Targeted Advertising and Social Status *

Nick Vikander †

January 2010

Abstract

This paper shows firms may use non-targeted advertising to exploit consumers' desire for social status. Each consumer cares about what other consumers believe about his wealth. Advertising transmits information allowing 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 that non-targeted, informative advertising can generate effects often associated with persuasion.

1 Introduction

Firms sometimes advertise high-end goods to a broad public, at a price that most people cannot afford. 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

*Comments on this paper are most welcome. I would like to thank my supervisor Maarten Janssen, Bauke Visser, Stefano Puntoni, Chaim Fershtman and Tore Ellingsen for helpful comments, as well as participants in the 2009 European Winter Meeting of the Econometric Society, ASSET 2009, and seminars in Amsterdam, Rotterdam, Stockholm and Copenhagen.

†Tinbergen Institute and Erasmus University Rotterdam, vikander@tinbergen.nl, www.tinbergen.nl/∼vikander

[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/

of thirty-five items from Elle's fall fashion section cost over $700, including a 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]

These firms could not reasonably expect most consumers they reach to buy their products. It would seem more efficient to target ads at consumers more likely to buy, which is after all what many firms do. They often put great effort into selecting which of distinct audiences to reach via specialized cable television, satellite radio, and magazines (Esteban et al. 2006).

Targeting technology also continues to improve. Different households watching the same program on cable tv may simultaneously receive different ads, and someone surfing the internet will receive ads based on his personal browsing history and the exact search query typed into Google or Yahoo (Johnson 2009). What then makes the above examples of non-targeted advertising so different?

This paper puts forward an explanation 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 buy and recognize goods.

Recognizing essentially means consumers can identify a good for what it is when they see it. An uninformed consumer who sees an iPhone would just believe it is a normal phone, but a consumer who recognizes it can infer something about the owner as someone who owns a high-end good. Broad advertising therefore helps consumers signal through their purchases.

This mechanism has much in common with previous economic analysis of social status, such as 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 the characteristic, either in absolute terms or compared to some reference point.[6]

These papers emphasize that signaling through consumption is only possible if goods are visible to others, since only then can they influence beliefs. I take the approach that visibility is not enough. Consumers must also recognize the good to understand what having it means, creating a role for non-targeted advertising.

This mechanism could only work for visible goods, which suggests why the above examples of non-targeted advertising are different. Cars, clothes and portable technology all tend to be highly visible.

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

[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.

sells one variety of the good, and then where it sells multiple varieties.

Wealth differs across consumers, and willingness to pay is increasing in wealth. Each consumer wants others to believe he is wealthy, where status utility depends on the average beliefs of other consumers.

Consumers are initially uninformed in two respects. They do not know where to buy any variety, and instead can only buy a composite good. They also cannot recognize any variety when bought by others, in the sense of distinguishing it from other varieties or from the composite good.

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

Without status effects, the firm would target advertising only at consumers it expects will buy. It would sell a single variety to all consumers whose wealth exceeds a certain level. With multiple varieties, it would divide the market and sell a different variety to each segment.

Status effects lead to non-targeted advertising. With one variety, the firm still only sells to consumers over a certain wealth, but now it advertises to all consumers. Those who buy the good are wealthier than those who do not, so buying sends a positive signal. The signal increases the incentive to buy, but only to the extent that consumers recognize the good. The firm therefore advertises to those who do not buy to increase the willingness to pay of those who do.

With multiple varieties, I derive the equilibrium when status effects are small. The firm divides the market into segments as before. It still advertises the highest-end variety to all consumers, even though that reduces the status of all other varieties. By an unraveling argument, it uses some non-targeted advertising for all varieties, even for those that give low status. Still, the firm does not advertise to wealthier consumers than those who buy because that would reduce its ability to price discriminate. That means high-end varieties are most broadly advertised, and poorer consumers receive many ads for varieties they cannot afford.

I then look at two specific cases to illustrate additional issues. The first case shows the firm may advertise all varieties to all consumers if status concerns are large. The second shows that the firm may still use non-targeted advertising if consumers can inform themselves through costly search.

