Persuasion or Information?
Advertising and Pricing of Image Goods

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Abstract

This paper examines a monopoly firm’s decision on price and advertising in a market where exclusivity matters. Two forms of advertising are analyzed: (a) informative advertising, in which the firm provides real information about the product’s existence, features and quality, and (b) image advertising, in which the firm communicates an image for the product that allows buyers to associate themselves with. Consumers are both image-conscious and “snobbish.” In other words, both image and exclusivity give them utility. Therefore, image advertising increases consumers’ willingness to pay even though they are assumed to be fully rational. In equilibrium only a fraction of consumers will buy the image good. We analyze the effects of income dispersion, the inherent nature of the product, and the existence of a strategic competitor on the equilibrium outcome and welfare. The monopolist makes lower profits selling to more snobbish consumers if the product is of high quality. An increase in consumers’ snobbishness causes the share of image advertising to decrease if the product is of low quality. Also, it is shown that the monopolist advertises more than the two duopolists combined, and more consumers are served under monopoly than under duopoly, leading to an increase in total welfare.

Keywords: Snobbishness, image-consciousness, advertising strategy.
JEL Codes: M3, L1, D01, D42

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1 Introduction

It is generally accepted that consumption can be a social activity.¹ Consumers’ purchase decisions may depend not only on the product’s ability to satisfy practical needs, but also its ability to fulfill social needs such as prestige, uniqueness, or the need to communicate a certain image. Research has shown that consumers could place a lower value on a product when more consumers own it. In a laboratory experiment, Worchel, Lee and Adewole (1975) show that this kind of behavior can even exist for products like cookies. This implies that people might choose unique or exclusive items not only for reasons of signaling their wealth or status, but also for the sake of being just different. Advertisements are often designed to appeal to these kinds of consumer needs. Pollay (1984) reports the finding in a study of 2000 randomly selected magazine advertisements that uniqueness appeals are used as a central theme in 10% of magazine advertisements and as a subordinate theme in 23%.

In this paper, we ask how consumers’ desire for exclusivity affects the firm’s pricing and advertising. Our definition of desire for exclusivity, or “snobishness,” follows Leibenstein’s (1950) terminology; snobbish consumers are those whose willingness-to-pay for a product goes down as the total number of consumers increases. Snobbishness is more likely to be a significant factor in markets for luxury goods such as jewelry, perfumes, expensive watches, and luxury cars. In these markets, it is believed that some consumers would find the product less valuable if it is consumed by many, and that firms may potentially make higher profits if they maintain a high price level in order to keep their customers happy.

The brand may lose its appeal if different market segments become attracted to it, leading to decreased profits for the firm. Let us consider the example of the Cadillac Cimarron. This compact car built by Cadillac was introduced in 1982. Despite the Cimarron’s moderate profitability, the Cadillac brand name was tarnished. Buyers of the model came from a market segment which could not afford luxury sized Cadillacs. Owners of luxury sized models lost their sense of the car’s exclusivity.² This was part of a series of events that drove the division close to bankruptcy in the 1980s. Consequently, the Cimarron was discontinued after 1988. Similarly, Burberry, a British luxury fashion brand, attempted to make the brand relevant to an increasingly-diverse

¹See Veblen (1899).
customer base, from businessmen wearing trench coats to trendy women carrying the latest Burberry couture to teenagers wearing Burberry scarves. Repositioning itself around so-called “accessible luxury” yielded short-term gain for the company. In the long run, however, becoming associated with younger, less-affluent customers hurt the company’s brand image. The company reported some fairly poor financial results at the end of 2007, despite the fact that a rival company, Armani, reported a strong year.3 Tiffany, a U.S. jewelry and silverware company, emphasized its inexpensive Tiffany-branded silver jewelry collection to increase store traffic.4 This strategy brought teenagers into the store, and consequently made its traditional customers feel marginalized, and damaged the brand image in the early 1990s.

In this paper, we consider these markets with exclusive products, and provide an explanation as to how a firm would choose its price and advertising intensity under various conditions. We also look at why firms might choose different forms of advertising, namely, informative and persuasive/image advertising. We define informative advertising as advertising that informs consumers of the existence of the product. Persuasive advertising is traditionally defined as advertising that increases the consumers’ willingness-to-pay and pushes out the demand curve. Here, we define what we term “image advertising” as advertising which seeks to create an image that consumers can identify with. By doing that, we provide foundations for the increases in willingness-to-pay without giving up the assumption of rationality.

Following these definitions, since any kind of advertising necessarily supplies information about the product’s existence, one might wonder why we don’t observe image advertising as the only type of advertising; this type both informs and persuades consumers.5 How do we explain the fact that we still see informative advertising? There are two explanations. One is that the product may merely offer intrinsic utility (defined as the utility derived directly from consumption) to consumers and provide little scope for the creation of an image that people might care to identify with. For goods of this sort, one would observe only informative advertising from sellers who seek to increase the size of their potential markets. Secondly, informative advertising is usually

3Taken from comments of Eric Newman in a January 2008 Brandweek article.
4Taken from comments of Aude Lagorce in a February 2008 MarketWatch article.
5There are cases in which it is virtually impossible to tell what is advertised if one is not already informed about what the product is. For the persuasive advertising to work, one has to know which product is advertised. The implicit assumption in this paper is that consumers can tell what the product is even if they just see image advertisements.
less costly than persuasive advertising. The creation of an image needs to engage the imagination and also the senses of the target audience.\textsuperscript{6} Creating and communicating an image or brand awareness requires creativity as well as sophisticated technology to make it a reality. On the other hand, an advertisement which just informs or reminds consumers of the product’s existence is, in principle, easier to prepare and, therefore, less costly. Even the media used by informative and persuasive advertising are usually different. Firms would be more likely to use television and glossy magazines for persuasive advertising, but employ the radio and the newspaper for informative advertising. For example, according to Advertising Age’s 2007 U.S ad spending by category, firms in product categories such as personal care, apparel, cigarettes & tobacco, beer, wine & liquor spend a much greater share of their total advertising budget on TV and magazine commercials; whereas, firms in product categories such as real estate, retail, general services, financial services, gas & oil spend a much greater share of their advertising budget on radio and newspaper commercials (See Table 1).

We use Leibenstein’s idea of “snob effects” to provide justification for image advertising without giving up the consumer’s optimization behavior. The idea of snob effects, which dates back to Veblen’s conspicuous consumption concept, states that consumers desire to own exclusive goods or goods that are not commonly purchased.\textsuperscript{7} This effect comes from a consumption externality. A consumer’s consumption has a direct negative effect on another consumer’s utility. However, in order to receive utility from consuming a product with snob effects, there is need for enough publicity about the product’s image or exclusive attributes. Image advertising serves to create this publicity needed to increase consumers’ willingness-to-pay. The firm has to take into account the tension between how many people know of the product and how many actually buy it.

We first consider a monopolist’s choice of price and advertising intensity if the product in question is a pure image good. Then we allow the good to give both image

\textsuperscript{6}“A brand is not a brand unless it competes along emotional dimensions. It must symbolize a promise that people believe can be delivered and one they desire to be part of,” says Jeffrey Swystun, the global director for a branding consultancy Interbrand (taken from http://www.brandchannel.com/papers_review.asp?sp_id=694 on May 19, 2008). This is not an easy task.

\textsuperscript{7}Leibenstein (1950) makes a distinction between “Veblen effects” and “snob effects”. In both effects, consumers care about their relative standing in the society. However, the former is a function of the price; the latter is a function of the consumption of others. The effect we are analyzing in this paper is the snob effect.
and intrinsic utility, and see how this affects the firm’s choice. Since the good now provides a positive intrinsic utility, there is room for informative advertising. This allows us to analyze the firm’s optimal mix of different forms of advertising under various conditions. Lastly, we consider a price-competition duopoly framework with two pure image goods, where the two firms first inform a fraction of the population of the product image, and then set their prices simultaneously. Informing a larger fraction of the population means that those who choose to buy the product will have a higher willingness to pay since there will be more agents to appreciate their purchase. However, price must be set such that only a fraction of the exposure audience actually buys the product. The firm will find the optimal balance between these two forces.

