Inconspicuous Conspicuous Consumption*

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Abstract

A puzzling feature of conspicuous consumption, given its signaling role, is that it is not *more* conspicuous. For example, luxury goods often feature subtle, difficult-to-recognize branding. We analyze a model where consumers care about their reputation for wealth and social capital. In equilibrium, wealthy but poorly-connected consumers choose loud status goods, while wealthy, well-connected consumers choose subtle status goods to separate from poorly-connected consumers. The model thus explains why "old-money" types consume subtly, whereas "nouveau-riche" types consume loudly. It also addresses the stylized fact that subtly-branded status goods tend to be pricier than their loudly-branded equivalents.

Keywords: conspicuous consumption, signaling, status, social capital, cultural capital.

JEL Classification Numbers: D11, D82, D43.

1 Introduction

In his critique of the Gilded Age, Veblen (1899) introduced the idea that conspicuous spending serves as a costly signal of wealth. Subsequently, a number of papers (e.g. Bagwell and Bernheim (1996), Charles et al. (2009), etc.) have modeled conspicuous consumption as the equilibrium outcome of a signaling game. In these models, wealthy consumers separate from poor consumers by consuming *status goods* despite the availability of cheaper functional substitutes. Veblen (1899) gives the example of hand-made silverware: "A hand-wrought silver spoon ... is not ordinarily more serviceable ... than a machine-made spoon of the same material."

Yet the example of silverware highlights a puzzling aspect of conspicuous consumption: it is often *subtle*, in the sense that it is difficult for others to observe and recognize. Hand-wrought silverware only signals wealth to dinner guests. Someone who wishes to signal his wealth as clearly as possible can do better: acknowledging this puzzle, Bagwell and Bernheim (1996) suggest publishing "tax returns or audited asset statements".

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We argue that people engage in subtly conspicuous consumption to simultaneously signal wealth *and* social capital. Here, social capital is about *connectedness* —a measure of the relationships that enable access to potentially valuable resources through social interaction; or, as Glaeser et al. (2002) put it, "the size of [one's] Rolodex".[1] People care a great deal about others' perceptions of their connectedness, and often attempt to signal their social capital by name-dropping: advertising their relationships with influential individuals such as celebrities or politicians. This leads naturally to our premise that status goods may be used to signal social capital in addition to pecuniary wealth.

Consider the following example. Adam is wealthy and socially well-connected. He can distinguish himself from less wealthy individuals by consuming costly status goods; for example, he might purchase an expensive car to drive around town. However, if Adam seeks to demonstrate that he is well-connected as well as wealthy, his consumption choice also has to distinguish him from wealthy, poorly-connected individuals. Thus, a better option might be buying an expensive painting to display in his living room. His guests, observing the painting, and noting that only Adam's guests ever observe it, infer that he is well-connected because using this painting as a signal of his type is cost-effective only if Adam's parties are attended by people who Adam seeks to impress.

This example illustrates the basic logic of our theory, and highlights the key role that subtlety plays. *Subtle* status goods are imperfectly observable in a specific way: they are easily recognized only in the course of close social interaction. Otherwise, subtle consumption may be mistaken for nonconsumption of status goods; either because subtle consumption is restricted to specific social settings (e.g., art that is displayed at home) or because subtle consumption is difficult to distinguish for non-status goods (e.g., luxury handbags versus generic alternatives). On the other hand, *loud* status goods (e.g., an expensive, flashy car) are easily recognized regardless of whether the observer is interacting closely with the consumer.

We develop a simple, stylized model where a consumer seeks to simultaneously influence a random observer's perception of his wealth and social capital. The consumer chooses between a *loud* status good and a *subtle* status good. (He can also choose non-consumption.) The loud good is always recognized by the observer, while the subtle good may be mistaken for non-consumption unless the consumer and observer interact closely. Importantly, a well-connected consumer is more likely to interact closely with the observer. This last assumption reflects the premise that connectedness measures the strength of the consumer's relationships with influential and important individuals or groups who the consumer seeks to impress. A highly-connected consumer's encounters with such observers tend to be closer and more intense, so these observers can more accurately discern the consumer's consumption choices.