Non-targeted targeting has an ambiguous effect on total welfare, but sale of the status good tends to hurt poorer consumers. Those who do not buy suffer because they are now revealed as being poor. Some consumers who buy each variety also suffer because sale of the status good affects their outside option. They pay a high price in equilibrium, and are willing to do so because not buying would suggest they are poor as well. If the firm sells enough varieties, all consumers may even be worse off.

The main contribution of the paper is to show how a firm's desire to exploit status effects can lead it to use non-targeted advertising. The idea is largely absent from the economics literature on advertising. To my knowledge, two other papers model how advertising can affect signaling by making goods easier to recognize.

In Wernerfelt (1990), firms compete in advertising to name products. They suggest through cheap talk what a particular product should signal, so that consumers who buy can express their type. Wernerfelt argues advertising can also promote signaling with vertical differentiation, and discusses an equilibrium where high types can only be recognized if they buy from firms with sufficient advertising. The relationship between advertising and consumer beliefs is defined solely by equilibrium conditions on the supply side of the market, something he admits is "not completely satisfactory".

Krahmer (2006) explores a mechanism similar to this paper, where advertising promotes conspicuous consumption by informing the public of brand names. He also argues the resulting effect on willingness to pay can be related to persuasive advertising.

In contrast, Krahmer assumes consumers are already fully informed about all goods. As such, he does not interpret the advertising as being informative. He looks at duopoly, and analyses how sequential advertising can impede entry. I look at a monopolist's incentive to target advertising at particular consumers, particularly when selling multiple varieties.

A related view in marketing is that a brand is an idea, which is more powerful if widely shared. More people should therefore be familiar with the brand than just the consumers who buy (Kotler and Keller 2008). It is precisely because everyone knows BMW and what it stands for, even those who will never buy a BMW car, that the brand has so much power (Kapferer 2008).

Advertising can play an important role in determining brand image (Keller 1993). In particular for luxury goods, Kapferer and Bastien (2009) mention that many more people should be familiar with the brand than those who could possibly afford to buy it for themselves. They contrast traditional advertising focused only on the target group, with the need to spread brand awareness more broadly.

A passage in Miller (2009)'s work on evolutionary psychology and consumerism gives perhaps the clearest expression of this idea:[7]

> "The luxury brands with the highest brand equity ... advertise in Vogue and GQ not so much to inform rich potential consumers that they exist, but to reassure rich potential consumers that poorer Vogue and GQ readers will recognize and respect these brands when they see them displayed by others" (Miller 126)

More generally, this paper is related to the consumer research literature on symbolic consumption. Levy (1959) argues possessions are not only important for what they are, but also for what they mean. People may consider possessions as an extension of the self, and they can help both to develop one's self-concept and to signal to others (Belk 1988). In particular, consumers often mention clothing, perfume and cars as means of self-expression (Aaker 1996). In Section 7, I argue the explicit depiction of consumer lifestyle in many ads supports the signaling mechanism of this paper.

[7] I would like to thank Ed Hopkins for bringing Miller's work to my attention.

Various other explanations have been put forward for non-targeted advertising. Targeting may simply be impossible because of imperfect technology, but that is not convincing for cases where the lack of targeting is extreme.

A related reason is that perfect targeting may be too costly. Advertising costs differ, and the cheapest way to reach a target market might be to advertise in media with a broader reach. Hernandez-Garcia (1997), Esteban et al. (2001), and Esteban et al. (2006) look at this cost reason and conclude that under quite general circumstances, targeting is still optimal.

Another type of explanation relates to anchoring. A consumer may feel something is a better deal if he knows about something similar but more expensive. That is, the utility from a particular choice may depend on the salient available alternatives (Swinkels and Samuelson 2006). Though plausible, that 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. Seemingly wasteful advertising may itself signal high quality (Nelson 1974). The mechanism here differs in that advertising does not signal anything, but instead helps consumers signal to one another. It is therefore not limited to experience goods, whose characteristics cannot be observed before purchase.

This paper also shows that non-targeted, informative advertising can generate effects more often associated with persuasive advertising.