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<tr>
<th></th>
<th>TV &amp; Magazine</th>
<th>Newspaper &amp; Radio</th>
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<tr>
<td>Personal care</td>
<td>95.0%</td>
<td>1.3%</td>
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<tr>
<td>Apparel</td>
<td>91.4%</td>
<td>2.9%</td>
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<tr>
<td>Cigarettes &amp; tobacco</td>
<td>91.0%</td>
<td>2.1%</td>
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<tr>
<td>Beer, wine &amp; liquor</td>
<td>69.3%</td>
<td>12.8%</td>
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<td>Real estate</td>
<td>23.0%</td>
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<td>Retail*</td>
<td>45.9%</td>
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<tr>
<td>General services**</td>
<td>37.7%</td>
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<td>Gas &amp; oil</td>
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<td>Financial services</td>
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<td><strong>Average</strong>*</td>
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Note: Calculated using media spending totals from TNS by category for 2007.

*Includes discount department & variety stores, department stores, retail, shopping centers & catalog showrooms.

**Includes apparel services, business services, beauty shops, doctors, nurses, chiropractors, dentists, hospitals, clinics & medical centers, legal services, rental services, dating services, spectator sporting events, exterminators, electric & water companies.

***Average over 29 industry categories of percentage of advertising spending in a given media.

Table 1: Share of advertising spending

Our approach yields some interesting results. First, we show that if advertising gets more costly, the firm is forced to lower its price. Second, the inherent nature of the product plays a role in the optimal mix of advertising that the firm chooses. Returns to informative advertising will be low if the product in question is of low intrinsic quality. Therefore, the firm will choose a larger share of image advertising. We demonstrate that an increase in snobbishness causes the share of image advertising
to decrease if the product is of low quality. Also, the monopolist makes lower profits selling to more snobbish consumers if the product is of high quality. Finally, it is shown that the market structure affects the firm’s choice of advertising intensity. A multi-product monopolist would advertise more than the two duopolists combined. Surprisingly, total welfare is higher under monopoly than under duopoly.

The paper is organized as follows. In Section 2, we give a brief literature review. Section 3 lays out a basic model of image goods, and studies various interesting additions to the basic model; particularly, how the income dispersion, the nature of the product, the possibility of informative advertising, and the market structure affect the choice of advertising and price. Section 4 concludes. The proofs to the propositions are provided in the appendix.

2 Literature

Our research uses the idea of conspicuous consumption which dates back to Veblen’s well-known work The Theory of the Leisure Class (1899). In his work, Veblen argues that people use consumption as a means to gain and signal status. Later on Leibenstein (1950) discusses snob effects in a classical article. He argues that the snob effect represents the desire of people to be exclusive or just different from the “common herd.”

Amaldoss and Jain (2005a, 2005b) in a series of papers study the pricing of conspicuous goods when the consumer pool is comprised of both snobs and conformists. Conformists are defined as those whose value for a product increases as the number of consumers who buy that product increases. The idea of image advertising in the existence of snob effects is studied by Krähmer (2006). As he puts it, image advertising increases consumers’ willingness to pay because consumers value how well-known the product’s image is. Krähmer studies this idea in a signaling framework in which there is a matching stage after the purchases are done. Each consumer is randomly matched with a member of the public, referred to as the consumer’s social contact. The contact does not choose an action, but only infers the consumer’s type from her knowledge of brand names, the consumer’s choice, and distribution of prices. After treating image advertising as a signaling device, the paper focuses on its entry deterrence effects. The author shows that an incumbent might strategically overinvest in advertising to deter
entry, and competition might be socially undesirable.

Signaling social status or wealth through conspicuous consumption has received a great deal of attention. For instance, Bernheim (1994) considers a model in which status depends on public perception about an individual’s predisposition. He shows that when status is sufficiently important relative to intrinsic utility, individuals conforms to a single standard of behavior. Bagwell and Bernheim (1996) study the conditions under which “Veblen effects” would arise from the desire to achieve social status by signaling wealth. In Pesendorfer (1995), sellers create new designs, and buyers like those designs because of their ability to signal buyers’ type to other buyers in a dating game. By creating designs, sellers are able to use their products to function as a signal for purchasers, similar to the signaling role of advertising. However in our setup, advertising, rather than allowing consumption to perform as a signaling device, directly enters the utility function. Therefore, it is used as an instrument at the firm’s disposal which lets purchasers know that there are agents who are aware of the product’s image. The need for exclusivity is modeled with the help of consumption externalities, rather than in a signaling framework. This also requires that consumers are image-conscious. Furthermore, we analyze the implications of income inequality, informative advertising, and include a monopoly-duopoly comparison.

Our research is also related to categorizing advertisements. It is commonly recognized that advertising influences consumer behavior in different ways. However, there has been a long debate on the categorization of advertisements. There are three main views explaining the effects of advertising on consumers. The persuasiv e view argues that advertising increases consumers’ willingness to pay by changing their perception about the product, differentiating products, and creating brand loyalty. As a result, it makes the demand for the advertised good more inelastic, leading to increases in price. In Eaton and White (2005), image advertising acts as a means to solve a coordination problem among similar individuals, who signal their types but find it difficult to choose between many equilibria. The informative view claims that advertising informs consumers about the product’s existence, characteristics, quality, what it’s used for, price etc. Grossman and Shapiro (1984) consider a model of horizontal differentiation in which the firms advertise simultaneously and advertising conveys full and accurate

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8 For an extensive survey of the empirical and theoretical studies of advertising, see Bagwell (2007).
9 The formalization of this view is offered by Dixit and Norman (1978).
information about the characteristics of the products. In a recent paper, Anderson and Renault (2006) look at the monopoly firm’s decision on how much information to release to the consumers about the product. A third view is that advertising is complementary to the advertised product. Becker and Murphy (1993) develop a model where advertising enters in the utility function just like any other good. The marginal utility of advertising may be positive, in which case advertising is a “good,” or it may be negative, in which case advertising is a “bad.” But the marginal utility of the advertised product rises with advertising so that advertising serves to shift out the demand for this product.

A different taxonomy of advertising was introduced by Johnson and Myatt (2006). The authors distinguish between advertising which could be hype or real information. In their work, promotional hype corresponds to traditional views of informative and persuasive advertising, i.e. it shifts out the demand curve. However, real information allows consumers to learn their match with the product’s attributes. When consumers’ valuations for a product are relatively homogeneous, firms will typically choose to serve a large fraction of potential consumers. The corresponding advertising strategy would be to highlight the existence of the product, or inform the consumers of the general characteristics or uses of the product. Firms will offer “something for everyone.” When consumers are heterogeneous, firms will restrict sales to a relatively small niche of potential consumers. A good advertising strategy would be to give real information about the extreme characteristics of the product. Many consumers will hate the product, but those who like it will love it.

In this paper, we will use the term image advertising instead of persuasive or complementary advertising, even though all these three views are related. Our definition of image advertising follows Krähmer; it is the type of advertising that informs consumers of the image of the good. Following this definition, we examine how firms choose the intensity and the form of advertising, image or information, that they pursue. The firm’s advertising choice may depend on the income inequality, the nature of the products, the market structure, and the degree of product differentiation.

10Nelson (1970) makes the distinction between search and experience goods. He claims that advertising for experience qualities is dominantly indirect information and advertising for search qualities is dominantly direct information.
3 The Model

We start with a basic model of image goods in a monopoly environment, and analyze how the monopolist chooses its price and advertising intensity. Later we slowly build on this basic model by adding some interesting features. The first question we ask is why income inequality might matter for the choice of price and advertising intensity. Then we consider the fact that an image good could provide intrinsic utility in addition to image utility, and analyze its implications. Next, with the introduction of informative advertising, we look at the firm’s optimal advertising mix and price. Finally, we consider a strategic situation in which two firms producing pure image goods are choosing their advertising and price. We are also able to make a welfare comparison.