The key prediction of the model is that wealthy, well-connected individuals consume subtly, whereas wealthy, poorly-connected individuals consume loudly. To highlight the relevance of this result, consider examples of consumption patterns in different settings:

[1] Bourdieu (1983), somewhat less succinctly, defines social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition".

Luxury Goods Many luxury goods brands have a product range that encompasses both subtle and loud forms of conspicuous consumption. For example, some handbag designs often come in multiple varieties. Loud varieties are prominently labeled with logos or brand motifs, whereas subtle varieties are unmarked or subtly marked. The loud Burberry Holdall bag in panel (a) of Figure 1 uses the classic checkered canvas that is Burberry's hallmark, whereas its subtle counterpart in panel (b) shows only a very small logo near the top. Further, the marketing strategies of these brands often insinuate that the subtler varieties of each item signal higher social status.[2] Our theory provides some insight into this phenomenon: the status associated with subtly-branded goods is recognition that their consumers are socially well-connected.

Figure (a) Traditional canvas check, $1,150

Figure (b) Nylon with leather trim, $1,495

Figure 1: Burberry Holdall Bag.
Source: `https://us.burberry.com/mens-bags`, accessed 28th of July 2015.

Old Money versus Nouveau Riche Conventional wisdom often associates loud consumption with the *nouveau riche*: those who have recently become wealthy. On the other hand, subtle consumption is associated with *old money*: those whose families have been wealthy for generations. Our interpretation is that old-money types possess large amounts of social capital, as they have been able to develop social connections over time, whereas the nouveau riche, who acquired wealth only recently, have accumulated little social capital. A striking example is found in Beal (2000), who categorizes wealthy Jordanian households into "two distinct and conflicting factions – old-money elites whose wealth was established prior to the flood of petrodollars into the country and new-money elites who came by their wealth primarily after 1973." Consistent with our theory's predictions, Beal (2000) describes old-money types as consuming subtly, in a way that concealed said consumption from public view: "The villa ... is, in contrast to many of Amman's new villas, located a considerable distance from the road and rather nondescript in exterior appearance ... The sitting room was stuffed full of richly embroidered and gilded furniture." In contrast, she describes the new-money types as consuming loudly: "The homes

[2]In the words of Tomas Maier, creative director at Bottega Veneta, "It's about a whisper, not a shout."

of the new elite ... scream their opulence at passers-by ... expensive cars driven in a reckless fashion throughout Amman's residential neighbourhoods."

Cultural Capital Many forms of cultural knowledge, such as appreciation of music, art or wine, qualify as subtle status goods in our theory: they (i) are costly to acquire, and (ii) being tacit in nature, can only be recognized through extensive social interaction. Such cultural knowledge is identified in the sociological literature as *embodied* cultural capital (Bourdieu (1983)). This literature emphasizes that cultural knowledge, being costly to acquire and difficult to discern, functions as a status good. Taking the perspective that cultural capital serves as a *subtle* good relative to material status goods, our model predicts that individuals with high social capital prefer cultural consumption, whereas people with low social capital favour material status goods.

Our stylized model also has implications for the aggregate distribution of conspicuous consumption. It predicts that the number of consumers who consume subtly, as a fraction of all consumers of status goods, increases with the value of signaling social connectedness. Consequently, loud consumption may be more prevalent, compared to subtle consumption, in social groups where social capital is relatively less valuable. It also predicts that as inequality increases, in the sense that wealth becomes concentrated in a smaller fraction of consumers, loud conspicuous consumption becomes more common.

Finally, we examine the pricing implications of our model. Berger and Ward (2010) and Han et al. (2010) provide evidence that subtle status goods are more expensive than loud status alternatives. In particular, Han et al. (2010) examine three types of status goods —designer handbags, high-end cars, and designer men's shoes— and show that subjective measures of brand prominence are negatively correlated with price. Some casual evidence that we have gathered in Appendix D indicates the same pattern. For example, the subtle Burberry bag in Figure 1b is 30 percent ($345) more expensive than the loud one in Figure 1a.[3] Our theory provides a simple economic explanation for this stylized fact. We show that under reasonable assumptions, a monopolist who sells both a loud good and a subtle good will set a higher price for the subtle good. The monopolist can extract more rents from highly-connected consumers by making the subtle good more exclusive, so that the signaling value of the subtle good increases. Interestingly, by doing so, the monopolist also increases the signaling value of the loud good, because medium-high types who would originally have purchased the subtle good fall back and pool with the lower types in purchasing the loud good. Thus, the monopolist extracts more rents over the range of types by setting a higher price for the subtle good than the loud good.