Informative advertising transmits product information such as price, availability, characteristics or quality. It is direct if such credible information is directly included in the ad, as in 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 (Milgrom and Roberts 1986, Kihlstrom and Riordan 1984).

Persuasive advertising directly affects consumer preferences or utility. Advertising may actually change consumer preferences (Dixit and Norman 1978), or enter directly into the utility function as a complement to consumption (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 in this paper is direct and purely informative. It can be thought of as transmitting information about appearance, price, who will likely buy the variety, and where it can be purchased. Advertising a variety only to those consumers who buy generates a signal, but one that is quite weak. Non-targeted advertising informs more people, strengthening the signal and changing the status from that variety. That is related to the idea that persuasive advertising can generate prestige. Non-targeted advertising also increases the difference in status between different varieties by making consumers in each market segment easier to identify. In so doing, it further differentiates largely similar goods.

This work can also be related to models of consumption with network externalities, where advertising can also play a role. There, advertising can help consumers coordinate on purchases by acting as a public signal or promoting common knowledge about a product (Pastine and Pastine 2002, Chwe 2001).

The idea here differs in that consumers do not care directly about who else buys a particular good, but instead care about who is believed to do so.[8]

Section 2 presents the model, and Sections 3 and 4 analyze 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.

2 The Model

A monopolist faces a market of n consumers, divided equally into t types (n large, $\frac{n}{t} \in \mathbb{Z}^+$). Type is private information, and wealth is increasing linearly in type between lower bound w_L and upper bound w_H. A consumer of type j has wealth:

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

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.

The firm produces $m \geq 1$ varieties of a status good at constant marginal cost, normalized to zero, where m is exogenous. Each variety gives consumers the same intrinsic utility, and varieties 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 choosing, 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 $p(x_k) \in \mathbb{R}^+$. I write $a_k \equiv a(x_k)$ and $p_k \equiv p(x_k)$ for short.

The cost of advertising is small but strictly positive. That ensures the firm will not advertise unless doing so increases total revenues, while preventing cost considerations from being the main factor driving the choice of advertising. Instead of explicitly carrying a cost $c_a > 0$ through the analysis, I take the equivalent approach of setting $c_a = 0$ but assuming the firm uses a tie-breaking rule. It strictly prefers one strategy over another if it yields the same revenue but involves strictly less 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.

[8] I would like to thank Volker Nocke for suggesting this parallel.

After the firm sets prices and advertises, consumers respond by simultaneously 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 $s_i : B_j \rightarrow B_j \cup \{\emptyset\}$. 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 which equals u_0 for each variety.

The consumer's status utility depends on what other consumers believe about his wealth. It 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 the beliefs of consumer i' 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, the beliefs of consumer i' depend on whether he is informed about the variety consumer i buys.

The term $\lambda > 0$ reflects 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. If consumer i buys a variety of which i' is informed, then i' recognizes the 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' believes i is the expected type of someone who does not buy such a variety. 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, on how a consumer's wealth differs from the average wealth in society. The normalization would not

affect the equilibrium analysis, as it just corresponds to adding a constant to the 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 follow the same strategy.

3 Analysis - Single Variety

The number of consumers is large, so I can assume consumers do not condition their beliefs on their own type. Since I consider symmetric equilibria, I work with $n = t$ effective consumers and identify each one'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.

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 someone 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:

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

Informed consumers recognize consumer j has bought the status good and believe he has wealth w_{buy}. Uninformed consumers cannot distinguish him from those who only buy the composite good. They maintain the prior belief 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 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 from the status good, plus the benefit in status utility from buying.

Denote willingness to pay for the status good 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 that $w_j < v(j)$ for each consumer. That will hold if the marginal utility of wealth near zero is sufficiently high, for example if $V(w) = ln(w)$. Doing so avoids corner solutions which would not seem to yield any particular 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 in the same way whether he buys or not.

The concavity of V implies that $v(j)$ is increasing in j. Wealthier consumers are willing to pay more for the status good, regardless of $(w_{buy} - w_{not})$, because they have a lower marginal utility of wealth.