3.1 Basic Monopoly Model of Image Goods

There are two goods in this economy which identical consumers might choose to consume. We denote by $x$ the consumer’s consumption of the composite good, the price of which is normalized to 1. There is also an image good, $v$, that the consumer can choose to consume. The demand for $v$ is 0-1; i.e. she either consumes one unit or none. Its price is denoted by $p$. The consumer’s optimization problem can be expressed in the following general form.

$$ U = \max_{x, I} \quad F(x) + I \cdot G(n(1 - V)) $$

s.t. $x + I \cdot p = m$ and $I \in \{0, 1\}$

The consumer’s income is denoted by $m$.\textsuperscript{11} $I$ is an indicator variable, which takes on the value 1 if $v$ is consumed, and zero if it is not. A consumer who is not informed, or who is informed but chooses not to buy $v$, gets no utility or disutility from it. The function $F$ is differentiable, increasing, and strictly concave in $x$. The function $G$ is increasing and strictly concave in its argument, $n(1 - V)$, where $n$ is the fraction of population informed about product $v$, and $V$ is the fraction of informed agents who choose to buy. Consumers have a conjecture about the total quantity demanded. The fraction of population who buy product $v$ is given by $nV$, and $n(1 - V)$ is the fraction of informed non-buyers. There is the so-called “snob effect” present in the consumption of

\textsuperscript{11} The case of nonidentical incomes is analyzed later.
the image good.\textsuperscript{12} Consumers value this good more if there are fewer buyers. However, they value it more if more people are aware of whatever this product’s image is. In order to analyze the image value in isolation, we also assume for now that $G(0) = 0$, i.e. product $v$ gives no intrinsic utility. This can happen when $n = 0$ or $V = 1$. In other words, consumers do not get any utility from $v$ if no one knows about its image, or if all informed consumers buy it. In the former case, consumers would not be able to distinguish themselves from others by displaying what they own. In the latter case, they would not feel that the product is exclusive to them. The assumption that $G(0) = 0$ is relaxed later.

As for the firm, $n$ is a choice variable, and can be considered as the target audience. The game played between the firm and the consumers proceeds as follows. First the firm chooses $n$, which we will refer to as advertising intensity.\textsuperscript{13} Advertisements randomly reach consumers. Then the price is chosen. Given the advertising intensity and price, consumers choose how much $x$ to consume, and whether or not to purchase $v$. The number of actual buyers of the image good $v$ is given by $nV$.

For the rest of the paper, we use the following explicit functional forms for $F$ and $G$ that satisfy the above properties. The consumer’s utility if she buys $v$ is given by

$$U = x^{1/2} + b(n(1-V))^{1/2}, \quad b > 0$$

subject to the budget constraint, $x + p = m$. How do we get from consumers’ utilities to the demand function? In other words, how do we find $nV$? Below we invoke the equilibrium condition for the calculation of $nV$.

The unique equilibrium will be interior as long as advertising is not too costly.\textsuperscript{14} Consumers’ expectation about the quantity demanded comes true, consistent with the rational expectations framework. Thus, they make the right purchase decision and there is no regret \textit{ex post}. The situation resembles a collective-action problem. Here, there is one action which does not directly affect others’ utility, namely, not buying. The other action, buying the image good, inflicts a negative externality on other buyers. In equilibrium, both buyers and non-buyers must get the same utility. In order to show that there can never be equilibria in which all or none of the informed

\textsuperscript{12}See Leibenstein (1950) for more on bandwagon, snob, and Veblen effects.
\textsuperscript{13}The target audience, call it $T$, can be defined as a function of the advertising intensity, i.e. $T(n)$. For simplicity, we assume $T(n) = n$.
\textsuperscript{14}If advertising was too costly, the firm would choose not to advertise. The trivial equilibrium would be that no consumer knows about the product, i.e. $n = 0$ and $V = 0$. 

10
consumers buy the image good, suppose first that all informed consumers buy the good, i.e. $V = 1$. This requires that buying $v$ gives a higher utility than not buying it. Therefore,

$$(m - p)^{1/2} \geq m^{1/2}.$$ 

This inequality would hold only if the firm chooses $p = 0$. However in that case, the firm’s profit is negative for any positive level of advertising. The revenue would be zero since price is zero, and there would be a positive cost associated with advertising. Hence, it is not optimal for the firm to set price equal to zero. Therefore, there cannot be an equilibrium where $V = 1$. Now suppose none of the informed buys the image good, i.e. $V = 0$. this requires that not buying $v$ gives a higher utility than buying it. Therefore,

$$(m - p)^{1/2} + bn^{1/2} < m^{1/2}.$$ 

If the firm chooses a positive price and a positive level of advertising such that the above inequality holds, then its profit would be negative. It does not sell any units but still incurs the cost of advertising. Hence, it is not optimal to do so. The firm instead would choose $n = 0$ and make zero profits. However, in that case, it would be more profitable to increase advertising intensity to induce some consumers to buy. The firm would find a $(p, n)$ combination such that buying and not buying the good give the same amount of utility provided that advertising is not too costly. Therefore, there cannot be an equilibrium where $V = 0$.

In equilibrium, some informed consumers buy and some do not. In order to have no profitable deviation, informed consumers will be indifferent between buying and not buying. We have the following equality:

$$(m - p)^{1/2} + b(n(1 - V))^{1/2} = m^{1/2}. \quad (1)$$

Solving for $V$ from the above equality, we get

$$V(p, n) = \frac{nb^2 - 2m + p + 2\sqrt{m - p}\sqrt{m}}{nb^2} \quad (2)$$

Once again, since $V(p, n)$ gives the fraction of informed buyers for every price and advertising combination, it has to be between $[0, 1]$. The expression given by (2) is
never greater than 1; however, it can take a negative value. For those \((p, n)\) combinations, \(V(p, n)\) takes the value zero. Therefore, the \(V(p, n)\) function is revised as the following.

\[
V(p, n) = \max \left\{ \frac{nb^2 - 2m + p + 2\sqrt{m-p}\sqrt{m}}{nb^2}, 0 \right\}
\]

We can now plot the demand function in a three-dimensional space. The total units demanded, \(nV\), is a function of price and the number of informed agents and, as explained above, is determined in equilibrium. Proposition 1 states its behavior with respect to its arguments.

Figure 1: Demand for a pure image good

**Proposition 1.** The demand function for the pure image good is decreasing in price, and increasing in advertising intensity.

It is important to note that unlike Veblen goods, the quantity demanded for a pure image good decreases as price increases. This result is consistent with Leibenstein’s (1950) and Amaldoss and Jain’s (2005a) theoretical finding that if a market is comprised of only snobs, then demand would not grow as price rises. Snobs are willing to pay a higher price if they expect that the market demand would be lower at the higher price. Such an expectation will be rational if there are some consumers who would demand less when the price is higher, i.e. if there are non-snobbish consumers. Since all consumers are snobbish and rational in our model, in other words they all
value being one of the few purchasers of the product, the individual demands will not go up when the total demand goes up.

