Targeted Advertising and Social Status *

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Abstract

This paper provides a novel explanation why firms sometimes use non-targeted advertising. Consumers value social status, which depends on what other consumers believe about their wealth. Advertising transmits information that allows consumers to buy the good, but also to recognize it when others buy.

In equilibrium, the firm uses non-targeted advertising to help consumers signal to each other through their purchases. It advertises to wealthy consumers who will buy, but also to poorer consumers who will not. Doing so ensures they understand what the goods signals, which increases the status and willingness to pay of consumers who buy. Trade may decrease social welfare, and in particular tends to make poorer consumers worse off. The mechanism shows effects often associated with persuasive advertising may instead result from informative advertising.

1 Introduction

Firms sometimes advertise high-end goods to a broad public, at a price such that most people will not buy them. One example is advertising for cars. Audi spent six million dollars to advertise its $118 000 R8 during the broadcast of Super Bowl XLII, reaching almost one hundred million viewers.[1] Prior to the 2008 Formula 1 Canada Grand Prix, Honda showcased its $100 000 Acura NSX at a popular street festival attended by hundreds of thousands of visitors.[2]

Advertising for clothes provides similar examples. The first three selections in Vogue magazine's 2008 fall fashion section were a $1200 trenchcoat, a $5500 watch and $600 shoes. Handbags cost between $1700 and $3300.[3] Twenty out of thirty-five items from Elle's fall fashion section cost over $700, including a

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[1] Brandweek, 12/15/2008, Vol.49, Issue 44 p6-6

[2] www.newswire.ca/en/releases/archive/June2008/03/c7902

[3] www.style.com/trendsshopping/theshopper/082008/

Peacock feather skirt for \$2500.[4] Both are mass circulation magazines, with a readership of approximately one million.

Similarly, large advertising campaigns made Nike Air Jordan shoes and the Apple iPhone household names, even though they were both mainly competing with high-end brands.[5]

A natural question is why firms might advertise in this way. On the surface, broad advertising for high-end goods appears wasteful. Firms could not reasonably expect most consumers to buy their products in the above examples. It would seem more efficient to target advertising at a smaller group of consumers who are more likely to buy.

After all, firms often do use targeted advertising. They put great effort into selecting which of distinct audiences to reach via specialized cable television, satellite radio, magazines and internet homepages (Esteban, Hernandez, and Moraga-Gonzalez 2006). Targeting technology also continues to improve. Different households watching the same program on cable tv may simultaneously receive different ads, internet service providers can directly track which websites a person visits, and search engines such as Google and Yahoo auction off space for internet ads conditional on a person's exact search query (Johnson 2009).

The above examples of non-targeted advertising are clearly the exception rather than the rule. What is it that makes them different?

This paper puts forward an explanation for non-targeted advertising based on two ideas. First, consumers value social status, which depends on what other consumers believe about their wealth. Second, consumers are initially uninformed, and advertising allows them both to recognize the good and to buy it.

Recognizing the good essentially means consumers can identify the good for what it is (price, characteristics, etc.) when they see it. A consumer who sees someone with an iPhone but who does not recognize it would just believe it is a normal phone. A consumer who does recognize it can instead infer something about the owner, as someone who owns a high-end good. Through this mechanism, broad advertising can promote conspicuous consumption by allowing consumers to signal to one another through their purchases.

This mechanism has much in common with previous economic analysis of status issues, such as that by Veblen (1899), Frank (1985), Ireland (1994) and Bagwell and Bernheim (1996). Status depends on beliefs about some unobserved characteristic, and actions only affect status to the extent they influence beliefs. High status is associated with a high level of these characteristics, either in absolute terms or compared to some reference standard.[6] Importantly, signaling through consumption is only possible if goods are visible to others, since only then can they influence beliefs.

The new element in this paper is that I assume physical visibility is not

[4] www.elle.com/fashionspotlight

[5] Advertising Age, 6/25/2007, Vol. 78, Issue 26, p8-8

[6] The mechanism would not work if people liked to conform as in Bernheim (1994), or disliked inequity as in Fehr and Schmidt (1999). But Kapferer and Bastien (2009) argues that people's desire for social stratification is the driver for luxury good sales.

enough. Consumers also need to recognize the good to understand what having it signals, and here advertising plays a key role.

The mechanism suggests the previous examples of non-targeted advertising are different because the goods are highly visible: cars, clothes, and portable technology. These types of goods are also often informally associated with social status.

In the model, a monopolist faces a market of consumers who are initially uninformed about the good it sells. I first look at the case where the firm only sells one variety of the good, and then where it can sell multiple varieties. All varieties are visible.

Consumers differ in their wealth, and wealthier consumers have a higher willingness to pay. Each consumer want others to believe he is wealthy. His utility is directly increasing in the average beliefs other consumers hold about his wealth.

Consumers can predict the equilibrium, and so the price of each variety and which consumers will buy each one. Consumers are initially uninformed in two respects. First, they do not know where to buy any variety, and instead can only buy a composite good. Second, they cannot recognize any variety, in the sense of being unable to distinguish it from any other good. If someone else bought a particular variety, they would be unable to identify which variety it was or if it was different than the composite good.

The firm can inform consumers by sending them an ad, which allows them to buy and recognize that particular variety. Advertising costs are small but strictly positive.

The relevant baseline case is where status effects are zero. Beliefs then have no effect on utility, so the firm would act as a standard monopolist and use only targeted advertising. A firm selling one variety would both advertise and sell to all consumers whose wealth exceeds a certain level. A firm selling multiple varieties would divide the market into different segments, and both advertise and sell a different variety to each segment. It would never advertise a variety to consumers who it does not expect will buy.

Strictly positive status effects lead the firm to use non-targeted advertising. In the one variety case, the firm still only sells to consumers over a certain wealth, but now it advertises to all consumers. Consumers who buy the good are wealthier than those who do not, so status effects increase their incentive to buy. But that is only true to the extent that other consumers recognize the good and understand the signal. The firm therefore also advertises to all consumers who do not buy to increase the willingness to pay of consumers who do, and so can charge a higher price.

In the multiple variety case, I derive the equilibrium where status effects are strictly positive but small. The firm still divides the market into segments and sells a different variety to each one. It advertises each variety to all consumers who buy it, but also to all who do not but who have lower wealth. By an unraveling argument, the firm can best exploit status effects by broadly advertising each variety. Still, it does not advertise any variety to wealthier consumers than those who buy as that would reduce its ability to price discriminate.

These results imply that when status effects are small, poorer consumers receive more ads than wealthier consumers. More information does not make them better off, since all ads except for one are for expensive varieties they are unwilling to buy. Each consumer is better able to distinguish between those who are wealthier than him than between those who are poorer.

I then look at specific cases to illustrate two additional issues. The first case shows the firm may advertise all varieties to all consumers if status effects are large. The additional status effects from advertising to wealthier consumers then outweigh the firm's reduced ability to price discriminate. The second case shows the firm may still use non-targeted advertising if consumers can inform themselves through costly search. The firm must advertise to inform consumers who will not buy, while some who buy will search to inform themselves.

Non-targeted targeting has an ambiguous effect on total welfare, but sale of the status good always makes some consumers worse off. Those who do not buy the status good are worse off because they now reveal themselves as relatively poor. Some consumers who buy each variety are also worse off, because sale of the status good affects their outside option. They are willing to pay a high price because not buying when others do sends a negative signal. If the firm sells a large number of varieties, all consumers may even be worse off.

The main contribution of the paper is to present a novel reason, based on status effects, why firms may use non-targeted advertising. The idea is briefly mentioned in Kapferer and Bastien (2009) but is absent from the economics literature on advertising. A number of other possible reasons for non-targeted advertising have been discussed. A first is that advertising technology is imperfect, so that targeting is simply not possible. This explanation is not particularly convincing when applied to the above examples, where the lack of targeting is extreme.

A related reason is that perfect targeting may be too costly. The cost of advertising differs in different media, and the cheapest way to reach a target market might be to advertise in media with a broader reach. Ads reach consumers who will not buy the good, but only as a side effect. Hernandez-Garcia (1997), Esteban et al. (2001), and Esteban et al. (2006) look at how this cost reason may cause firms not to target. Their conclusion is that under quite general circumstances, targeted advertising is still optimal.