If all consumers buy the status good, then the term w_{not} in (1) is not well-defined. Willingness to pay will depend on the out-of-equilibrium beliefs about a consumer who deviates by only buying 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 given by (1) with $\lambda = 0$. Clearly, the firm would only advertise to those consumers it expects to buy the good.

The firm's optimal strategy in the presence of status effects differs in that it also advertises to all poorer consumers who it does not expect to buy the 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 or not. It sells the status good to all consumers wealthier than that

critical type. The firm advertises to all consumers, so if some consumers do not buy ($j_0 > 2$) then it uses non-targeted advertising.

The intuition for the result is as follows. When $\lambda = 0$, the firm wants to sell any given quantity to as wealthy consumers as possible because they have the highest willingness to pay. When $\lambda > 0$, status effects push the firm in the same direction. Wealthy consumers 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 over a critical type. It chooses the critical type 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 consumers who buy it, but also to less wealthy consumers who do not. Doing so increases the status utility from buying, which lets the firm charge a strictly higher price.

With wealth linearly increasing in type, a consumer's incentive to buy the status good is independent of exactly how exclusive the status good is. Willingness to pay depends on the fact that consumers only buy if they are above some critical type, but it does not depend on the value of that critical type.

If the critical type is high, then only the wealthiest consumers buy the status good. Buying signals very high wealth, while not buying only signals wealth is slightly below average. If the critical type is low, then many consumers buy the status good. Not buying signals very low wealth, while buying only signals wealth is slightly above average.

One case may seem like consumers want to differentiate themselves from others, and the other may seem like they want to conform. In fact, in both cases consumers are just concerned about beliefs about their own wealth. They are willing pay a high price either because buying suggests something very good, or because not buying suggests something very bad.

To choose the critical type 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 gave them intrinsic utility $u_0 + \lambda t[(w_H - w_L)/2] > u_0$.

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 to 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 $j_0 \geq 2$.

A qualitatively similar result would hold if λ was increasing in j, so if wealthier consumers cared more about status. Willingness to pay would still increase with type as long as $(w_{buy} - w_{not}) > 0$, which would again give the firm an

incentive to sell only to consumers above some critical type. The same would hold if λ was decreasing in j, as long as equilibrium willingness to pay $v(j)$ was still increasing in j. That would be the case if λ decreased slowly enough, so a high type's lower marginal utility of wealth outweighed his lower marginal utility from status.

4 Analysis - Multiple Varieties

I now consider the case where the firm sells multiple varieties ($m \geq 2$). I derive the equilibrium for when 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 without status effects, 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.

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

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

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

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 in $[j_0, j_1 - 1]$, variety x_2 to consumers in $[j_1, j_2 - 1]$ and so on, selling variety x_m to consumers in $[j_{m-1}, t]$. Consumers in $[w_L, j_0 - 1]$ only buy the composite good. The values $j_0, \ldots, j_{m-1}$ are the same the firm would choose if there were no status effects.[9] The firm sets a price for each variety to make the lowest type to buy it indifferent with only buying the composite good.

[9]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 $1_{k \neq m}$

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. In that case, the firm only advertises $m - 1$ of the m varieties to consumers in $[1, j_0 - 1]$. That is enough for them to distinguish between consumers in all market segments, since they know the single variety they do not recognize must be the one of which they are uninformed.

The multiple variety case shows the firm will again use non-targeted advertising to take advantage of status effects, and it yields a number of new insights.

First, the firm will advertise the highest-end variety to all consumers, even though that decreases the utility of poorer consumers to whom the firm wants to sell something else. The intuition is that the advertising may decrease a consumer's utility from buying a lower-end variety, but it will not decrease his willingness to pay.

Say the highest-end variety x_m is advertised to all lower types, and consider the willingness to pay of a consumer who buys x_k in equilibrium. Someone who was uninformed about both x_m and x_k will downgrade his beliefs about those who buy a variety he does not recognize, since he now knows they are not among the highest types. He downgrades his beliefs about consumers who buy x_k, but also about consumers who only buy the composite good. Buying the composite good is everyone's best outside option, so the consumer in question is now worse off regardless of his purchasing decision. His willingness to pay for x_k is unchanged.