The monopolist firm’s problem is to maximize its profit choosing \( p \) and \( n \).

\[
\max_{p,n} \pi(p, n) = nV(p, n)p - A(n).
\]

where \( A(n) \) is the cost of advertising when \( n \) fraction of the potential consumers is reached. The typical assumptions about the advertising technology hold; \( A(0) = 0 \), \( A' > 0 \), and \( A'' > 0 \). From now on, we will use \( A(n) = an^2/2 \) for simplicity.\(^{15}\)

The two first order conditions (FOC’s) coming from the maximization problem of the firm are

\[
\left(1 - \frac{\sqrt{m}}{\sqrt{m - p}}\right) \frac{p}{b^2} + \frac{nb^2 - 2m + p + 2\sqrt{m - p}\sqrt{m}}{b^2} = 0 \tag{3}
\]

\[
p - an = 0 \tag{4}
\]

Denote equilibrium price and advertising intensity by \( p^* \) and \( n^* \), respectively. Because \( n^* \) can never exceed 1, the FOC given by (4) translates into

\[
n^* = \min \left\{ \frac{p^*}{a}, 1 \right\}. \tag{5}
\]

There are no closed form solutions for the equilibrium price and level of advertising. However, we are able to make comparative static analysis. Two questions of interest can be settled: What would happen to price and advertising intensity if 1) income increases, and 2) advertising becomes more costly? The answers are stated below.

**Proposition 2.** When there is an interior solution, the equilibrium price and advertising intensity that the monopolist chooses will be higher for a higher level of income. More consumers are served, and the monopolist makes a higher profit.

**Proposition 3.** When there is an interior solution, higher advertising cost leads to a lower equilibrium price and advertising intensity. Less consumers are served, and the monopolist makes a lower profit.

In order to understand the effects of each change, we take some parameter values, and plot the two FOC’s given by (3) and (5). By varying the income and cost of advertising, we are able to see what happens to the equilibrium price and advertising

\(^{15}\)An alternative advertising technology might require \( A(1) = \infty \). Our results do not change qualitatively if we incorporate this assumption.
intensity. Changes in income affects only condition (3), and changes in the cost of advertising affects only condition (5).

Panel (a) of Figure 2 shows that an increase in income causes the concave curve to shift up, leading to an increase in the equilibrium price and advertising intensity. In other words, as the identical income of everyone grows, the firm charges a higher price and advertises more aggressively in equilibrium. Higher income means the monopolist can charge a higher price for its product. Since the return per customer is higher now, he will want to reach more consumers with its advertising. Therefore, he increases the advertising intensity along with the price. With the increase in income, the monopolist serves more consumers, and achieves a higher profit. He feeds the consumers with more advertising, increasing their willingness-to-pay, and therefore manages to charge a higher price. Notice that under this setting any comparative statics result we get for the equilibrium price applies to the equilibrium advertising intensity as long as $n^* < 1$, since the two FOC’s tell us that there is a positive relationship between price and advertising.

Panel (b) of Figure 2 shows that an increase in the cost of advertising causes the straight line to become steeper, leading to a reduction in the equilibrium price and advertising intensity. What is maybe surprising at first is the fact that equilibrium price goes down as advertising becomes more costly. Costly advertising means the firm will choose to advertise less. However, a smaller reach is less desirable for the buyers since they value how well-known the product is. Consumers’ willingness-to-pay
is reduced. In order to induce them to buy the good, the firm has to lower its price. Therefore, higher advertising cost causes the equilibrium price to be lower, and lower advertising cost increases it. Also, with the increase in the cost of advertising, the monopolist serves fewer consumers, and earns a lower profit.

This is a different result than suggested by Grossman and Shapiro (1984) for the following reason. In their model, advertising is informative; it informs consumers of the existence of the firms’ products. When the cost of advertising decreases, firms advertise more. With more advertising, each firm’s reach in the market goes up. Because of strategic effects, improved information about the existence of firms leads to reduction of prices. Thus, advertising is pro-competitive; the equilibrium price goes down with more advertising. However in our model, consumers are image-conscious; advertising directly enters their utility function. Therefore, an increase in image advertising causes the equilibrium price to increase.

3.2 The Importance of Income Inequality

In this section, we would like to see the implications of income inequality on the monopoly firm’s choice of advertising intensity and price. The utility of consumer $i$ takes the following form if she buys the pure-image product $v$.

$$U_i = (m_i - p)^{1/2} + b(n(1 - V))^{1/2}$$

where $m_i$ is distributed uniformly between $m$ and $\bar{m}$, i.e. $m_i \sim U[m, \bar{m}]$. The budget constraint has to be satisfied as well, i.e. $m_i \geq p$. Given a set of price and advertising intensity, we can find located on this interval a consumer who is indifferent between buying and not buying the product. All consumers with incomes higher than her income will buy the product because buying gives them higher utility. This indifferent consumer’s location effectively determines the fraction of informed agents who choose to buy in equilibrium. Thus,

$$V = \frac{\bar{m} - \tilde{m}_i}{\bar{m} - m}$$

where $\tilde{m}_i$ is the income of the indifferent consumer. Next, we solve for $\tilde{m}_i$ from the following equation, which equates this consumer’s utility from buying and not buying.

$$(\tilde{m}_i - p)^{1/2} + b\left[n(1 - \frac{\bar{m} - \tilde{m}_i}{\bar{m} - m})\right]^{1/2} = \tilde{m}_i^{1/2}$$
After expressing the income level of the indifferent consumer in terms of the firm’s choice variables of $p$ and $n$, we can write out the firm’s maximization problem.

$$\max_{p,n} \pi = nV(p,n)p - A(n).$$

For comparative statics analysis, we are particularly interested in the effect of income inequality on the firm’s choice of its strategic variables. Figure 3 plots the equilibrium price and advertising intensity as the standard deviation$^{16}$ of income distribution increases while the mean income remains the same.

![Figure 3: Effect of income inequality](image)

There are a few interesting things to note in this graph. First, as income dispersion grows, the monopolist advertises less. Second, the equilibrium price decreases, and then increases. So we see that unlike what has been shown in the previous section, price and advertising intensity move in opposite directions after a certain point. This is because as the dispersion grows, the firm first reacts by lowering its price and advertising intensity. A given reduction in price will retain many customers. However, the firm also lowers its advertising intensity because what it can extract from each buyer is lower. Recall that advertisements reach consumers randomly. This means that the firm cannot target its ads to richer consumers, and this results in a reduction in advertising. As the dispersion in income keeps growing, after a certain point, the increase in dispersion induces an increase in price. Now the firm finds it more profitable

---

$^{16}$The standard deviation of the uniform distribution is calculated as $(\mu - m)/\sqrt{12}$. 

16
to sell to a few rich customers at a high price than to many at a low price. A testable implication of this behavior would be the following. In a market where exclusivity matters, one expects to see higher prices when income distribution is highly egalitarian or highly inegalitarian. Prices would be lowest when there is moderate dispersion in income distribution. Also, we would expect to see lower levels of advertising as the income inequality increases.

Third, fewer consumers are served when the income is more unevenly distributed, i.e. $nV$ is lower. Reduction in the firm’s advertising intensity results in a smaller pool of potential consumers. Fewer of them will know about the product image. However, when the price is lowered as well we would expect that this would bring more consumers. It turns out that the advertising effect dominates the price effect, leading to a reduction in the number of buyers. For larger levels of dispersion, both the advertising intensity and price are lowered. Both of these actions work towards the reduction of the number of actual buyers.

Lastly, the monopolist makes the highest profit when the variance of the income distribution is zero, that is, when consumers have identical incomes. That means the monopolist is better off with lower dispersion of income. This is partially in accordance with the results of Johnson and Myatt (2006). They show that firms make higher profits when they are faced with extreme consumer characteristics, i.e. very high or very low levels of dispersion in consumer characteristics. However, in our model where exclusivity matters, the monopolist is best off with no income inequality, and makes lower profits as income inequality increases. The increase in income disparity leads to a reduction in the return to advertising because of the fact that ads are nontargetable. With identical incomes every agent who receives an ad is a potential customer, whereas with nonidentical incomes this is not the case. In that sense, some ads are wasted. This leads to a reduction of the monopolist’s profit. These arguments are summarized below.

**Observation 1.** As the income inequality grows leaving the mean income the same,

(a) the monopolist advertises less;
(b) the equilibrium price first decreases and then increases;
(c) fewer consumers are served;
(d) the monopolist’s profit decreases.