Another type of explanation is related to anchoring. A consumer's willingness to pay might increase if he knows about a similar good which is more expensive; the original good now seems like a better deal. More generally, the utility from making a particular choice may depend on the salient available alternatives (Swinkels and Samuelson 2006). This explanation seems plausible but cannot explain why a firm advertises to consumers it does not expect to buy any of its goods.

Finally, firms may advertise to signal product characteristics. If consumers are unsure of say quality, a firm may want to burn money through seemingly wasteful advertising (Nelson 1974). Advertising itself can then signal that quality is high. The mechanism here also relates advertising to signaling, but advertising itself does not signal anything at all. It just informs consumers, which helps them signal to each other through their purchases. It is therefore not limited to experience goods, whose characteristics cannot be observed before purchase.

A second contribution is to show that certain effects associated with persuasive advertising can actually result from informative advertising. That is, informative advertising can affect social status, and help differentiate otherwise identical goods.

Informative advertising transmits product information such as price, availability, characteristics or quality (Anderson and Renault 2006). It is direct if such credible information is directly included in the ad. Papers that have studied direct informative advertising include Butters (1977), Grossman and Shapiro (1984) and Meurer and Stahl (1994). Informative advertising is indirect if it serves as a signal, for example of price (Bagwell and Ramey 1994) or quality (Kihlstrom and Riordan 1984, Milgrom and Roberts 1986).

Persuasive advertising directly affects consumer preferences or utility. Advertising may actually change consumer preferences (Dixit and Norman 1978), or help capture consumers who will not consider buying from rivals (Schmalensee 1976, Chioveanu 2008). It may also enter directly into the utility function, so that consumption of the good and advertising are complements (Stigler and Becker 1977, Becker and Murphy 1993). That can reflect the idea that advertising itself creates prestige or differentiation from other goods (Ackerberg 2001).

Advertising is this paper is purely informative. It allows consumers to recognize and buy a particular variety, and so can be thought of as transmitting information about appearance, price, who will likely buy the variety, and where it can be purchased. Information transmission is direct, as the advertising does not signal anything to consumers. Advertising is not persuasive, as it does not directly affect preferences or utility.

Advertising affects the social status from buying a variety, which is closely related to the idea of prestige from persuasive advertising.[7] Advertising also increase differentiation between varieties. More people can recognize each variety, which increases the difference in status from buying different ones. It does so here simply by informing consumers.

Section 2 presents the model, and Sections 3 and 4 contain analysis for the case of one and multiple varieties. Section 5 touches on two additional issues by looking at specific cases. Section 6 looks at how selling the status good affects consumer and total welfare. Section 7 discusses what type of information firms should include in their ads to take advantage of status effects, for example price or product characteristics. Section 8 concludes.

[7] Krahmer (2006) presents a related signaling idea where advertising helps "the public" recognize brand names, but argues explicitly against interpreting it as informative advertising. The large literature on conspicuous consumption has tended not to consider the role of advertising at all.

2 The Model

A monopolist faces a market of n consumers, divided equally into t types (n large, $\frac{n}{t} \in \mathbb{Z}^+$). Wealth is increasing linearly in type between lower bound w_L and upper bound w_H, and type is private information. Let $N = \{1, \ldots, n\}$ be the set of consumers, indexed by i, and $T = \{1, \ldots, t\}$ be the set of types, indexed by j. A consumer of type j has wealth:

$$w_j = w_L + (\frac{j-1}{t-1})(w_H - w_L)$$

The firm produces $m \geq 1$ varieties of a status good at constant marginal cost, normalized to zero, where m is exogenous. I first look at the case where the firm produces one variety ($m = 1$).

When $m \geq 2$, varieties are similar in the sense that each gives the same intrinsic utility to consumers. Varieties will only differ in their signaling value that arises in equilibrium. Let $M = \{x_1, \ldots, x_m\}$ be the set of varieties, indexed by k.

The firm moves first by deciding, for each variety x_k, to which types of consumers it will advertise, $a(x_k)$, and by committing to a single price $p(x_k)$. The firm's advertising technology allows it to advertise each variety to as many types as it likes, or to none at all.

The firm's strategy is therefore $s_f = (A, P)$, where $A = (a(x_k))_{x_k \in M}$, $a(x_k) \subseteq T \cup \{\emptyset\}$ and $P = (p(x_k))_{x_k \in M}$, with $p(x_k) \in \mathbb{R}^+$. Write $a_k \equiv a(x_k)$ and $p_k \equiv p(x_k)$ for short.

I assume the cost of advertising is small but strictly positive. It is also small in relation to any other parameters that I may also consider to be small in the later analysis. Costs are small because I do not want cost considerations to drive the firm's advertising decision. They are strictly positive because I do not want advertising to all consumers to be a weakly dominant strategy.

I will proceed with the analysis in the following equivalent way. I carry out the analysis as if advertising were costless, but the firm uses a tie-breaking rule. The firm strictly prefers one strategy over another if it yields the same revenue but involves strictly less total advertising $\sum_{x_k \in M} |a_k|$.

Consumers are initially uninformed about each variety. If the firm advertises variety x_k to type j, then it informs all consumers of that type about that variety. Informing a consumer about variety x_k does not inform him about any other variety $x_{k'}$ with $k' \neq k$. Advertising is purely informative.

Consumers respond to the firm's advertising and pricing by making a purchasing decision. Each consumer can buy zero or one unit of the status good, and only of a variety of which he is informed. He spends any remaining income on a composite good. The price of the composite good is normalized to one.

Let B_j be the set of varieties consumer i of type j can afford and of which he is informed, $B_j = \{x_k | j \in a_k, p_k \leq w_j\}$. The consumer's strategy is a function $s_i : B_j \to B_j \cup \{\emptyset\}$. Denote his chosen action by α_i, where $\alpha_i = x_k$ if he buys variety x_k and $\alpha_i = \emptyset$ if he only buys the composite good.

Defining $p_\emptyset \equiv 0$, the firm maximizes profits:

$$\pi = \sum_{i \in N} p_{\alpha_i}$$

Consumer preferences are additively separable in intrinsic utility U_I and status utility U_S. Consumer i of type j who takes action α_i has intrinsic utility:

$$U_I = V(w_j - p_{\alpha_i}) + u_0 1_{\alpha_i \neq \emptyset}$$

The first term is the utility from the composite good, with $V' > 0$ and $V'' < 0$. The second term is the intrinsic utility from the status good, u_0, which is the same for each variety.

The consumer's status utility depends on what other consumers believe about his wealth. His status utility is:

$$U_S = \lambda \big[\sum_{i' \in N \setminus i} \mu_{i'}(w_i | (A, \times_{i'' \in N} \alpha_{i''})) \big] / (N-1)$$

Status utility depends on the average beliefs of all other consumers, where consumer i''s beliefs are $\mu_{i'}$. These beliefs depend in turn on each consumer's purchasing decision and on the firm's choice of advertising A. In particular, consumer i''s beliefs depend on whether he is informed about the variety bought by consumer i.

The term $\lambda > 0$ gives how much consumers cares about status, which is independent of type. From now on, I incorporate the term $(N-1)$ in the denominator directly into λ.

The beliefs of any consumer i' about consumer i follow from Bayes' rule. Consumer i' conditions his beliefs on the information at his disposal in the following way. If consumer i buys a variety of which i' is informed, then i' recognizes that variety and believes i is the expected type of someone who buys that variety. If consumer i does not buy a variety of which i' is informed, then i' does not recognize that variety and believes i is the expected type of someone who does not buy a variety of which he is informed. In the later case, he believes i either buys a variety of which he is uninformed, or only buys the composite good. Consumer i' cannot condition his beliefs on the amount i consumes of the composite good, which in that sense is non-visible.

When I look at welfare, it will be appropriate to normalize status utility so that it depends on beliefs about $[w - (w_H + w_L)/2]$. That is, beliefs about how a consumer's wealth differs from average wealth in society. The normalization would not affect the equilibrium analysis, as it just corresponds to adding a constant to each consumer's utility function.

To summarize, I look for a Bayes-Nash equilibrium, consisting of strategies $(s_f, \times_{i \in N} s_i)$ and beliefs μ about each consumer's type after he has made a purchasing decision. Each player's strategy is a best response to the strategies of the others, given beliefs. Equilibrium beliefs follow from strategies via Bayes' rule. There is no a priori restriction on beliefs about a consumer who makes a purchasing decision that does not occur in equilibrium. I look for a symmetric equilibrium where all consumers of the same type have the same strategy.