Second, for each variety, the firm will use non-targeted advertising to inform some consumers who do not buy it, regardless of whether buying that variety signals high or low wealth.

The intuition is that broadly advertising a high-end variety generates an unraveling effect. Consumers who buy x_m are the highest types, and they are willing to pay more if other can recognize x_m. Advertising x_m to all poorer consumers leaves x_{m-1} as the highest-end variety that some consumers may not recognize. Consumers are willing to pay more for x_{m-1} if it is widely recognized, since they can then distinguish themselves from all lower types. Continuing in this way, even consumers who buy the lowest-end variety x_1 want to distinguish themselves from still lower types who only buy the composite good.

These two points imply the firm's equilibrium price for each variety is higher than it would be under targeted advertising. The result would be unchanged if λ varied monotonically with type.

Third, non-targeted advertising causes similar goods to become increasingly differentiated. The varieties are identical in terms of intrinsic utility, but would already differ somewhat in equilibrium if the firm only used targeted advertising. Buying a particular variety would send a signal, since each consumer would recognize others who buy the same variety. But the signal would be weak, because the consumer could not distinguish between others who buy different varieties. Non-targeted advertising informs him of other varieties and increases the strength of the signal, reducing the status utility from low-end varieties while increasing that from high-end varieties.

Fourth, a tension exists between exploiting status effects and price discrim-

ination. The firm only uses non-targeted advertising for a variety x_k towards poorer consumers than those who buy it. The unraveling argument suggests the firm could further exploit status effects by also advertising x_k to wealthier consumers. The problem is that advertising x_k to wealthier consumers would reduce the firm's ability to price discriminate. Consumers who buy a variety $x_{k'}$ with $k' > k$ are willing to pay a high price because of their low marginal utility of wealth. 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. As λ is small, this negative effect outweighs any positive effect the advertising generates through status effects.

One feature of the equilibrium is therefore that lower types receive more ads than higher types. They are better informed, and so better able to distinguish between consumers who buy different varieties. Being better informed does not leave them better off, since all ads they receive but one are for expensive varieties they are unwilling to buy.

Another feature of the equilibrium is that each consumer is better able to distinguish between consumers who are wealthier than him, than between those who are poorer. Each 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. Being uninformed about all lower-end varieties implies he has just a single belief about poorer consumers who buy any one of them.

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 is apparent in the optimal price p_k as given by (2), which 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 that or any higher variety. 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 to buy a variety are fully informed, and so can precisely identify anyone who only buys 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 to 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 a variety x_1 that is 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 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 holds because the 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 pay 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 who it does. It expects some of the later group to search and inform themselves.

I examine a simple set-up 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 let $c_a > 0$ be the 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 $s_f = (a, p)$, where p is arbitrarily close to that given in Theorem 1. Consumers choose $\alpha_j = x$ 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 search instead. 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. It will not advertise to these consumers if their willingness to pay exceeds the price by more than c_s, since they are then willing to bear the cost of informing themselves. As search costs decrease, the firm advertises to fewer and fewer consumers.

An extreme case is 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 and total welfare.

The first result 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 values from Theorem 2. Then there exist positive constants $\Delta_0 < (j_1 - j_0), \Delta_1 < (j_2 - j_1), \ldots, \Delta_{m-1} \leq (t - j_{m-1})$ 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 his utility when the firm sells the status good minus his 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 type 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.

□

The result says there are consumers in each market 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, which decreases 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 negative. So even consumers who buy a variety that gives them high status may be made worse off because of the high price they pay. 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 if 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, 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 selling the status good has a negative effect on consumer welfare if $CV > 0$, and a negative effect on total welfare if $\pi - CV < 0$. 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 it 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 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 consumer wealth is 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 to make status 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 status concerns 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 or not it uses non-targeted advertising. 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 poor to 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 gave more status than before, they would only be willing to give up a slightly higher transfer. 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 status concerns 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 from above by total consumer 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 mech-

anism 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 itself has little to say about whether a firm would include price information in its ads.[10] Formally, advertising affects social status just 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, be it price, appearance or some feature of the target market.