The fact that the monopolist advertises less when income dispersion increases seems
somehow puzzling. Why wouldn’t the monopolist advertise more intensively? This would increase the willingness-to-pay of those few who can afford to buy, and therefore, the firm would be able to charge a higher price. However, advertising the image serves two purposes here. First, because advertising is persuasive, more advertising means greater willingness-to-pay. Secondly, it informs the consumers of the product image so that the pool of potential buyers increases. With a larger dispersion of income, the ads will be viewed by a larger number of agents who cannot even afford to buy the good. This is because the firm cannot target its ads, which leads to more wasteful advertising. Consequently, the firm cuts back its advertising.

3.3 Why the Nature of the Product Matters

Until now, we have considered the advertising decision of a monopolist producing a pure image good; i.e. a good which gives only image utility and no intrinsic utility. In this section, we consider a good which gives both image and intrinsic utility. A simple way to do this is to use a utility function of the following form. When the good is consumed, the consumer’s utility is

$$U = (m - p)^{1/2} + b\left[\alpha(n(1 - V))^{1/2} + (1 - \alpha)\bar{v}\right]$$

where $\bar{v}$ is the intrinsic utility derived from the consumption of good $v$. This can also be thought of as utility coming from the use value or practical value that the good provides. It can also be interpreted as the value consumers attach to quality. This would mean that higher values of $\bar{v}$ correspond to higher quality. It is an objective value, which does not vary with advertising intensity or how many consumers purchase the product. Parameter $\alpha \in [0, 1]$ is a taste parameter measuring how snobbish the consumers are. In other words, it indicates the relative importance of image. When $\alpha = 1$, we are back to the pure image good model; the consumers only care about the image. When $\alpha = 0$, the good gives no image utility but just intrinsic utility, which is the standard good model. Finally, since income dispersion is not the focus of this section, we assume that the consumers have identical incomes. This assumption also helps us avoid unnecessary complications.

It is important to note that advertising in this setup acts to inform consumers of the product’s image, and not its existence. We assume that the consumers are aware of the product’s existence but initially uninformed about the image it communicates, in which
case \( n \) in the consumer’s utility is reinterpreted as the fraction of consumers informed about the product image after the firm’s advertising. There is one equilibrium in which some consumers buy and some do not buy the good.\(^{17}\) The fraction of consumers who buy \( v \) will be determined by the equality of consumption utility and no consumption utility. Hence we have

\[
(m - p)^{1/2} + b \left[ \alpha (n(1 - V))^{1/2} + (1 - \alpha)\bar{v} \right] = m^{1/2}
\]

We solve for \( V(p, n) \). Once we know \( V(p, n) \), we can write the firm’s profit. The equilibrium price and level of advertising are obtained with the maximization of the firm’s profit with respect to these choice variables.

\[
\max_{p, n} \quad nV(p, n)p - A(n) \quad (6)
\]

Before talking about the equilibrium and comparative statics, let us look at the behavior of the demand function with respect to price and advertising intensity.

![Figure 4: Demand for an imperfect image good](image)

**Proposition 4.** The demand function for the imperfect image good is weakly decreasing in price and increasing in advertising intensity.

\(^{17}\)Since the good now gives intrinsic utility, consumers might be willing to pay a positive price even though everyone else is buying the product (\( V = 1 \)), or no one else knows about the product’s image (\( n = 0 \)). Thus, there might be equilibria in which everyone or no one buys. In this paper, we are interested in interior solutions.
The demand surface for an imperfect image good is different than that for a pure image good. There is a range of prices for which every informed consumer will buy the good, since the good gives some positive intrinsic utility. Particularly, the total amount demanded will be equal to \( n \) for \( p \) such that \((m - p)^{1/2} + b(1 - \alpha)v \geq m^{1/2}\). The demand starts to fall with price once that critical price level is passed.

A question of interest is, how does an increase in snobbishness effect the price, advertising intensity, and profit? In Figure 5, we see the effect of an increase in snobbishness on price, advertising, and firm profit.

![Figure 5: Effect of an increase in snobbishness](image)

The way \( \alpha \) enters the utility function allows us to vary consumers’ snobbishness. Snobbish consumers do not care too much about the intrinsic quality of the good, and attach a higher weight to image. Therefore, they have a higher \( \alpha \) which puts more weight on image, and less on intrinsic quality. If the product in question is of very high intrinsic quality, then an increase in snobbishness would bring about a reduction in price and advertising intensity. This is because consumers’ willingness-to-pay greatly decreases if they are very snobbish. Image is very important for them, but not quality. Hence, no matter how high the quality is, they are not willing to pay a high price for the good. Similarly, if the product has very low quality, then an increase in snobbishness would bring about an increase in price and advertising intensity. In this case, consumers’ willingness-to-pay is greatly increased. It turns out that for moderate qualities this monotonicity breaks down.
First, for a given level of snobbishness, the firm charges a higher price and advertises more if the quality is higher. In Figure 5, the price and advertising intensity curves for the high quality good always lie above those for low quality. If quality is higher, consumers are willing to pay more for the product, and therefore the firm charges a higher price. Since the return from informing consumers of the product image is higher as well, the advertising intensity will be higher for these goods. Secondly, for moderate qualities as snobbishness increases, the equilibrium price and advertising intensity first decrease then increase. This case can be considered as the mix of the two extreme cases explained above. Starting with low levels of snobbishness, an increase in $\alpha$ takes away weight from quality and puts it on image. Consumers, who now care relatively less about quality, lose their willingness-to-pay for the product. As a response the firm lowers its price and advertising intensity. As $\alpha$ continues to increase, more and more weight is placed on image. The additional utility that image gives to the consumers starts to outweigh the loss in utility that quality provides. The firm now charges a higher price and advertise to a greater audience since returns to advertising are higher. The propositions are stated below.

Proposition 5. When there is an interior solution, for a given level of snobbishness the price and advertising intensity are higher if the product is of higher intrinsic quality.

Proposition 6. When there is an interior solution, for moderate qualities an increase in the level of snobbishness leads to first a reduction then an increase in the price and advertising intensity.

Even though we need formal analysis to make further claims, one intuitive result emerges from these graphs. We have assumed that the level of snobbishness is an exogenous element. However, suppose for a moment that the firm could actually affect it, perhaps by means of product design, advertising or other promotions. Effectively, it could decide how important the good’s image will be to the consumers. In that case, the firm would find it profitable to increase the level of snobbishness for the goods that have low intrinsic quality. For goods with higher quality, making the image relatively more important will only lower the profit. This is intuitive if we can interpret the good’s low use/intrinsic value as availability of close substitutes or unoriginality. In this case, the firm will find it profitable to increase the importance of image. Examples of such goods with a large number of close substitutes and a highly valued image could be designer clothing, perfumes, and luxury cars.
3.4 Informative or Image Advertising?

We continue our analysis with the addition of the choice of informative advertising to the current model. We assume that the consumers initially do not know about product \( v \). The firm can send out ads of two kinds: a) informative, and b) persuasive/image. We call an ad “informative” if it informs consumers of the product’s existence. An ad is an “image” ad if it informs the consumers of the product’s image. Informative ads, in principle, are easier to prepare and therefore less costly. The firm is only required to tell/remind the consumers that the product exists, and maybe show the product in the ad. Image ads require creative ideas and technology to bring those ideas to reality in order to capture and convince the viewers. Therefore they are more costly for the firm.\(^{18}\)

If the firm can send two different kinds of ads, the consumers will be divided into four groups: those who see only the informative ad (Group 1), those who see only the image ad (Group 2), those who see both ads (Group 3), and those who see neither (Group 4). What will be the reaction of these four groups of people after seeing (or not seeing) the ad(s)? Group 1 consumers will know that the product exists but not that it is associated with a particular image. Therefore, they get the intrinsic utility only. Group 2 and 3 consumers both know about the product’s image. Therefore, they get both the intrinsic and image utility. Even though Group 2 consumers did not receive an informative ad conveying the fact that the product exists, since they have received “an” ad, they will know that the product exists. For them, having received an informative ad is irrelevant. Effectively, image ads serve both purposes: inform about the existence and the image. However, since they are more costly and the product provides intrinsic utility, there is still room for informative advertising.