3 Analysis - Single Variety

The number of consumers, n, is large, so each consumer will not take his own type into account when forming beliefs about others. I look at symmetric equilibria, so I can work with $n = t$ effective consumers, one per type, and identify each effective consumer's equilibrium action with that of all consumers of his type. I use j to index both consumers and types, so consumer j is of type j and has wealth w_j.

Consider the case where $m = 1$, so the firm produces only one variety of the status good. I will omit the subscript 1 on p_1 and x_1 since there cannot be any confusion about which variety I am referring to.

I first calculate a consumer's willingness to pay for the status good, given that the firm advertises to $r < t$ consumers at price p and given the purchasing decisions of other consumers.

Let w_{buy} be the expected wealth of a consumer who buys the status good

$$w_{buy} = \frac{\sum w_j 1_{\alpha_j = x}}{\sum 1_{\alpha_j = x}}$$

where the summation is taken over all consumers. If consumer j buys the status good, then his utility is:

$$V(w_j - p) + u_0 + \lambda r(w_{buy}) + \lambda(t - r)(\frac{w_H + w_L}{2})$$

The informed consumers recognize consumer j has bought the status good, and thus believe he has expected wealth w_{buy}. The uninformed consumers cannot distinguish him from those who only buy the composite good. Their belief is just the prior, that he has average wealth $(w_H + w_L)/2$.

If consumer j does not buy the status good, his utility is:

$$V(w_j) + \lambda r(w_{not}) + \lambda(t - r)(\frac{w_H + w_L}{2})$$

where w_{not} is the expected wealth of someone who only buys the composite good. It is defined in an analogous way to w_{buy}.

Consumer j's willingness to pay for the status good is therefore the minimum of his wealth w_j and the value of p that satisfies:

$$V(w_j) - V(w_j - p) = u_0 + \lambda r(w_{buy} - w_{not})$$

The left-hand side is the utility he gives up by buying the status good, since he must consume less of the composite good. The right-hand side is the intrinsic utility he gains the status good, plus the benefit in terms of status utility.

Denote that willingness to pay by $v(j)$. Rearranging gives:

$$v(j) = min\{w_j, w_j - V^{-1}[V(w_j) - u_0 - \lambda r(w_{buy} - w_{not})\}$$

I will assume that V and parameters are such at $w_j < v(j)$ for each consumer. That will always be the case if the marginal utility of wealth near zero is sufficiently high, for example if $V(w) = ln(w)$. I do so to avoid corner solutions, which would not seem to yield greater insight. Willingness to pay is therefore:

$$v(j) = w_j - V^{-1}[V(w_j) - u_0 - \lambda r(w_{buy} - w_{not})] \tag{1}$$

The status term in willingness to pay depends only on the beliefs of the r informed consumers. The beliefs of uninformed consumers affect consumer j's utility, but they do so in the same way whether he buys or not.

The concavity of V implies that $v(j)$ is increasing in j. Wealthier consumers have a strictly higher willingness to pay for the status good because of their lower marginal utility of wealth. That is the case regardless of the value of $(w_{buy} - w_{not})$, since all consumers care about status to the same extent.

If the firm serves the whole market, then w_{not} in the above expression is not defined. Willingness to pay will depend on the out-of-equilibrium beliefs about a consumer who only buys the composite good.

In the absence of status effects, the firm would just solve the standard problem of a monopolist facing a downward sloping demand curve. The demand curve would be determined by (1) with $\lambda = 0$. Clearly, the firm would only advertise to those consumers who would buy the good.

The firm's optimal strategy in the presence of status effects differs in that it also advertises to all less wealthy consumers who do not buy the status good.

Theorem 1. *Let $m = 1$. Then the firm chooses $s_f = (a, p)$ with $a = \{1, \ldots, T\}$ and $p = v(j_0)$, where j_0 is the lowest type such that:*

$$(t - j_0 + 1)v(j_0) \geq (t - j_0 + 2)v(j_0 - 1)$$

and $j_0 = 1$ if there is no such type. Its price is therefore

$$p = w_{j_0} - V^{-1}[V(w_{j_0}) - u_0 - \lambda t(\frac{w_H - w_L}{2})]\}$$

Consumers choose $\alpha_j = x$ iff $j \geq j_0$.

Proof. See appendix □

In words, the firm sets the price so that a critical type j_0 is indifferent about buying. It sells the status good to all consumers above that critical type, so with wealth $w \geq w_{j_0}$. The firm advertises the status good to all consumers. That means if it does not sell to all consumers ($j_0 > 2$), then the firm uses non-targeted advertising.

The intuition for the result is as follows. For any given quantity sold, the firm wants to sell to as high types as possible. Just like in the standard monopolist problem, the firm wants to sell to consumers who have high willingness to pay. Now with $\lambda > 0$, there is the added effect. High types who buy the good make it more desirable in terms of status, raising the willingness to pay of all other consumers. The firm therefore sells only to consumers with type above some critical value. It chooses this critical value by balancing the increased sales from reducing its price with the reduction of revenue from all units it already sells.

If the firm does not sell to the whole market, then buying the status good sends a strictly better signal than not buying it ($w_{buy} > w_{not}$). That will be the case if willingness to pay for the lowest type consumer is sufficiently low, for example if $w_L \ll w_H$. The firm advertises to all consumers to ensure that everyone understands the signal.

The result reflects the intuition described in the introduction. The firm advertises the status good to those who buy it, but also to less wealthy consumers who are unwilling to buy at the advertised price. Doing so increases the status utility of consumers who buy the good, which lets the firm charge a strictly higher price.

Perhaps surprisingly, a consumer's incentive to buy the status good is independent of how exclusive the status good is. It is important that the status good be somewhat high-end, in the sense that only consumers with type above some critical value buy it. However, a consumer's willingness to pay does not depend on the firm's choice of critical value.

If the firm chooses a high critical value, then only very high types buy the status good. Consumers are willing to pay a high price because buying the good shows they are very wealthy. Not buying only signals their wealth is slightly below average.

If the firm chooses a low critical value, then many different types buy the status good. Buying only shows a consumer's wealth is slightly above average. But consumers are still willing to pay a high price, because not buying the good signals they have very low wealth.

It may seem in the former case like consumers are trying to differentiate themselves from others, and in the later case like they are trying to conform. In fact, both situations can occur through the same mechanism, by which consumers just care about direct beliefs about their own wealth.

To set the critical value j_0, the firm faces a similar problem to the case where status effects are absent. The only difference is that consumers behave as if the status good gives them intrinsic utility $u_0 + \lambda t[(w_H - w_L)/2]$ instead of just u_0. The firm sets p, which determines j_0, by balancing the marginal and infra marginal effects of a change in price.

If the firm sells to the entire market ($j_0 = 1$), then willingness to pay depends on the out-of-equilibrium beliefs about a consumer who only buys the composite good. The most natural beliefs are that such a consumer has the lowest wealth w_L. Such beliefs can be justified in the following way. If the firm chose different critical values j_0 that tended one, then the beliefs implied by Bayes' rule would tend to w_L. With these out-of-equilibrium beliefs, a consumer's willingness to pay for the status good is the same for $j_0 = 1$ as it is for any $j_0 \geq 2$.

The same type of equilibrium outcome would hold if λ was increasing in j, so if wealthier consumer were more concerned with status. In this situation willingness to pay would increase with type if $(w_{buy} - w_{not}) > 0$, which would again give the firm an incentive to sell only to types above some critical value. It would also hold if λ was decreasing in j, as long as it was not decreasing by too much. The important thing is that equilibrium willingness to pay $v(j)$ still be increasing in j. That would be the case if high types' lower marginal utility of wealth outweighed their lower marginal utility from status.

4 Analysis - Multiple Varieties

I now consider the case where the firm sells multiple varieties ($m \geq 2$). I assume that λ is small but still strictly positive. The firm can only sell one variety to each type, so without loss of generality I can say that the number of varieties is no more than the number of types, $m \leq t$.

In the baseline case where status effects are absent, the firm would just divide the market up into m segments, one per variety, and carry out price discrimination between the different segments. All varieties would give the same utility, and the price of each variety would make the lowest type to buy it indifferent with only buying the composite good. The firm would advertise each variety only to those consumers who buy it.