Here, price only has an indirect effect on social status by influencing beliefs about the wealth of those who buy. The most direct way to exploit status effects would seem to be to suggest just who these consumers are. That squares well with what many firms actually do in their ads.

Levy (1963) argues that when visibility is high, one important thing possessions can signal is a consumer's lifestyle. Ads often depict carefully selected lifestyle categories of consumers, so consumption choices can tell us a person's social type (Englis and Solomon 1995). For example, ads of Louis Vuitton suggest a connection with wealth and sophistication.

Depicting lifestyle is most important for products where reference groups play an important role (Bearden and Etzel 1982). One important reference group consists of other consumers who buy the brand, and who thus share a social connection (Muniz and O'Guinn 2001). In this sense, imagery that makes associations about the typical brand user can strengthen brand image (Escalas and Bettman 2003). Firm sometimes make the reference group explicit by using obvious group members as spokespersons in advertisements (Kotler and Keller 2008).

Reference groups other than typical brand users may also be important, such as groups that buyers aspire to join, and lifestyles portrayed in advertising are often idealized (Englis and Solomon 1995). Still, the above evidence lends credence to the mechanism explored in this paper. It shows firms are preoccupied with what people will believe about those who buy their goods, and use advertising to explicitly suggest what these beliefs should be.

The model also suggests something more 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, allowing consumers to recognize the variety when they see it and also to buy it themselves.

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. It could send an ad focussing on image, making it more likely consumers will remember the good and thus recognize it when they see it. It could also send an ad focussing on content, which is more likely to transmit practical information about where to

[10] Most economic models of advertising cannot address 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 characteristics. Even there, it is always optimal in a weak sense to advertise the price. Rational consumers will anticipate the price whether it is advertised or not.

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 exclusively focusses on image. 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 use 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 promotes conspicuous consumption, not through persuasion, but just by transmitting information. 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 affect what 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.

I would also like to explore how the mechanism in this paper relates to comparative advertising, where one firm's ads refer to a rival firm's products. One piece of unfavourable information about a low-end good is that consumers who buy it are poor, so they may lose social status if the good is widely recognized. It would be interesting to see if a rival firm selling a high-end good might use comparative advertising to inform consumers about the low-end good, ensuring it is recognized and thus obtaining a competitive advantage.

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 the 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 must leave only buying the composite good as each consumer's best outside option. 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 type's 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:

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

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 $i \notin a_m$, 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 $c_s > 0$. That 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

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

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.

References

Aaker, D. A. (1996). *Building Strong Brands*. New York: The Free Press.

Ackerberg, D. A. (2001, Summer). Empirically distinguishing informative and prestige effects of advertising. *RAND Journal of Economics 32*(2), 316–33.

Anderson, S. P. and R. Renault (2006, March). Advertising content. *American Economic Review 96*(1), 93–113.

Bagwell, K. and G. Ramey (1994, January). Advertising and coordination. *Review of Economic Studies 61*(1), 153–72.

Bagwell, L. S. and B. D. Bernheim (1996, June). Veblen effects in a theory of conspicuous consumption. *American Economic Review 86*(3), 349–73.

Bearden, W. O. and M. J. Etzel (1982, September). Reference group influence on product and brand purchase decisions. *Journal of Consumer Research: An Interdisciplinary Quarterly 9*(2), 183–94.

Becker, G. S. and K. M. Murphy (1993, November). A simple theory of advertising as a good or bad. *The Quarterly Journal of Economics 108*(4), 941–64.

Belk, R. W. (1988, September). Possessions and the extended self. *Journal of Consumer Research: An Interdisciplinary Quarterly 15*(2), 139–68.

Bernheim, B. D. (1994, October). A theory of conformity. *Journal of Political Economy 102*(5), 841–77.

Butters, G. R. (1977). Equilibrium distributions of sales and advertising prices. *The Review of Economic Studies 44*(3), 465–491.

Chwe, M. S.-Y. (2001). *Rational Ritual: Culture, Coordination, and Common Knowledge*. Princeton: Princeton University Press.

Dixit, A. and V. Norman (1978). Advertising and welfare. *The Bell Journal of Economics 9*(1), 1–17.