Related Literature There is a significant economic literature on costly status signaling, starting with Veblen (1899). Our main contribution is to develop a link between subtle conspicuity and the need to signal social connectedness. Closest to our paper is Feltovich et al. (2002), who analyze the phenomenon of *countersignaling*. In their model, when observers have costless access to a noisy signal about the (unidimensional) consumer's type, high-type consumers may choose not to invest in a separate costly signal that is

[3]Prices in U.S. dollars obtained from Burberry's website `https://us.burberry.com/mens-bags`, accessed the 28th of July 2015. Additional evidence is presented in Appendix D.

correlated with type, in order to separate from medium types. Thus, countersignaling takes the form of *no signal* rather than a subtle but costly signal.

A number of papers explore the price theory of status goods, mainly focusing on settings with unidimensional types (wealth). Bagwell and Bernheim (1996) treat the case of perfect competition, and derive conditions under which Veblen effects (i.e. consumption as a signal of wealth) arise. Kuksov and Wang (2012) show that in a competitive market for status goods, the need for exclusivity may induce randomness in "fashion" trends (i.e., which good signals status in equilibrium). Pesendorfer (1995) and Rao and Schaefer (2013) consider the dynamic problem faced by a monopolistic producer of status goods. Pesendorfer (1995) shows how "fashion cycles" may arise in equilibrium due to a Coase-Conjecture-esque effect whereby the monopolist gradually reduces the price of a good, thus increasing its accessibility to the broader population over time. Rao and Schaefer (2013) show that status goods experience sharper price depreciations over time than non-status goods. Amaldoss and Jain (2005) discuss optimal monopoly pricing in a setting where some consumers seek to distinguish themselves, whereas others seek to conform in their consumption choices. We view our contribution as complementary to these analyses, as we focus on a novel aspect of conspicuous consumption —the observed subtlety of status goods— while abstracting from many of the issues that these papers analyze.

Recent work in the marketing literature (e.g., Berger and Ward 2010, Han et al. 2010, Yoganarasimhan 2012) argue that subtle status goods serve as a marker of cultural or stylistic knowledge that can only be recognized by the appropriate in-group. There, subtlety is an effective signaling device of group membership only because out-groups lack the requisite knowledge to imitate in-groups' consumption choices. In contrast, our analysis emphasizes that consumers are consuming subtly not to signal their cultural knowledge, but rather to signal their social capital. Importantly, our model explains why subtle signaling may be credible even if consumption choices can be imitated.

The rest of the paper is organized as follows. Section 2 describes the model. Section 3 presents the main result —that well-connected types consume subtly while poorly-connected types consume loudly— and discusses some comparative statics. We endogenize prices in Section 4, and show that a monopolist optimally charges more for the subtle good than the loud good. Further results and omitted proofs are presented in the Appendices. In particular, Appendix D discusses anecdotal evidence that subtle luxury goods are priced higher than their loud equivalents.

2 The Model

Consumers are distinguished by two attributes, *wealth* and social *connectedness*. There is a unit mass of *wealthy consumers* who have identically high wealth ($w = w_H$) but differ in connectedness. Amongst wealthy consumers, connectedness θ is distributed with density f on $\Theta = [\underline{\theta}, \infty)$, $\underline{\theta} > 0$, and has finite mean, $\mathbb{E}[\theta] < \infty$. There is also mass $\rho > 0$ of *poor consumers* who have low wealth ($w_L < w_H$) and low social connectedness ($\theta_L < \underline{\theta}$). For convenience, we normalize $w_L = 0$ and $\theta_L = 0$.

A consumer (he) is randomly drawn from the population. The consumer may purchase a single unit of either a *loud* status good ($x = \ell$) or a *subtle* status good ($x = s$). Denote the non-consumption option by $x = \varnothing$. Each status good x costs $p_x > 0$ whereas non-consumption costs zero, $p_\varnothing = 0$. Poor consumers choose non-consumption by default,[4] so we focus on wealthy consumers' choices.