As in the case of one variety, strictly positive status effects give the firm an incentive to use non-targeted advertising. A difference here is that the firm will not advertise each variety to all consumers. It will advertise each variety to the consumers who buy it, and to all less wealthy consumers who do not.

Theorem 2. *Let λ be small, and define $j_m \equiv t$, $j_{-1} \equiv 1$. The firm chooses critical values $j_0, \dots, j_{m-1}$, and $s_f = (A, P)$ such that, if $j_0 \geq 2$, then $a_k = \{1, \dots j_k\}$ for all $x_k \in M$. If $j_0 = 1$, then there is instead one value of k such that $a_k = \{j_2, \dots j_k\}$. It sets the following price p_k*

$$w_{j_{(k-1)}} - V^{-1}\{V(w_{j_{(k-1)}}) - u_0 - \lambda(j_0 - 1)[(\frac{w_{j_{(k-1)}} + w_{j_k - 1_{k \neq m}}}{2}) - (\frac{w_1 + w_{j_0 - 1}}{2})]$$

$$-\lambda \sum_{k'=1}^{k} (j_{k'-1} - j_{(k'-1)})[(\frac{w_{j_{(k-1)}} + w_{j_k - 1_{k \neq m}}}{2}) - (\frac{w_1 + w_{j_{(k'-1)}-1}}{2})]\} \qquad (2)$$

Consumers of type j choose $\alpha_j = x_k$ if $j_{k-1} \leq j < j_k$, and $\alpha_j = \emptyset$ if $j < j_0$.

In words, the firm divides the market up into m segments and sells a single variety to consumers in each segment. It sells variety x_1 to consumers with type in $[j_0, j_1 - 1]$, variety x_2 to consumers with type in $[j_1, j_2 - 1]$ and so on, selling variety x_m to consumers with type in $[j_{m-1}, t]$. Consumers with type in $[w_L, j_0 - 1]$ only buy the composite good. These values $j_0, \dots, j_{m-1}$ are the same the firm would chose if there were no status effects.[8] The firm sets a price for each variety to make the lowest type who buys it indifferent with only buying the composite good.

The firm advertises each variety to consumers who buy it and to all lower types. The only exception is if $j_0 = 1$, so if every consumer buys some variety

[8]The terms $j_k - 1$ and $j_{k'-1}$ in (2) include the -1 because of the discrete set-up. That would be dropped in a model with continuous types, as would the indicator $1_{k \neq m}$

of the status good. In that case, the firm only send ads for $m-1$ of the m varieties to consumers with type in $[1, j_0-1]$. That is enough for these types to identify a consumer who buys any variety. They infer that anyone they do not recognize must have bought the single variety of which they are uninformed.

Just as in the one-variety case, the firm advertises varieties to lower type consumers to take advantage of status effects. However, having the firm to sell multiple varieties yields a number of new insights.

First, the firm advertises the highest-end variety x_m to all lower type consumers who do not buy it, but it also does the same for every variety x_k. That is, it uses non-targeted to inform people about each variety, regardless of whether buying that variety confers high or low status.

The intuition is that consumers who buy x_m are the highest types, and they are willing to pay more if others can understand what x_m signals. If the firm advertises x_m to inform all lower type consumers, then those who buy x_{m-1} are the highest remaining types to buy a variety of which some consumers may be uninformed. They are willing to pay more for x_{m-1} if others can recognize that variety, so that they distinguish themselves from all lower types. Continuing in this way, even consumers who buy the lowest variety x_1 want to distinguish themselves from still lower types who only buy the composite good. The firm uses more non-targeted advertising for high-end varieties, but it uses some for all varieties.

Advertising a variety $x_{k'}$ to all lower types not only increases the willingness to pay of those who buy $x_{k'}$, but it may also increase the willingness to pay for those who buy a lower variety x_k with $k < k'$. It will never decrease the willingness to pay of the latter group of consumers, although it may decrease their utility.

Take the case of variety x_m, and consider some consumer who was uninformed about both x_m and x_k. Once that consumer receives an ad for x_m, he can distinguish that variety from x_k. He downgrades his beliefs about consumers who buy x_k, since he now knows they are not among the highest types. That decreases the status utility of those who buy x_k. However, he also downgrades his beliefs in the same way about consumers who only buy the composite good, and that is the best outside option for those who buy x_k. Consumers who will buy x_k in equilibrium are made worse, regardless of their purchasing decision. Their willingness to pay for x_k is unchanged.

Advertising x_m to all lower types is even more advantageous for the firm if lower types are informed about x_k but uninformed about x_m. Advertising x_m then leaves the equilibrium beliefs about those who buy x_k unchanged, as consumers can already recognize that variety. But just as above, it reduces the status utility of anyone who take his best outside option and only buys the composite good. Willingness to pay for x_k increases.

Putting these steps together, it follows that the firm's equilibrium advertising allows it to charge a higher price for each variety than if it just used targeted advertising. The result would be the same if λ varied monotonically with type.

A second insight is that the firm does not advertise any variety x_k to higher type consumers than those who buy. That is, non-targeted advertising for a variety goes exclusively to less wealthy consumers. The above argument would suggest that also advertising x_k to higher types would further increase willingness to pay for x_k through status effects. The problem is that advertising x_k to higher types would reduce the firm's ability to price discriminate. Consumers who buy a higher variety $x_{k'}$ with $k' > k$ have a lower marginal utility of wealth than those who buy x_k. That allows the firm to charge a higher price for $x_{k'}$ than it does for x_k. If the firm advertised x_k to these higher types, it would have to drop the price of $x_{k'}$ to prevent the higher types from buying x_k instead. Status effects are small, so this negative effect outweighs any increase in willingness to pay for x_k that the advertising may generate through status effects.

One feature of the equilibrium is therefore that lower type consumers receive more ads than higher types. They are better informed, and so better able to distinguish between consumers who buy different varieties. That being said, being better informed does not increase their utility. From the perspective of these lower types, most of the ads they receive are of no use. They advertise expensive varieties that these consumers are unwilling to buy.

Another feature of the equilibrium is that each consumer is better able to distinguish between other consumers who are wealthier than him, than between those who are less wealthy. The consumer is fully informed about all higher-end varieties than the one he buys. If he buys variety x_k, he is able to distinguish between consumers who have about the same wealth as he does (those who buy x_k), consumers who are a bit wealthier (those who buy $x_k + 1$), and so on up until the wealthiest consumers who buy x_m. In contrast, the consumer is completely uninformed about all lower-end varieties. He is unable to distinguish between less wealth consumers, and just forms a single expectation about this group.

The beliefs of the lowest types have the greatest impact on each consumer's willingness to pay for the variety he ends up buying. This is despite the fact that status utility depends only on average beliefs over all consumers. The reason is that the lowest types are most informed about higher-end varieties, and so have the most negative beliefs about consumers who take their outside option. That can be seen by looking at the firm's optimal price p_k for variety x_k, as given by (2). It is derived as follows.

The firm sells x_k to types in $[j_{k-1}, j_k - 1]$, and sets the price to makes type j_{k-1} indifferent with only buying the composite good. As argued above, willingness to pay for x_k is not affected by the beliefs of consumers who buy any higher variety $x_{k'}$ with $k' > k$. The summation in the expression for p_k therefore only runs to k.

Consider lower type consumers who buy some variety $x_{k'}$ with $k' < k$. These consumers are informed about x_k, and so believe that those who buy x_k have expected wealth $(w_{j_{(k-1)}} + w_{j_k - 1_{k \neq m}})/2$. If a consumer instead only buys the composite good, those who buy $x_{k'}$ believe he is the expected type of someone who does not buy any variety $x_{k'}, x_{k'+1}, \ldots, x_m$. That is, he has expected wealth $(w_1 + w_{j_{(k'-1)}-1})/2$. The term in the summation is just the difference between these two expressions. It is decreasing in k', and is therefore larger for lower types. The lowest types are fully informed, and so infer anyone who does not buy a variety they recognize must only consume the composite good.

5 Two Additional Issues

5.1 Multiple Varieties and Large Status Effects

Theorem 2 reveals a tension between the firm's desire to exploit status effects and its desire to price discriminate. Broadly advertising a variety allows more consumers to recognize it, and through status effects the firm can increase its price. There is no conflict with price discrimination when the firm advertises a variety to poorer consumers than those who buy it. These consumers find the variety "too expensive" and so do not want to buy once informed.

