equilibrium, one snob should buy if the price is 5.9 francs. The expectations range from 0 to 10, with mean = 1.63, median = 1 and mode

= 1. In theory, the demand should be four units, if the price is increased to 6.9 francs. We note that the expectations range from 0 to 10, with mean = 3.38, median = 3 and mode = 4. Thus, although the expectations vary widely, they conform to the qualitative predictions of the model.

Our subjects expected anywhere from none to all of the conformists to buy the product at both prices. Yet, as before, the distributions of expectations are qualitatively consistent with the equilibrium solution. If the price is 5.9, all conformists should buy. The corresponding expectations followed a distribution with mean = 8.86, median = 9 and mode = 9. But if the price is 6.9, then two conformists should buy. The expectations were distributed with mean = 3.51, median = 3 and mode = 3.

TRENDS IN EXPECTATIONS We also examined the trends in expected demand over blocks of five trials. An analysis of variance suggests that the block means are significantly different for snobs (Price = 5.9: $F_{(5,780)} = 66.79, p < 0.001$; Price= 6.9: $F_{(5,780)} = 4.35, p < 0.001$). The results are similar for conformists.

Discussion The experimental results show that in a market comprising both snobs and conformists we could observe an upward-sloping demand curve as predicted by the rational expectations equilibrium. In this study, we used two price points to trace the demand curve. Assessing the demand at three price points using a within-subject experimental design could add to the robustness of the experimental finding. In Study 2, presented in Amaldoss and Jain (2005a), we used three price points to trace the demand curve. Furthermore, in contrast to Study 1, we provided subjects additional monetary incentive for making accurate demand forecasts. The payoff based on purchase decision was similar to the experiment described earlier. The additional payoff based on accuracy of the total demand projection $= 5 - (|e|/2)$ where e is the difference between actual and forecasted demand. The findings of this additional study are consistent with the theoretical predictions.

Another interesting implication of our theory is that, if the market comprises only snobs, then it exhibits a downward-sloping demand curve. We find experimental support for this prediction (see Study 3 in Amaldoss and Jain, 2005a for more details). A related question is whether or not more snobs will purchase a product as price increases in a duopoly market. The answer is yes. Interested readers can find theoretical and experimental support for this claim in Amaldoss and Jain (2005b).

5. Summary and directions for future research

In this chapter, we attempted to explore how social needs may influence strategic pricing. The theoretical and empirical analysis offers some useful insights about pricing of conspicuous goods.

1. *What is the effect of consumer desire for uniqueness or conformity on the demand pattern for conspicuous goods?* We show that in a market comprising snobs and conformists, demand among snobs may increase as the price of a product increases. However, the demand among conformists, as well as the total market demand, may decrease as price rises. The intuition for this result is that snobs prefer a higher-priced product if they expect the overall demand to be lower at the higher price, and such

an expectation will be rational only if the conformists have a downward-sloping demand curve. Hence, in a market comprising either only snobs or conformists, the demand curve is downward sloping. It is useful to note that our result does not rely on signaling either product quality or wealth of consumers.[7] We find support for our model predictions in our experiments and also in the empirical research of Chao and Shor (1998).

2. *How does consumer desire for uniqueness or conformity affect firms prices and profits?* In a monopoly, conformism is conducive to firms' profits, whereas snobbishness hurts firms' profits. In a duopoly, on the other hand, the desire for uniqueness leads to higher prices and profits. The intuition for this result is as follows. As the price of a product falls, this attracts more buyers, and thereby makes the product less appealing to the snobs. Thus firms are less inclined to cut prices as snobbishness increases. The resulting softening in price competition increases firm profits. In contrast, conformism encourages price competition and thus reduces firm profits.
3. *Do consumers buy high-quality products because of their desire for uniqueness?* It is commonly believed that snobs buy high-quality products at high prices. In contrast to this perception, we find that when snobbishness is sufficiently large, snobs might actually buy a lower-quality product. However, if snobbishness is low and snobs have a strong preference for quality, then we might observe them buying high-quality products. Hence snobs purchase high-quality products despite snobbishness and not because of it.

There are several avenues to further investigate how social factors may influence firm behavior. Next we discuss some of these research opportunities.

The theoretical model discussed in this chapter is a single-period game. As producers of conspicuous goods typically make multiple pricing decisions over a long time horizon, it would be useful to investigate how social effects affect firms' pricing policies over time. For example, it is plausible that desire for conformity could lead to penetration pricing. We also did not examine how heterogeneity among consumers in the need for uniqueness or conformity could impact the results, and it is useful to explore such issues. We note that, while there is a large body of research on reference groups, extant research has yet to investigate the implications of these social groups for firm behavior. Our theoretical model can be adapted to formally study reference group effects (for one such attempt see Amaldoss and Jain, 2007).

The issue of brand equity has attracted the attention of marketing scholars for a long time. Researchers have examined the factors that determine the success of brand extensions (see Aaker and Keller, 1990; Reddy et al., 1994), and the impact of failed brand extensions on the parent brand (e.g. Keller and Aaker, 1992). It is possible to modify the framework proposed in this chapter to examine how social effects can moderate the success of brand extensions. It would also be interesting to investigate how firms should price multiple product lines in the presence of social effects.

Word of mouth is well recognized as an important source of information. While

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[7] In fact, an explanation based on signaling status cannot account for an upward-sloping demand curve for snobs (see Corneo and Jeanne, 1997).

previous research has examined the issue of product adoption and advertising in the presence of word of mouth (see for example Mayzlin, 2006), researchers have not examined the issue of pricing in markets where word of mouth is the primary means of communication. Finally, it would be useful to test our model predictions using field data on consumption of conspicuous goods.

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