After choosing consumption, the wealthy consumer meets an observer (she) who is either *discerning* or *undiscerning*. All observers can recognize loud consumption, but unlike a discerning observer, an undiscerning observer cannot distinguish between non-consumption and subtle consumption. Specifically, the observer receives a signal $y \in \{y_\varnothing, y_\ell, y_s\}$ that depends on the consumer's consumption choice and her own type. If the consumer chooses $x \in \{\varnothing, \ell, s\}$, then the observer receives the corresponding signal y_x *except* in the case of subtle consumption $x = s$ and an undiscerning observer; in that case the observer receives signal $y_\varnothing$. A consumer with connectedness $\theta \in \Theta$ encounters a discerning observer with probability $\eta(\theta) > 0$, where $\eta(0) = 0$, $\eta' > 0$, and $\eta(\theta) \to 1$ as $\theta \to \infty$. This captures the premise that well-connected consumers are more likely to encounter discerning observers.

The observer's posterior *belief* $\mu(w, \theta \mid y)$ is a probability distribution over consumer types, as a function of signal y. Note that the observer does not know her own type (discerning or non-discerning) when forming beliefs; we relax this assumption in Appendix B. The consumer cares about the observer's ex-post evaluation of his wealth and connectedness: he wants to be perceived as wealthy and well-connected. The consumer's expected *signaling payoff*, given signal realization y and belief function μ, is a weighted average of observer's expectations about the consumer's wealth and connectedness:

$$u(y, \mu) \;=\; \mathbb{E}_\mu\big[w \,\big|\, y\big] \;+\; \beta\, \mathbb{E}_\mu\big[\theta \,\big|\, y\big], \tag{1}$$

where $\beta > 0$ is the relative weight of social connectedness. The *expected utility* of a θ-type consumer who consumes $x \in \{\varnothing, \ell, s\}$ is simply his expected signaling payoff, less the cost of consumption:

$$U(x, \theta, \mu) \;=\; \mathbb{E}\big[u(y, \mu) \,\big|\, x\big] \;-\; p_x.$$

In this consumer–observer signaling game, a *strategy* for the wealthy consumer is a mapping σ from Θ to probability distributions over available choices $\{\varnothing, \ell, s\}$. Given prices p_ℓ, p_s, a perfect Bayesian *equilibrium* is a strategy for the wealthy consumer and a belief function for the observer such that (i) the consumer's strategy is a best-response to the observer's beliefs, and (ii) the observer's beliefs are consistent with Bayes' rule and the consumer's strategy. We place no restrictions on out-of-equilibrium beliefs; consequently, the analysis does not establish that the equilibria of interest are unique.

Throughout the paper we maintain the following assumption, which simplifies the characterization of equilibrium outcomes in knife-edge cases.

Assumption 1. If a consumer is indifferent between some form of conspicuous consumption versus non-consumption, then he always chooses conspicuous consumption.

2.1 Discussion

Before proceeding to the analysis, let us discuss some assumptions of the model.

[4] Borrowing is not possible in our model. If we relax this constraint, then we can still ensure that poor agents do not consume by imposing Spence-Mirrlees type conditions on consumer preferences.

We separate the role of consumer and observer in the model. More realistically, we might expect consumers and observers to be the same group of people: consumers seek to impress their peers, who are also consumers of conspicuous goods. This separation of roles is not crucial to the analysis: we may simply assert that the signalling game represents a one-shot social interaction which takes place after consumer and observer are randomly drawn from the same population and matched. The observer's type – discerning or undiscerning – then reflects the nature of this interaction.

The assumption that the observer does not know her own type when forming beliefs allows us to focus cleanly on the tradeoff between loud and subtle signaling, and produce clear predictions about conspicuous consumption patterns. We also think that this assumption is natural: it reflects the premise that observed consumption choices are used as a simple heuristic to judge social status. In Appendix B, we consider a version of the model where the observer knows her own type, and thus forms posterior beliefs based on both the signal y and her type. Most of our main insights are preserved, but require stronger assumptions.