A conflict exists if the firm advertises a variety to wealthier consumers than those who buy. Wealthier consumers view the variety as a "better deal" than the high-end variety the firm intends them to buy. The firm must convince them to still buy the high-end variety by reducing its price.

When facing such a trade-off, the firm has to weigh the increase in price of the more heavily advertised variety against the decrease in price of the high-end variety. Theorem 2 assumed consumers' concern for status was small, so the latter negative effect always won out. The firm preferred to retain its ability to price discriminate, and never advertised a variety wealthier consumers than those who bought it.

I now show this need not be the case when status effects are large. The following example has two varieties and three types, and the firm advertises both varieties to all consumers.

Result 1. *Let $V(w) = \ln(w)$, $t = 3$, $m = 2$, and let λ be large. Say the firm does not sell to all consumers.*

Then the firm chooses $s_f = (A, P)$ where $a(x_1) = a(x_k) = T$, and

$$p_1 = (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{2}}]$$

$$p_2 = w_H[1 - e^{\frac{\lambda}{2}(w_H - w_L)}] + (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{2}}]e^{\frac{\lambda}{2}(w_H - w_L)}$$

Consumers choose $\alpha_1 = \{\emptyset\}$, $\alpha_2 = \{x_1\}$ and $\alpha_3 = \{x_2\}$

Proof. See appendix □

Type 3 consumers with wealth w_H buy variety x_2, type 2 consumers with wealth $(w_H + w_L)/2$ buy variety x_1, and type 1 consumers with wealth w_L only buy the composite good. The firm advertises both varieties to all consumers. Unlike in Theorem 2, type 3 consumers receive an ad for variety x_1 bought by a lower type.

Advertising x_2 to all consumers allows the firm to increase p_2, since now the wealthiest consumers can also recognize x_1. They can distinguish consumers who buy x_1 from those who only buy the composite good, which increases the incentive to buy x_1.

On the other hand, advertising x_2 to all consumers means the firm must drop p_3 to prevent the wealthiest consumers from buying x_2 instead. In this case, the firm's benefit in exploiting status effects advertises outweighs its loss from less price discrimination.

The result depends on λ being large, but in a perhaps unexpected way. Advertising x_1 to all consumers greatly increases the status incentive to buy x_1, but the firm can only increase the price by a small amount.

If consumers value status very much, type 2 consumers were already willing to pay a high price for x_2 when only two types were informed. They were anxious that consumers who were informed distinguish them from those only buying the composite good. After type 2 consumers pay this price, the marginal utility of their remaining wealth is very high. Advertising x_2 still further leaves their willingness to pay almost unchanged, as they weigh the extra status utility against the high marginal utility of wealth.

Instead, the result hold because firm does not lose much ability to price discriminate by informing wealthy consumers about cheaper varieties when λ is large. Wealthy consumers are not very tempted to buy cheaper lower-end varieties, because doing so would entail a large drop in status utility. The firm can advertise x_2 to all types, and only has to reduce p_3 by a small amount to keep the wealthiest consumers indifferent.

5.2 Non-targeted Advertising and Consumer Search

I now consider an issue that arises if consumers can inform themselves through costly search. Janssen and Non (2008) show in a duopoly setting that advertising and consumer search can be substitutes. Equilibria involving a high level of advertising tend to have little consumer search, and vice-versa.

Their intuition is that both firms and consumers want to overcomes the information gap in the market to allow mutually beneficial trade to take place. One side of the market will not incur a cost to overcome this gap if it expects the other side to do so instead.

This intuition does not fully translate to the current setting. In the presence of status effects, the interests of firms and consumers in transmitting information are less neatly aligned. The firm wants consumers to recognize the good and so is willing to incur a cost to inform them, including some consumers who it does not expect to buy. In contrast, these consumers are not willing to incur any positive search cost, as they do not benefit from being informed.

For this reason, the firm may have a greater incentive to advertise to consumers it does not expect to buy the good, than to those it does. That is because it expects some of the later group to search and inform themselves.

I examine a simple set-up which does not allow for any general conclusions on the relationship between advertising and search costs in the presence of status effects, but which suffices to expose the above intuition. The firm sells one variety, and any consumer who does not receive an ad can inform himself by paying search cost $c_s > 0$. The search cost can be interpreted as the cost of finding out where a good is sold. I explicitly fix the firm's cost of informing one consumer through advertising at $c_a > 0$. I still assume advertising costs are small in relation to all parameters, except possibly c_s.

Result 2. *Let $m = 1$, and $c_a > 0$ be the firm's cost of informing a consumer through advertising. After the firm advertises, assume each consumer can inform himself about the status good by paying search cost $c_s > 0$.*

Then the firm chooses $s_f = (p, a)$, where p is arbitrarily close to that given in Theorem 1. Consumers also act as in Theorem 1, so $\alpha_j = x$ if and only if $j \geq j_0$ for critical type j_0.

The firm advertises $a = \{1, \ldots, j'\}$, where j' is defined as follows. If c_s/c_a is sufficiently close to zero, then $j' = j_0 - 1$. If not, then j' is the lowest type in $\{j_0, \ldots, T\}$ such that $v(j' + 1) - v(j_0) \geq c_s$. If there is no such type, then $j' = T$.

Consumers of type j search if and only if $j \geq j' + 1$.

Proof. See appendix □

The result says there are three types of equilibria, depending on the size of search costs. When search costs are sufficiently high, the firm advertises to all consumers. Consumers do not need to search, and the outcome coincides with that of Theorem 1.

When search costs are lower, the firm advertises to all consumers who do not buy the status good and only to some who do. All consumers who do not receive an ad instead search. The firm knows that all consumers who buy except for the lowest such type would also be willing to buy for a strictly higher price. The firm will not advertise to these consumers if their willingness to pay exceeds the price by more than c_s, since these consumers are willing to bear the cost of informing themselves. As search costs decrease, the firm advertises to fewer and fewer consumers.

An extreme case occurs when search costs are sufficiently low compared to advertising costs. The firm still advertises, but only to consumers it does not expect to buy. The lowest type to buy the status good must now incur search cost c_s to inform himself, meaning the firm must charge a price c_s lower than if it had sent him an ad. Doing so reduces profits by c_s times quantity sold, and reduces costs by c_a. For any fixed $c_a > 0$ however small, that will be profitable for search costs close enough to zero.

6 Welfare

I now look at welfare, comparing the equilibrium outcome with what would occur if the firm did not sell the status good. The externalities from status effects mean that selling the status good can decrease consumer or total welfare.

The first results shows that certain consumers would be better off if the firm did not sell the status good.

Theorem 3. *Let $\{j_0, j_1, \ldots, j_{m-1}\}$ be the critical types chosen by the firm in equilibrium. Then there exist positive constants $\Delta_0 < (j_1 - j_0), \Delta_1 < (j_2 - j_1), \ldots, \Delta_{m-1} < (t - j_{m-1})$ such that consumers with type $[j_0, j_0 + \Delta_0], [j_1, j_1 + \Delta_1], \ldots, [j_{m-1}, j_{m-1} + \Delta_{m-1}]$ would all have higher utility if the firm did not sell the status good.*

Proof. Say a consumer with wealth w, buys a variety at price p. Take utility when the firm sells the status good minus utility when the firm does not and differentiate with respect to w, giving $V'(w-p) - V'(w)$. That is strictly positive by $V'' < 0$. So among consumers who buy a particular variety, higher types have a larger gain (or a smaller loss) of utility. If consumers in some segment suffer a loss in utility, it will be those whose type lies below a certain threshold.

Consumers of type $j < j_0$ only buy the composite good. They suffer a loss in utility if the firm sells the status good since $w_{j_0} \leq w_H$:

$$V(w) + \lambda(\frac{w_L + w_{j_0 - 1}}{2}) < V(w) + \lambda(\frac{w_L + w_H}{2})$$

The utility of consumer j_{k-1}, the lowest to buy variety x_k, is

$$V(w_{j_{(k-1)}} - p_k) + u_0 + \lambda(\frac{w_{j_{(k-1)}} + w_{j_k - 1}}{2})$$

The firm's price p_k from (2) makes him indifferent with only consuming the composite good. That would give utility $V(w_{j_{(k-1)}}) + \lambda(\frac{w_L + w_{j_{(k-1)} - 1}}{2}) < V(w_{j_{(k-1)}}) + \lambda(\frac{w_L + w_H}{2})$, so he too is made worse off. $\square$

As before, the firm's equilibrium strategy is to divide the market up into m segments, and sell a different variety to each segment. The result says there are consumers in each segment who would be better off if the firm did not sell the status good. In particular, this will be the poorer consumers in each segment. All consumers who do not buy the status good would also be better off.