Englis, B. G. and M. R. Solomon (1995, Spring). To be and not to be: Lifestyle imagery, reference groups, and the clustering of america. *Journal of Advertising 24*(1), 13–28.

Escalas, J. E. and J. R. Bettman (2003). You are what they eat: The influence of reference groups on consumers' connections to brands. *Journal of Consumer Psychology 13*(3), 339–48.

Esteban, L., A. Gil, and J. M. Hernandez (2001, June). Informative advertising and optimal targeting in a monopoly. *Journal of Industrial Economics 49*(2), 161–80.

Esteban, L., J. M. Hernandez, and J. L. Moraga-Gonzalez (2006, March). Customer directed advertising and product quality. *Journal of Economic & Management Strategy 15*(4), 943–68.

Fehr, E. and K. M. Schmidt (1999, August). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics 114*(3), 817–868.

Frank, R. H. (1985, March). The demand for unobservable and other nonpositional goods. *American Economic Review 75*(1), 101–16.

Grossman, G. M. and C. Shapiro (1984, January). Informative advertising with differentiated products. *Review of Economic Studies 51*(1), 63–81.

Hernandez-Garcia, J. M. (1997, August). Informative advertising, imperfect targeting and welfare. *Economics Letters 55*(1), 131–137.

Ireland, N. J. (1994, January). On limiting the market for status signals. *Journal of Public Economics 53*(1), 91–110.

Janssen, M. C. and M. C. Non (2008, January). Advertising and consumer search in a duopoly model. *International Journal of Industrial Organization 26*(1), 354–371.

Johnson, J. P. (2009). Targeted advertising and advertising avoidance. *Mimeo, Johnson Graduate School of Management, Cornell University*.

Kapferer, J. (2008). *The New Strategic Brand Management*. Kogan Page.

Kapferer, J. and V. Bastien (2009). *The Luxury Strategy: Break the Rules of Marketing to Build Luxury Brands*. London: Kogan Page.

Keller, K. L. (1993). Conceptualising, measuring and managing cutomer-based brand equity. *Journal of Marketing 57*(1), 1–22.

Kihlstrom, R. E. and M. H. Riordan (1984, June). Advertising as a signal. *Journal of Political Economy 92*(3), 427–50.

Kotler, P. and K. Keller (2008). *Marketing Management (13th Edition)*. Prentice Hall.

Krahmer, D. (2006, December). Advertising and conspicuous consumption. *Journal of Institutional and Theoretical Economics (JITE) 162*(4), 661–682.

Levy, S. J. (1959, July-August). Symbols for sale. *Harvard Business Review 37*(4), 117–24.

Levy, S. J. (1963). Symbolism and lifestyle. *Proceedings, American Marketing Association Conference*, 140–50.

Meurer, M. and D. I. Stahl (1994, March). Informative advertising and product match. *International Journal of Industrial Organization 12*(1), 1–19.

Milgrom, P. and J. Roberts (1986, August). Price and advertising signals of product quality. *Journal of Political Economy 94*(4), 796–821.

Miller, G. (2009). *Spent: Sex, Evolution, and the Secrets of Consumerism*. London: Random House.

Muniz, Albert M, J. and T. C. O'Guinn (2001, March). Brand community. *Journal of Consumer Research: An Interdisciplinary Quarterly 27*(4), 412–32.

Nelson, P. (1974, July/Aug.). Advertising as information. *Journal of Political Economy 82*(4), 729–54.

Pastine, I. and T. Pastine (2002, August). Comsumption externalities, coordination, and advertising. *International Economic Review 43*(3), 919–943.

Stigler, G. J. and G. S. Becker (1977, March). De gustibus non est disputandum. *American Economic Review 67*(2), 76–90.

Swinkels, J. M. and L. Samuelson (2006, March). Information, evolution and utility. *Theoretical Economics 1*(1), 119–142.

Veblen, T. (1899). *The Theory of the Leisure Class*. Penguin Classics.

Wernerfelt, B. (1990, January). Advertising content when brand choice is a signal. *Journal of Business 63*(1), 91–98.