3 Equilibrium Consumption Patterns

In this section, taking prices as given, we show that equilibria always involve low-θ (high-θ) types consuming loudly (subtly), and perform comparative statics.

3.1 Loud vs. Subtle Consumption

We start by highlighting the interaction between the consumer's connectedness θ and his consumption choice. Write the consumer's expected utility as a function of his consumption choice:

$$\begin{aligned} U(\varnothing,\theta,\mu) &= u(y_\varnothing,\mu), &(2)\\ U(\ell,\theta,\mu) &= u(y_\ell,\mu) - p_\ell, &(3)\\ U(s,\theta,\mu) &= \eta(\theta)\,u(y_s,\mu) + (1-\eta(\theta))\,u(y_\varnothing,\mu) - p_s. &(4)\end{aligned}$$

Fixing the observer's belief μ, all θ-types who choose loud consumption (non-consumption) receive the same expected utility. To ease notation, omit θ from the argument in those cases, and write these expected utilities as $U(\varnothing,\mu)$ and $U(\ell,\mu)$. The expected utility of a wealthy consumer who chooses subtle consumption depends on his connectedness; a higher θ improves the chances that he will meet a discerning observer who recognizes subtle consumption.

Our first result states the key insight of this paper: whenever subtle consumption occurs, it is always associated with high connectedness. In particular, there is *no* equilibrium where poorly-connected consumers consume subtly, whereas their well-connected peers consume loudly.

Proposition 1. *In equilibrium, if some type $\theta \in \Theta$ chooses $x = s$ with positive probability, then all types $\theta' > \theta$ consume $x = s$ with probability* 1.

Proof. Accepting the premise that $\sigma(s|\theta) > 0$ for some $\theta \in \Theta$ and given equilibrium beliefs μ of the observer, we must have $U(s, \theta, \mu) - U(\ell, \mu) \geq 0$ and $U(s, \theta, \mu) - U(\varnothing, \mu) \geq 0$. Using Eq. (2) and (4) in the last equilibrium condition, one obtains

$$\eta(\theta)\big[u(y_s, \mu) \ - \ u(y_\varnothing, \mu)\big] \ \geq \ p_s \ > \ 0.$$

Since $u(y_s, \mu) > u(y_\varnothing, \mu)$, it follows that the expected utility $U(s, \cdot, \mu)$ is strictly increasing in the social connectedness parameter. Therefore, for all $\theta' > \theta$,

$$U(s, \theta', \mu) \ > \ U(\ell, \mu) \qquad \text{and} \qquad U(s, \theta', \mu) \ > \ U(\varnothing, \mu).$$

All wealthy consumers with $\theta' > \theta$ strictly prefer subtle consumption to loud consumption and non-consumption, thus $\sigma(s|\theta') = 1$ as claimed. □

Proposition 1 shows that subtle consumption is monotone in θ; if any type consumes subtly, then all higher types consume subtly as well. This monotonicity arises because the payoffs to subtle consumption relative to loud and non-consumption are monotone in connectedness θ. On the other hand, for wealthy but poorly connected consumers subtle consumption is an ineffective signal, strictly dominated by non-consumption. Thus low-θ consumers choose either loud or non-consumption, depending on whether the benefit of signaling wealth (but low connectedness) exceeds the cost of the loud good. Appealing to Assumption 1, we obtain the following corollary.

Corollary 1. *In any equilibrium strategy σ for the wealthy consumer, there exists $\theta^* \in [\underline{\theta}, \infty]$ such that all wealthy consumers with $\theta < \theta^*$ choose the same option $x \in \{\varnothing, \ell\}$, and all wealthy consumers with $\theta > \theta^*$ choose $x = s$.*

Corollary 1 simplifies the classification of equilibria. First, there exist equilibria where all (wealthy) consumers make the same consumption choice; these correspond to either $\theta^* = 0$ or $\theta^* = \infty$. Such equilibria are supported by the appropriate off-path beliefs; for example, an equilibrium where all wealthy consumers consume loudly is supported by the belief that buyers of the subtle status good are poorly-connected. Second, there exist equilibria where consumers below the threshold θ^* choose non-consumption, whereas consumers above the threshold choose subtle consumption. These two classes of equilibria are of less interest to us; instead we focus in the third class of equilibria, where loud and subtle consumption co-exist.