It is easy to understand why consumers who only buy the composite good suffer a loss in utility. For them, the only effect of the firm selling the status good is to reveal them as having relatively low wealth. They do not buy the status good when wealthier consumers do, decreasing their status utility.

Some consumers who buy each variety would also be better off if the firm did not sell the status good. The reason is that selling the status good changes the beliefs associated with each consumer's best outside option, which is to only buy the composite good. Some consumers are willing to pay a very high price for the variety because not buying it would signal something very negative. So even consumers who buy a variety that gives them high status may be made worse off because of the high price. They are willing to buy the variety, but they would prefer if no one did.

Two special cases are when the firm can sell only one variety ($m = 1$), and when it can sell as many varieties as there are types ($m = t$). In the first case, all consumers with wealth below a certain threshold would be better off it the firm did not sell the status good. In the second, all consumers would be better off.

I now look at aggregate consumer and total welfare when status effects are small and when they are large. The concavity of V means that there are wealth effects, so consumer surplus is not well defined. I instead evaluate consumer welfare in terms of compensating variation (CV). That is, given that trade has taken place, I look at what transfer each consumer would need to achieve the same utility as if the firm had not sold the status good. I then sum over these transfers. A consumer's contribution to the compensating variation is positive if that consumer suffers a loss in utility from the firm selling the status good.

I will say trade in the status good has a negative effect on consumer welfare if $CV > 0$, and a negative effect on total welfare if $\pi - CV < 0$. One must be careful about how to interpret these statements. Formally, $CV > 0$ means selling the status good and then carrying out zero sum transfers between consumers cannot lead to a Pareto improvement. $\pi - CV < 0$ means that selling the status good and then carrying out zero sum transfers cannot lead to a Pareto improvement even if all firm profits are returned to consumers, as in a general equilibrium framework.

I make the following simplifying assumptions for the subsequent analysis. First, I assume that $V(w) = ln(w)$. That is convenient because it ensures each consumer's willingness to pay is always strictly less than his wealth, regardless of the value of λ. Second, I assume that the number of types t is large. That means I can approximate the results by assuming in the proof that consumers are uniformly distributed on $[w_L, w_H]$.

To say something sensible about welfare for different values of λ, I need to explicitly normalize status utility so that status is a zero sum game. Otherwise, a change in λ would affect aggregate welfare just by changing the total status utility in society. I now set status utility to:

$$U_S = \lambda \sum_{i \in N} (w_i - \frac{(w_H + w_L)}{2} | (A, \times_{i \in N} \alpha_i))$$

where the only difference is the new term $(w_L + w_H)/2$. With this normalization, the sum of status utility over all consumers is zero.

Theorem 4. *Let $V(w) = \ln(w)$, t be large, and say the firm does not sell to all consumers.*

Then for λ sufficiently small, $CV < 0$. The value of $(\pi - CV)$ is increasing in the amount of non-targeted advertising if and only if u_0 is below some strictly positive threshold.

For λ sufficiently large, $(\pi - CV) < 0$. The value of $(\pi - CV)$ is thus maximized when the firm does not sell the status good.

Proof. See appendix □

The first part of the result says that when concerns for status are small, selling the status good increases consumer welfare. It must then also increase total welfare, since firm profits are strictly positive. Non-targeted advertising may either increase of decrease total welfare, depending on the value of u_0.

It is not surprising that consumer welfare increases, since if status effects were absent then trade would result in a Pareto improvement. When $\lambda > 0$, selling the status good makes some consumers worse off because beliefs about them change. But consumers as a whole benefit when status concerns are small.

The use of non-targeted advertising can either increase or decrease total welfare. If the firm could only use targeted advertising, it would sell each of its m varieties to a different segment of the market, and advertise each variety only to the consumers who buy it. Its equilibrium strategy, given in Theorem 2, is that it also advertises each variety to consumers who have lower wealth than those who buy it.

The assumption $V = ln$ means that the firm would divide the market up into the same m segments, whether it uses targeted or non-targeted advertising. Using non-targeted advertising allows it to increase the price, but that cancels out in $\pi - CV$.

The only way non-targeted advertising affects total welfare is by changing the beliefs about consumers in different market segments. Non-targeted advertising increases the signaling value of each variety, so that consumers in each market segment can be more precisely recognized. It redistributes status utility from less wealthy to more wealthy consumers.

The redistribution is efficient if consumers with higher wealth are willing to pay more for a marginal unit of status than consumers with lower wealth. That is the case when u_0 is small, since wealthier consumers have a lower marginal utility of wealth.

When u_0 is large, consumers who buy some variety are already willing to give up a large amount in compensating variation just because of intrinsic utility from the status good. If the situation changed so that the variety gives more status than before, they would only willing to give up a little bit more in transfers. The relevant marginal utility of wealth they use to make the decision is actually higher than that of poorer consumers who only buy the composite good. In this case, the redistribution of status utility from poorer to wealthier consumers is inefficient.

When concerns for status are large, selling the status good decreases total welfare. It would be socially optimal for trade not to take place, and so for there to be no advertising. Selling the status good decreases consumer welfare when status effects are large, which comes from the fact that the ln function decreases without bounds as wealth tends to zero. Consumers who gain from trade are never willing to give up more than their initial wealth in terms of compensation. Consumers who do not buy the status good are made worse off as λ increases, and their status utility decreases linearly in λ. They need increasingly large compensating transfers as λ increases, and their positive contribution to CV is unbounded from above.

Compensating variation therefore increases without bound as λ tends to infinity, and firm profits π are bounded above by total consumers wealth. That means for λ sufficiently large, selling the status good decreases total welfare.

7 Discussion - What Information to Advertise?

In reality, firms advertising high-end goods often do not seem to advertise the price. There are exceptions, such as the ads for clothing in fashion magazines mentioned in the introduction. This might nonetheless cast doubt on the mechanism proposed in the paper. If a firm wants to take advantage of status effects, shouldn't it advertise the price so that consumers realize the good is high-end?

The model has little to say about whether a firm would include price information in its ads. Advertising affects social status by allowing consumers to make a link between the variety they see advertised, and a particular variety they expect to exist in equilibrium. To make the link, it is sufficient to inform consumers about one characteristic of the variety. That could be price, but it also just as well be something else: the set of consumers who receive the ad, the set of consumers who buy the variety, or the average wealth of those who buy.

The majority of economic models of advertising cannot address what type of information firms should include in their ads, and in particular why firms might not advertise price (see discussion in Anderson and Renault 2006). The last paper is an exception, as it looks at advertising both of price and product attributes. They view price advertising as a commitment device, preventing the firm from holding up consumers by changing the price after they have searched.

Anderson and Renault show that the firm can sometimes achieve its maximum profits by only advertising information on product attributes. In that case, price advertising is unnecessary. Still, it is always optimal in a weak sense to advertise the price. Rational consumers will anticipate the price whether it is advertised or not.

Since economic models of advertising have trouble explaining why a firm would not advertise price information, one can turn to more informal arguments. For example, a firm may want to set different prices in different submarkets that are all reached by the same ad. There may also be a social convention that explicitly stating the price of a luxury good is considered to be bad taste.

Furthermore, a firm's decision to advertise the price will only affect social status indirectly. Status effects do not come from the price of the good, but from beliefs about what type of consumers buy it. Price information is useful only to the extent it can help consumers infer something about those who buy.

Casual observation suggests firms that do not advertise price may nonetheless use their ads to directly suggest what type of consumers will buy the good. Firms do so by associating their good to a particular lifestyle. This so-called lifestyle branding focusses less on the good itself than on characteristics of those who buy it (e.g. consumers who buy Louis Vuitton are wealthy and sophisticated). That squares well with the idea that firms want to influence consumers beliefs to take advantage of status effects.

Although the model has little to say about whether firms will advertise price, it still suggests something about what type of information firms should include in their ads. In particular, firms might want their ads to be less than fully informative.

The model assumes that advertising always transmits two types of information. It allow consumers to recognize the variety when they see it, and it also allows them to buy the variety.