The firm first chooses advertising intensity by choosing the fraction of the population reached by informative and image ads. Denote these by \( n_I \) and \( n_P \), respectively. Then a fraction \( n_I(1 - n_P) \) will be in Group 1, a fraction \( n_P \) will be in Group 2 and 3, and a fraction \( (1 - n_I)(1 - n_P) \) will be in Group 4. The cost of informative and image advertising is assumed to be given by \( A(n_I) = a_I n_I^2 / 2 \) and \( A(n_P) = a_P n_P^2 / 2 \).

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\(^{18}\)A firm, in principle, can send both types of messages in one single ad. However, for the purposes of the current model, that would not be an interesting case since it would not be possible for us to say something about the proportion of each. Informative message in the ad would be completely redundant.
respectively, where \( a_I > 0, a_P > 0, \) and \( a_I < a_P. \) After the ads have been viewed by consumers, the firm chooses its price, and trade takes place.

Since Group 1 consumers are not aware of the product’s image, they do not get image utility. For them, \( \alpha = 0. \) Their utility depends on their consumption of the composite good and the intrinsic value of the image good, \( \tilde{v}. \) Therefore, they will all buy the product if the following is true. Otherwise, Group 1 consumers will not be served by the firm.

\[
(m - p)^{1/2} + b\tilde{v} \geq m^{1/2} \quad \Rightarrow \quad p \leq -b^2\tilde{v}^2 + 2b\tilde{v}\sqrt{m}.
\]

Consumers in Groups 2 and 3 are aware of both the existence and the image of product \( v. \) They put a positive weight on the product image, i.e. for them \( \alpha \in (0, 1). \) In other words, their utility depends not only on their consumption of the composite good and the intrinsic value of the image good, but also on how well-known the product image is and on how many customers there are. They will buy the product if the following is true.

\[
(m - p)^{1/2} + b\left[\alpha(n_P(1 - V))^{1/2} + (1 - \alpha)\tilde{v}\right] \geq m^{1/2}
\]

As before, there is an interior solution when the above expression holds with strict equality. We solve for \( V(p, n_P), \) and write the firm’s profit function.

\[
\pi(n_I, n_P, p) = [n_I(1 - n_P) + n_PV(p, n_P)]p - A(n_I) - A(n_P)
\]

The firm has three choice variables, \( p, n_I, \) and \( n_P, \) which lead to three FOC’s. There is one important point to note. By choosing a mix of informative and image advertising, the firm can manipulate the amount of the increase in consumer’s willingness-to-pay. Those who are in Group 1 will purchase the product regardless of the intensity of advertising. However, those who are in Groups 2 and 3 are affected by the intensity. Intrinsic quality is not the only element in a product that they would care about since they are now aware of the product image. Therefore, image advertising might even cause devaluation of their total willingness-to-pay for the product because knowledge of image increases their \( \alpha. \)

By combining the FOC’s, we can write the equilibrium levels of advertising intensity, \( n^*_i(p), \) \( i = 1, 2, \) as functions of price. Denote \( \tilde{n}_i = p(a_j - p)/(a_Ia_P - p^2), \) \( i = I, P, \)
$j = I, P, i \neq j$. Then the equilibrium levels of advertising is given by

$$n_i^*(p) = \begin{cases} \min\{\tilde{n}_i, 1\} & \text{if } \pi(p, \tilde{n}_i, \tilde{n}_j) \geq 0 \\ 0 & \text{if } \pi(p, \tilde{n}_i, \tilde{n}_j) < 0 \end{cases}$$

We can solve for the equilibrium price and advertising intensities only numerically. These are plotted in Figure 6.

As can be seen from the first graph in Figure 6, the higher the intrinsic quality of the good, the lower the share of image advertising the firm employs. For a given level of snobbishness, as $\bar{v}$ grows, there is greater incentive for the firm to spend its advertising money on informing the consumers of the existence of its product. Therefore, the share of image advertising decreases. In the extreme case, when consumers are fully snobbish and, therefore, do not care about the intrinsic quality of the good at all, the share of image advertising converges for different qualities. This is because the quality will not be a factor in determining the price and advertising levels any more.

What happens to the composition of advertisements if the level of snobbishness increases? In that case, image becomes relatively more important. As can be seen from the second panel, for high qualities the equilibrium price decreases. An increase in snobbishness leads to a reduction in willingness-to-pay because it takes weight away from intrinsic quality and places it on image. As for the firm, this increase leads to an increase in image advertising (see the first panel in Figure 6). Image ads, if viewed by those who also view informative ads, cause devaluation of the willingness-to-pay if
the product is of high intrinsic quality. Consumers realize that intrinsic quality is not
the only product attribute that they would care about. However, the share of image
advertising goes up. When consumers are more snobbish, the firm is still better off
increasing the share of image advertising because the returns to image advertising are
high. The firm is able to extract more from each buyer.

For low qualities, as the level of snobbishness increases, the equilibrium price in-
creases. The utility that consumers get from quality is low. Thus, willingness-to-pay
in fact increases when consumers place a smaller weight on intrinsic quality. What
is maybe more puzzling at first is that the share of image advertising decreases even
though image becomes more important for consumers. The intuition is as follows.
Recall that consumers, who receive only informative ads (Group 1 consumers), buy
the product regardless of the market demand or advertising intensity. An increase
in the share of image advertising would reduce the number of these consumers since
some of them would also receive image ads. When this happens, these consumers
would become a part of Group 3 consumers (those who receive both ads). We know
that because of the negative externality inflicted on other buyers, only some of them
would end up purchasing the product. Image advertising, by letting more consumers
know about the image, is effectively causing some agents not to buy. Yet, these agents
would have purchased the product had they not seen the image ads. For this reason
the firm lowers the share of image advertising to prevent consumers in Group 1 from
joining Group 3. One point to note here is that the firm in fact increases the intensity
of both types of advertising. However, informative advertising increases more than
image advertising, leading to a reduction in the share of the latter. These arguments
are summarized below.

Observation 2. When both informative and image advertising are possible, for a given
level of snobbishness, the share of image advertising is higher for goods with lower
intrinsic quality.

Observation 3. An increase in snobbishness causes the share of image advertising to
increase if the product is of high intrinsic quality, and to decrease if the product is of
low intrinsic quality.

Observation 4. The monopolist makes lower profits selling a high-quality product to
more snobbish consumers.
3.5 Existence of a Strategic Competitor

So far we have looked at a monopolist’s pricing and advertising decisions when the monopolist is producing an image good. In this section we analyze the case of duopoly. There are two firms, firm 1 and firm 2. Each firm produces a differentiated image good which gives no intrinsic utility (or consumers do not care about quality).

As in the first case we considered above, all consumers are identical and each consumer consumes at most one unit of an indivisible image good. After the two firms’ advertising efforts, the population is divided into 4 groups: those who see only firm 1’s ads (fraction $n_1(1 - n_2)$), those who see only firm 2’s ads (fraction $n_2(1 - n_1)$), those who see both ads (fraction $n_1n_2$), and those who see none (fraction $(1 - n_1)(1 - n_2)$).