In a slightly richer model, the firm might have to choose whether each ad should focus on transmitting one or the other type of information. That is, it could send an ad making it more likely consumers will remember the good and thus recognize it when they see it, or an ad more likely to transmit practical information about where to buy the good. The firm would face a trade-off in transmitting the two different types of information, perhaps due to limited cognitive ability of consumers.

The firm would then choose non-targeted advertising that is exclusively informative in one dimension, that of making consumers recognize the good. The sole purpose of non-targeted advertising is to take advantage of status effects. The firm has no incentive to inform these consumers about how to buy the good, because it does not want them to buy it anyway.

If the firm had still more flexibility in what to include in its ads, it might send non-targeted advertising that is even less informative. Say the firm could send an ad that only allows consumers to recognize the status good in an imprecise way. Consumers who receive the ad can distinguish between the status good and the composite good, but not between the different varieties of the status good.

Consumers who receive the ad just form an average belief about all those who buy the status good. Compared to an ad that allows them to recognize each specific variety, that decreases the status of those who buy higher varieties but increases the status of those who buy lower varieties. If poorer consumers cared more about status than wealthy consumers, the net effect might well be to increase firm profits.

8 Conclusion

This paper shows that consumer status seeking can explain why firms may sometimes use non-targeted advertising. Broadly advertising a high-end good ensures that even consumers who do not buy the good can recognize it, and so appreciate it when others buy. Advertising makes consumption conspicuous, not through persuasion, but just by transmitting information to consumers. This information allows consumers to signal to each other through their purchases.

An interesting avenue for further research would be to look more formally at how this mechanism can influence the information firms include in their ads. As discussed in the previous section, a firm might advertise different information depending on whether it wants consumers to purchase the good, to recognize a variety, or to recognize the good but not to distinguish between different varieties. Looking at this issue could shed light on why firms advertise certain types of information and not others, something that has not received much attention in the literature to date.

Appendix

Proof of Theorem 1. Let $s_f = (p, a)$ such that t' types receive an ad and $r < t'$ types buy. Keep t' fixed, and denote the lowest type to buy the status good by j_0. By (1), $v(j)$ is increasing in j so the firm will set $p = v(j_0)$. It is also increasing in $(w_{buy} - w_{not})$ so the optimal j_0 is $t - r + 1$. That means all types $j \geq j_0$ buy.

That implies $(w_{buy} - w_{not}) = (w_H - w_L)/2 > 0$. So $v(j_0)$ is highest if $a = T$, and the price is

$$p = v(j_0) = w_{j_0} - V^{-1}[V(w_{j_0}) - u_0 - \lambda t(\frac{w_H - w_L}{2})]$$

We have $\pi = v(j_0)(t - j_0 + 1)$, where marginal revenue drops as j_0 decreases. The firm chooses j_0 as the lowest type j such that:

$$(t - j + 1)v(j_0) \geq (t - j + 2)v(j_0 - 1)$$

so that selling to one more type would give negative marginal revenue. It chooses $j_0 = 1$ if no such type exists.

Proof of Theorem 2.

If $\lambda = 0$, the firm faces the standard monopolist problem of price discrimination with m possible prices. It divides the market into m segments, $[j_0, j_1 - 1], [j_1, j_2 - 1], \ldots, [j_{m-1}, t]$, sells variety x_k to consumers in $[j_{k-1}, j_k - 1]$ and charges $p_k = v(j_{k-1}) = w_{j_{k-1}} - V^{-1}[V(w_{j_{k-1}}) - u_0]$, to make type j_{k-1} indifferent with only buying the composite good.

If $\lambda > 0$, then each p_k would include a term proportional to λ. Status utility is continuous in λ, so as λ tends to zero v_j tends to value above. The firm's division of the market into m segments must then tend to what it would play if $\lambda = 0$. The segments actually coincide for λ sufficiently small because the set of types is discrete.

The firm leaves each consumer's outside option as to only buy the composite good. Any increase in revenue from doing otherwise would tend to zero with λ. It would have to set a lower price for some x_k to keep $j \in [j_{k-1}, j_k - 1]$ from taking this outside option, where $p_k < w_{j_{k-1}} - V^{-1}[V(w_{j_{k-1}}) - u_0]$ also holds in the limit.

If $\lambda = 0$, we have $v_j > v_{j-1}$ for any variety. If $\lambda > 0$ tends to zero, p_{k+1} tends to $v(j_k)$ but the utility from each variety tends to the same value, u_0. All consumers therefore strictly prefer x_k over $x_{k'}$ if and only if $k < k'$. That implies $a_k \subset \{1, \ldots, j_k - 1_{k \neq m}\}$, since otherwise some types best outside option would not be to only buy the composite good.

I now show that $a_k = \{1, \ldots, j_k - 1_{k \neq m}\}$. For each variety x_k, price is:

$$p_k = w_{j_{k-1}} - V^{-1}\Big\{V(w_{j_{k-1}}) - u_0 - \lambda\{\sum_{i=1}^{t}[\mu_i(j|\alpha_j = x_k) - \mu_i(j|\alpha_j = 0)]\}\Big\}$$

It is strictly increasing in beliefs any type i holds about those who buy x_k and decreasing in beliefs about those who only buy the composite good.

Let R_j be the set of varieties that type j recognizes, so $k \in R_j$ iff $j \in a_k$. If $i \in a_k$ then $\mu_i(j|\alpha_j = x_k) = [w_{j_k - 1_{k\neq m}} + w_{j_{k-1}}]/2$. If $i \notin a_k$ then

$$\mu_i(j|\alpha_j = x_k) = \mu_i(j|\alpha_j = 0) = \frac{\sum_{k'=1}^{m} w_{k'} 1_{k' \notin R_i}}{\sum_{k'=1}^{m} 1_{k' \notin R_i}}$$

Choosing $a_m = T$ maximizes p_m, because $\mu_i(j|\alpha_j = x_m) > \mu_i(j|\alpha_j = 0)$. That holds because x_m is bought by the highest types $[j_{m-1}, t]$.

Furthermore, there is no $a_{m'} \neq T$ such that, for any K, p_k given $a_{m'}$ is strictly larger than given $a_m = T$. If $i \notin a_k$, then $\mu_i(j|\alpha_j = x_k) = \mu_i(j|\alpha_j = 0)$ regardless of a_m, so the choice of a_m does not affect p_k. If $i \in a_k$, then $\mu_i(j|\alpha_j = x_k) = [w_{j_k - 1_{k\neq m}} + w_{j_{k-1}}]/2$ regardless of a_m. But

$$\mu_i(j|\alpha_j = x_k) = \frac{\sum_{k'=1}^{m} w_{k'} 1_{k' \notin R_i}}{\sum_{k'=1}^{m} 1_{k' \notin R_i}}$$

is strictly lower if $i \in a_m$ than if $i \in a_m$, again because x_m is bought by the highest types. Repeatedly applying this argument to x_{m-1}, x_{m-2} and so on yields the result.

Proof of Result 1. Applying $V(w) = ln(w)$ to (1) gives willingness to pay for x_k of

$$v(w_j) = w_j[1 - e^{-u_0 - \lambda(\mu_k - \mu_{not})}]$$

if j's best outside option is to only buy the composite good. Here μ_k is average beliefs if he buys x_k and μ_{not} if he only buys the composite good.

Say the firm sells a single variety to two types. By Theorem 1, it chooses $a_x = T$ and $p = v(w_2)$. For λ large, that gives approximately $p = (w_H + w_L)/2$ and $\pi = (w_H + w_L)$.