The utility of a consumer who has seen both ads is given by

$$\max\{U_1, U_2, \bar{U}\}$$

where

$$U_1 = (m - p_1)^{1/2} + b \left[ (1 - k)n_1 + kn_2 \right] (1 - V_1)^{1/2}$$

$$U_2 = (m - p_2)^{1/2} + b \left[ (1 - k)n_2 + kn_1 \right] (1 - V_2)^{1/2}$$

$$\bar{U} = m^{1/2}$$

where $p_i$ is the price of good $i$, $i = 1, 2$, $n_i$ is the advertising intensity of firm $i$, and $k \in [0, 1/2)$ is the spillover parameter. The two firms produce products that are imperfect substitutes of each other in the following sense. A consumer of $v_1$ gets utility from how well-recognized $v_1$ is, as well as from how well-recognized the rival product is to a certain extent. If, for instance, these two products are BMW and Mercedes, BMW consumers get utility from the fact that many people recognize Mercedes as a high-class car. Wide recognition of Mercedes’s image increases the likelihood that BMW’s image will be recognized as well. This is because a car which looks similar to a high-class car (BMW in this case) must also be a high-class car. This spillover effect will be larger the closer substitutes the products are. Therefore, one can interpret $k$ as the degree of product differentiation. The interval for $k$ is taken to be $[0, 1/2)$. If $k = 0$, then we are back to the so-called “independent” demands framework in the sense that there is no direct effect of each product on one another. If $k = 1/2$, then both products have the same influence on one another. So $k$ could lie anywhere in this interval.\(^\text{19}\)

\(^\text{19}\)It does not make sense to have $k$ greater than $1/2$, since that would mean a purchaser of a product cares more about who knows the other product.

\(^\text{20}\)In order to keep the utility from growing limitless, we use $k$ and $1 - k$ weighting in the utility
In the Nash equilibrium of this game, no consumer regrets her purchase decision and the firms’ choices of price and advertising are profit-maximizing. More explicitly, a consumer who has seen ads from firm 1 only is indifferent between purchasing and not purchasing $v_1$. Similarly, a consumer who has seen ads from firm 2 only is indifferent between purchasing and not purchasing $v_2$. Finally, a consumer who has seen ads from both firms is indifferent between purchasing $v_1$, $v_2$, and nothing. If this was not the case, then consumers would be switching between products or between purchasing and not, until there is no more incentive to do so, at which point indifference is established. For instance, suppose a group of consumers sees both ads and calculates that $v_2$ gives higher utility. What happens is that, for a given set of prices, more consumers who are aware of $v_2$ will start to buy this product, increasing $V_2$, and therefore decreasing the utility of consuming it. This flow of consumers will stop until $v_2$ gives as much utility as both $v_1$ and not buying at all.

In order to find the equilibrium, we first write the indifference condition of a consumer who has seen ads from both firms.\(^{21}\)

\[
(m - p_1)^{1/2} + b\left[((1 - k)n_1 + kn_2)(1 - V_1)\right]^{1/2} = m^{1/2}
\]

Then, we solve for $V_1(p_1, n_1, n_2)$.

\[
V_1(p_1, n_1, n_2) = \frac{b^2[(1 - k)n_1 + kn_2] - 2m + p_1 + 2\sqrt{m - p_1}\sqrt{m}}{b^2[(1 - k)n_1 + kn_2]}
\]

Firm 1’s problem is then given by

\[
\max_{p_1, n_1} \pi_1 = n_1V_1(p_1, n_1, n_2)p_1 - A(n_1).
\]

The firm maximizes its profit with respect to its price and advertising intensity given the rival’s price and advertising intensity.\(^{22}\) We look for a symmetric equilibrium; particularly an equilibrium in which the two firms choose the same price and advertising intensity, i.e. $p_1 = p_2$ and $n_1 = n_2$.

Before analyzing the results for the duopoly case, we would like to also look at the multi-product monopoly case to be able to make a comparison between the two. Now function.

\(^{21}\)It turns out that in the symmetric Nash equilibrium, consumers in all groups are indifferent between the choices available to them.

\(^{22}\)The first-order conditions are given in the Appendix.
suppose both $v_1$ and $v_2$ are produced by a single firm. The monopolist’s problem is

$$\max_{p_1, n_1, p_2, n_2} \pi_M = n_1 V_1(p_1, n_1, n_2)p_1 + n_2 V_2(p_2, n_2, n_1)p_2 - A(n_1) - A(n_2).$$  \hspace{1cm} (8)$$

Some results about the duopoly and monopoly cases are given in Table 2.

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Table 2: Comparison of monopoly and duopoly

As in the standard monopoly-duopoly comparison, the equilibrium prices and profit are higher under monopoly than under duopoly. The monopolist also advertises more. This is because when the two products are produced by a single firm, the externalities they cause on each other are internalized. According to our formulation, when firm 1 advertises this benefits firm 2, and vice versa. Just like with any positive externality scenario, each firm underadvertises in equilibrium compared to the case of a single firm. However, if both of these products are produced by a monopolist, then this effect is taken into account and the equilibrium advertising intensity now maximizes the industry profit.\(^{23}\)

In either case, consumers get the same consumer surplus (denoted by CS in the table above). This comes from the property of the equilibrium that everyone gets the same utility/CS, regardless of the ads they see, whether they purchase one or the other good, or whether they make a purchase at all. (If this was not the case, then there would be switching until consumer indifference was established.) What is more interesting is that more consumers are served under monopoly than under duopoly (denoted by $n_iV_i$ in the table above). The monopolist advertises more, causing a

\(^{23}\)We can also look at the free-entry equilibrium by assuming a fixed cost of entry for all firms. A low fixed cost would mean that more firms enter the industry. Price and advertising intensity would go down, and fewer consumers would be served.
higher willingness to pay. Even though it charges higher prices, the advertising effect dominates the price effect, and more consumers end up making a purchase.

Another interesting point emerges from the welfare comparison, which is straightforward to make. Consumers get the same CS under monopoly and duopoly. Hence, the only thing we need to look at is the firm profits/producer surplus. As per the table, the monopolist makes more than the sum of the profits of the two duopolists. Therefore, the total surplus is higher under monopoly. The monopolist, by internalizing the externality in consumption, advertises more. This increases the consumers’ willingness to pay. Now the monopolist can charge a higher price for her products to capture all of the extra welfare created, and therefore leaving the consumers as well off. But since he is making a higher profit, the total surplus increases.

Observation 5. Monopolist charges higher prices and advertises more than the duopolists. More consumers are served and a higher total surplus is achieved under monopoly than under duopoly.

Finally, when products are closer substitutes, i.e. \( k \) is larger, prices and advertising intensity will be lower for the duopoly case. Since the firms’ effect on each other is higher with a larger \( k \), the firms will underadvertise even more. Their profit will be lower, and they will serve a smaller group of consumers. However, if the market structure is a monopoly, the magnitude of \( k \) does not have a relevance in determining the profit maximizing price and advertising intensity for the monopolist.

Observation 6. In the duopoly case, if the products are closer substitutes the prices and advertising intensities of the firms will be lower, and the disparity between the number of consumers served under duopoly and monopoly increases.

4 Conclusion

This paper studies a model of image goods with an emphasis on image advertising. If the consumers are image-conscious, this type of advertising increases their willingness-to-pay. Purchasers of the product know that when the firm advertises more intensively, they will be able to distinguish themselves from a larger group of non-buyers who will recognize the product and its image. In addition, because of the presence of negative consumption externalities, there is the so-called “snob effect,” i.e. purchasers value
exclusivity. The firm chooses its price and advertising mix taking into account these two forces.

We consider factors that might affect the choice of advertising intensity, advertising form, and price. We first analyze the implications of income inequality on the monopoly firm’s choice of advertising intensity and price. Some interesting results emerge. First, the monopolist advertises less if income inequality is high. It is less likely that a consumer who has seen the advertisement can afford to buy the product. Consequently, the firm cuts back its advertising. Second, as the income dispersion grows, the price first declines, and then starts to increase. A reduction in price retains many consumers when the income dispersion is low. However, as it grows the firm focuses on richer customers by increasing its price. Third, the monopolist prefers lower income dispersion. He can sell more units at a moderate price, and make higher profit when consumers have similar incomes.