The firm can deviate by selling x_2 to $j = 3$ with $a_2 = T$, and selling x_1 to $j = 2$ with $a_1 = \{1, 2\}$. It can charge $p_1 = v(w_1)$ and $p_2 = v(w_2)$ where

$$p_1 = (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{3}}]$$

$$p_2 = w_H[1 - e^{-u_0 - \lambda(w_H - w_L)\frac{11}{12}}]$$

The terms in the exponents come from the following: $\mu_2 = w_H$ since all consumers recognize x_2, $\mu_1 = (2/3)[(w_L + w_H)/2] + (1/3)[(w_L + (w_L + w_H)/2)/2]$ since $j = 3$ believes such a consumer is either $j = 1$ or $j = 2$, and $\mu_{not} = (2/3)w_L + (1/3)[(w_L + (w_L + w_H)/2)/2]$ by the same reasoning. That gives

$$\pi = (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{3}}] + w_H[1 - e^{-u_0 - \lambda(w_H - w_L)\frac{11}{12}}]$$

which exceed profits from selling a single variety. If the firm instead chooses $a_1 = a_2 = T$ so all consumers are fully informed, it can charge

$$p'_1 = (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{2}}]$$

It charges $p'_2 < p_2$ to make $j = 3$ indifferent between x_2 and x_1.

$$ln(w_H - p'_2) + \lambda(w_H) = ln(w_H - p'_1) + \lambda(\frac{w_H + w_L}{2})$$

$$p'_2 = w_H[1 - e^{\frac{\lambda}{2}(w_H - w_L)}] + (\frac{w_H + w_L}{2})[1 - e^{-u_0 - \lambda \frac{w_H}{2}}]e^{\frac{\lambda}{2}(w_H - w_L)}$$

Profits are then $\pi' = p_1' + p_2'$, and only differ from π in terms multiplied by e to some power. Dividing $\pi' - \pi$ by $e^{-\lambda \frac{w_H}{3}}$ leaves only one term that is not e to some negative power of λ, which is $-[(w_H + w_L)/2]e^{-u_0}$. That implies $\pi' > \pi$ for λ sufficiently large.

Proof of Result 2. Let $s_f' = (p', a')$ be the firm's strategy from Theorem 1, so $a' = \{1, \ldots, T\}$ and p' such that j buys iff $j \geq j_0$. Let R' be the resulting revenue and π' the resulting profits, which differ by advertising costs Tc_a (small). So $R < R'$ and $\pi < \pi'$ for any $s_f \neq s_f'$. If consumers can search, the firm can always obtain revenue $R = R'$ and profits $\pi = \pi'$ in equilibrium by choosing $s_f = s_f'$.

I argue all consumers will be informed in equilibrium and $\alpha_j = x$ iff $j \geq j_0$. Say that were not the case. The firm must then have played some $s_f \neq s_f'$. It can deviate to s_f', giving revenues $R' > R$, where $R' - R$ is independent of c_a and c_s. It incurs extra costs proportional to c_a and independent of c_s. That is profitable as c_a is small.

Consumers $j < j_0$ will never search. They will not buy the good, so searching only costs them $c_s > 0$. They implies they must be informed through advertising, so $\{1, \ldots, j_0 - 1\} \subset a$.

Say the firm advertises to j_0, so $j_0 \in a$. Any type $j > j_0$ with $j \in a$ will search iff $v(j + 1)$ - $v(j_0) \geq c_s$. That is, if his willingness to pay exceeds the price by at least the search cost. That will hold for all $j \geq j'$, for j' defined as the lowest type in $\{j_0, \ldots, T\}$ such that $v(j' + 1) - v(j_0) \geq c_s$, or $j' = T$ if there is no such type. The firm can save cost c_a by not advertising to $j \geq j'$, while keeping p the same. That implies $a = \{1, \ldots, j'\}$.

Say instead $j_0 \notin a$. Type j must search to become informed, and the firm sets $p = v(j_0) - c_s$ to leave him indifferent. Willingness to pay is increasing in type, so all $j > j_0$ with $j \notin a$ will also search. That implies $a = \{1, \ldots, j_0 - 1\}$.

Any profitable deviation must involve increasing p, and so advertising to j_0. That would increase costs by c_a times a constant. The maximum price so that j_0 will still buy is $p = v(j_0)$, which increases revenue by c_s times a constant. The deviation is unprofitable iff c_s/c_a is sufficiently close to zero.

Proof of Theorem 4. Compensating variation is the transfer giving type j the same utility as if the firm did not sell the status good. Let μ_{not} be the average belief about j if $\alpha_j = \{\emptyset\}$ and μ_k if $\alpha_j = x_k$. Then we have

$$ln(w_j + \tau_\emptyset) + \lambda\mu_{not} = ln(w_j) + \lambda(\frac{w_H + w_L}{2})$$

$$\tau_\emptyset^j = w_j\{e^{-\lambda[\mu_{not} - (\frac{w_H + w_L}{2})]} - 1\}$$

$$ln(w_j - p_k + \tau_k) + \lambda\mu_k = ln(w_j) + \lambda(\frac{w_H + w_L}{2})$$

$$\tau_k^j = w_j\{e^{-u_0 - \lambda[\mu_k - (\frac{w_H + w_L}{2})]} - 1\} + p_k$$

As λ becomes small, $\tau_\emptyset^j$ tends to zero and τ_k^j tends to $w_j(e^{-u_0} - 1) + p_k$. $CV = \sum_{j=1}^n \tau_k^j$ where $\alpha_j = x_k$, and $(\pi - CV)$ just equals $-CV$ ignoring all terms p_k. So $(\pi - CV) = \sum_{j=1}^n [w_j(1 - e^{-u_0})]1_{\alpha_j \neq \emptyset} > 0$

From Theorem 2, the firm's strategy when λ is small is to divide the market into the same segments it would if $\lambda = 0$ and to sell variety k to $j \in [j_{k-1}, j_k)$. $V = ln$ implies $p_k = w_{j_{k-1}}(1 - e^{-u_0})$, so

$$\pi = (1-e^{-u_0})[(w_H - w_{j_{m-1}})w_{j_{m-1}} + (w_{j_{m-1}} - w_{j_{m-2}})w_{j_{m-2}} + \ldots + (w_{j_1} - w_{j_0})w_{j_0}]$$

Differentiating with respect to w_{j_k} for $k = 1, \ldots, M$ and solving for each j_k gives $w_{j_k} = \frac{w_H}{2^{m-k}}$, independent of λ and firm advertising. That implies $\pi - CV$ equals:

$$\frac{1}{2}\left\{[(\frac{w_H}{2^n})^2 - w_L^2](1-e^{-\lambda[\mu_{not}-(\frac{w_H+w_L}{2})]}) + \sum_{k=1}^{m}[(\frac{w_H}{2^{m-k}})^2 - (\frac{w_H}{2^{m-k+1}})^2](1-e^{-u_0-\lambda\mu_k-(\frac{w_H+w_L}{2})})\right\}$$

A small increase in non-targeted advertising increases the variation in beliefs. That is, μ_{not} will change by some small ϵ_0 and each μ_k by some small amount ϵ_k, where at least one such ϵ is non-zero. There also exists $k' < m$ such that $k < k'$ implies $\epsilon_k \leq 0$ and $k \geq k'$ implies $\epsilon_k \geq 0$.

The change in $\pi - CV$ from a small increase in non-targeted advertising is

$$\frac{1}{2}\lambda\left\{\epsilon_0[(\frac{w_H}{2^n})^2 - w_L^2]e^{-\lambda[\mu_{not}-(\frac{w_H+w_L}{2})]} + \sum_{k=1}^{m}\epsilon_k[(\frac{w_H}{2^{m-k}})^2 - (\frac{w_H}{2^{m-k+1}})^2](e^{-u_0-(\lambda\mu_k-(\frac{w_H+w_L}{2}))})\right\}$$

Let u_0 be small, λ tend to zero and factor the above expression to give

$$\frac{1}{2}\lambda\left\{\epsilon(\frac{w_H}{2^n} - w_L)(\frac{w_H}{2^n} + w_L) + \sum_{k=1}^{m}\epsilon_k(\frac{w_H}{2^{m-k}} - \frac{w_H}{2^{m-k+1}})(\frac{w_H}{2^{m-k}} + \frac{w_H}{2^{m-k+1}})\right\} \tag{3}$$

Advertising cannot change the average beliefs so

$$\epsilon_0(\frac{w_H}{2^n} - w_L) + \sum_{k=1}^{m}\epsilon_k(\frac{w_H}{2^{m-k}} - \frac{w_H}{2^{m-k+1}}) = 0$$

Expression (3) only differs from the above by a term multiplying each ϵ_k that is increasing in k. That implies (3) > 0.

If u_0 is not small, the first (negative) term in ((3)) is unchanged while e^{-u_0} multiplies the entire (positive) summation. Hence $\pi - CV$ decreases monotonically in u_0 and all terms except the first tend to zero, and (3) > 0.

Now say λ is not small. The firm does not sell to all consumers, so some consumers are believed to be of below average type. Note that p_k is bounded above for all k. The above expressions for τ shows that for all consumers believed to be below average type, τ increases without bound in λ. For all other consumers, τ decreases in λ and is bounded below by consumer wealth. So as λ becomes large, $(\pi - CV)$ decreases without bound.

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