The inherent nature of the product also plays an important role in the optimal mix of advertising that the firm chooses. Since the returns from informative advertising will be low if the product in question is of low intrinsic quality, the firm will devote a larger share of its advertising to image. Image advertising may, in fact, cause devaluation of the willingness-to-pay by taking weight away from intrinsic quality and placing it on image. We demonstrate that an increase in snobbishness causes the share of image advertising to increase if the product is of high quality, and to decrease if the product is of low quality. The group of consumers who view only informative ads buy the product regardless of the advertising intensity or the total number of buyers, whereas only some viewers of image ads purchase the product because of the negative consumption externality. Image advertising, by letting more consumers know about the image, is effectively causing some agents not to buy. As for the monopolist, profits are lower when selling a high-quality product to more snobbish consumers.

Finally, comparing the multi-product monopoly and duopoly cases in the model gives us the following novel insight. With advertising externalities present, the monopolist charges higher prices and advertises in total more than the duopolists. The monopolist serves more consumers than the two duopolists combined. In our model, the total surplus is higher under monopoly than under duopoly. Consumers are just as well off, but the monopolist makes higher profits than the two duopolists combined. In other words, all else equal, moving from a duopoly to a monopoly would increase
the social welfare with pure image goods.

We hope to support our theoretical results with empirical evidence in future research. The result that larger income inequality leads to first a reduction then an increase in prices is very intriguing from an empirical perspective. It is also possible to do an ad content analysis for products where exclusivity matters, identify different forms of advertisements, and look at their shares under various market conditions and consumer characteristics.

Appendix

• Proof of Proposition 1
Differentiating the expression for $nV(p, n)$, we obtain

$$\frac{\partial nV(p, n)}{\partial p} = \frac{1}{b^2} \left(1 - \frac{\sqrt{m}}{\sqrt{m-p}}\right) < 0 \quad \forall p < m$$

$$\frac{\partial nV(p, n)}{\partial n} = 1 > 0.$$

Q.E.D.

• Proof of Proposition 2 and Proposition 3
Solving for $n$ from the FOC’s given by (3) and (4), we obtain

$$n = f(p, m) \equiv \frac{2(m-p)\sqrt{m-p} - (2m-3p\sqrt{m})}{b^2\sqrt{m-p}}$$

$$n = g(p, a) \equiv \frac{1}{a}p.$$

Taking the total derivatives,

$$dn = \frac{\partial f}{\partial p} dp + \frac{\partial f}{\partial m} dm$$

$$dn = \frac{\partial g}{\partial p} dp.$$

One can show that $\frac{\partial f}{\partial m} > 0$ and $\frac{\partial f}{\partial p} > 0$. Also, since $\frac{\partial g}{\partial p} > 0$, $dn$ and $dp$ have the same sign. When we have an interior solution, i.e. $b$ is not too large and $a$ is not too small, then one can show that $\frac{dn}{dm} > 0$. This also implies that $\frac{dp}{dm} > 0$. Following a similar argument, one can show that $\frac{dn}{da} < 0$ and $\frac{dp}{da} < 0$. Q.E.D.
• Proof of Proposition 4
Differentiating the expression for \( nV(p, n) \), we obtain

\[
\frac{\partial nV(p, n)}{\partial p} = \begin{cases} 
0 & \text{if } p \leq b\bar{v}(1 - \alpha)[2\sqrt{m} - b\bar{v}(1 - \alpha)] \\
-\frac{\sqrt{m} - \sqrt{m-\bar{v}(1-\alpha)}}{\alpha^2\sqrt{m-\bar{v}}(1-\alpha)} & < 0 \text{ otherwise.}
\end{cases}
\]

\[
\frac{\partial nV(p, n)}{\partial n} = 1 > 0.
\]

Q.E.D.

• Proof of Proposition 5
Solving for \( n \) from the FOC’s with respect to \( p \) and \( n \) obtained from problem (6), we obtain

\[
n = f(p, \bar{v})
\]

\[
n = g(p).
\]

Taking total derivatives,

\[
dn = \frac{\partial f}{\partial p} dp + \frac{\partial f}{\partial \bar{v}} d\bar{v}
\]

\[
dn = \frac{\partial g}{\partial p} dp.
\]

Denote the partial derivatives as \( \frac{\partial f}{\partial p} \equiv f_p \). Combining the two, we get

\[
dn = \frac{g_p f_{\bar{v}} d\bar{v}}{g_p - f_p}.
\]

One can show that \( g_p > 0 \). When we have an interior solution, i.e. when \( b \) and \( \bar{v} \) are not too large, then one can show that \( f_{\bar{v}} < 0 \) and \( g_p - f_p < 0 \). This proves that when \( d\bar{v} \) is positive, \( dn \) is also positive. The same is true for \( dp \) as well. Q.E.D.

• Proof of Proposition 6
We use the solutions for \( n \) from the proof of Proposition 5.

\[
n = f(p, \alpha)
\]

\[
n = g(p)
\]

Taking total derivatives,

\[
dn = \frac{\partial f}{\partial p} dp + \frac{\partial f}{\partial \alpha} d\alpha
\]

\[
dn = \frac{\partial g}{\partial p} dp.
\]
Denote the partial derivatives as \( \frac{\partial f}{\partial p} \equiv f_p \). Combining the two, we get

\[
dn = \frac{g_pf_\alpha d\alpha}{g_p - f_p}
\]

We want to show that the sign of \( dn \) is ambiguous when \( d\alpha \) is positive. We have shown in the previous proof that \( g_p > 0 \) and \( g_p - f_p < 0 \) when \( b \) is not too large. Hence, we only need to show that the sign of \( f_\alpha \) is indeterminate. \( f_\alpha \) is a function of \( \alpha \). Let us denote it as \( f_\alpha(\alpha) \). For \( b \) and \( \bar{\nu} \) not too large or small, one can show that there is a unique \( \alpha^* \in [0,1] \) which satisfies \( f_\alpha(\alpha) = 0 \). For \( \alpha < \alpha^* \), \( f_\alpha(\alpha) > 0 \) and, therefore, \( dn < 0 \). The opposite is also true. Q.E.D.

- The two FOC's for problem (7):

\[
\frac{\partial \pi_1}{\partial p_1} = \frac{n_1p_1 \left(1 - \sqrt{m/p_1}\right)}{(1 - k)n_1 + kn_2} + \frac{n_1 \left( (1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}} \right)}{(1 - k)n_1 + kn_2} = 0
\]

\[
\frac{\partial \pi_1}{\partial n_1} = \frac{((1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}})p_1}{(1 - k)n_1 + kn_2} + \frac{1 - k)n_1p_1}{(1 - k)n_1 + kn_2} - \frac{(1 - k)n_1p_1((1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}})}{(1 - k)n_1 + kn_2^2} - an_1 = 0
\]

- The two FOC's for problem (8):

\[
\frac{\partial \pi_M}{\partial p_1} = \frac{n_1p_1 \left(1 - \sqrt{m/p_1}\right)}{(1 - k)n_1 + kn_2} + \frac{n_1 \left( (1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}} \right)}{(1 - k)n_1 + kn_2} = 0
\]

\[
\frac{\partial \pi_M}{\partial n_1} = \frac{((1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}})p_1}{(1 - k)n_1 + kn_2} + \frac{1 - k)n_1p_1}{(1 - k)n_1 + kn_2} - \frac{(1 - k)n_1p_1((1 - k)n_1 + kn_2 - 2m + p_1 + 2\sqrt{m - p_1\sqrt{m}})}{(1 - k)n_1 + kn_2^2} - \frac{kn_2p_2}{(1 - k)n_2 + kn_1} - \frac{kn_2p_2((1 - k)n_2 + kn_1 - 2m + p_2 + 2\sqrt{m - p_2\sqrt{m}})}{(1 - k)n_2 + kn_1^2} - an_1 = 0
\]
References