Definition 1. An equilibrium is *full* if for each status good $x \in \{\ell, s\}$, there is a strictly positive mass of wealthy consumers that choose x.

Combined with Corollary 1, Assumption 1 ensures that in a full equilibrium all wealthy consumers consume either loudly or subtly. Consequently, a full equilibrium is characterized by a threshold $\theta^* \in (\underline{\theta}, \infty)$ such that all types $\underline{\theta} \leqslant \theta < \theta^*$ choose to consume loudly and all types $\theta > \theta^*$ choose to consume subtly. Thus we restrict attention to such *threshold strategies* for the wealthy consumer which, slightly abusing notation, are denoted by $\sigma[\theta^*]$. Correspondingly, define a *threshold belief* $\mu[\theta^*]$ for the observer to be a belief function that is consistent with threshold strategy $\sigma[\theta^*]$. A full equilibrium then corresponds to a threshold θ^* and associated threshold strategies and beliefs $(\sigma[\theta^*], \mu[\theta^*])$ such that

$$U(\ell, \mu[\theta^*]) \;\geqslant\; U(\varnothing, \mu[\theta^*]), \tag{5}$$

$$U(s, \theta^*, \mu[\theta^*]) \;=\; U(\ell, \mu[\theta^*]). \tag{6}$$

Equation 5 states that all wealthy consumers prefer loud consumption to non-consumption, while Equation 6 specifies that the threshold type-θ^* consumer is indifferent between loud and subtle consumption.

We now discuss how inferences about consumption choices change with the threshold θ^*. Under threshold beliefs $\mu[\theta^*]$, the signaling payoffs derived from y_ℓ and y_s are

$$u\left(y_\ell, \mu[\theta^*]\right) \;=\; \mathbb{E}_{\mu[\theta^*]}\big[w \,\big|\, y_\ell\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \,\big|\, y_\ell\big] \tag{7}$$

and similarly

$$u\left(y_s, \mu[\theta^*]\right) \;=\; \mathbb{E}_{\mu[\theta^*]}\big[w \mid y_s\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_s\big]. \tag{8}$$

From Equation 7 and Equation 8, the signaling payoff from both signals y_ℓ, y_s is increasing in the threshold θ^*. Intuitively, a higher threshold type θ^* means that subtle consumption is more 'exclusive', so that y_s signals, on average, higher θ-type. At the same time, a higher threshold type also increases the signaling payoff from loud consumption: marginal types switch from subtle consumption to loud consumption, thus expanding rightward the distribution of types consuming loudly.

The consumer's signaling payoff from signal $y_\varnothing$ given threshold belief $\mu[\theta^*]$ is

$$u\left(y_\varnothing, \mu[\theta^*]\right) \;=\; \mathbb{E}_{\mu[\theta^*]}\big[w \mid y_\varnothing\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\varnothing\big]. \tag{9}$$

The first term (wealth signaling effect) of Equation 9 is decreasing in the threshold type θ^*, as a higher threshold implies the observer expects fewer wealthy consumers to purchase the subtle status good. The effect of θ^* on the second term (connectedness signaling effect) of Equation 9 is ambiguous. As before, a higher threshold type makes subtle consumption more exclusive. However, a higher threshold type also increases the likelihood of $y_\varnothing$ being generated by non-consumption instead subtle consumption. To resolve this ambiguity and obtain clean comparative statics, we introduce the following assumption about the degree of wealth concentration, which is maintained for the rest of this section.

Assumption 2. There is a large number of poor consumers – specifically,

$$\rho \;\geqslant\; \frac{\int_{\underline{\theta}}^{\infty} (\theta - \underline{\theta})(1 - \eta(\theta) f(\theta)\, d\theta}{\underline{\theta}}.$$

Loosely speaking, Assumption 2 rules out countersignaling, whereby non-consumption is perceived by the observer as a signal that the consumer is likely to be a highly connected type. Consequently, with a sufficiently large number of poor unconnected consumers, the signaling value of non-consumption is strictly decreasing in the threshold θ^*. The following summarizes these observations.

Lemma 1. *Suppose the observer maintains threshold beliefs $\mu[\theta^*]$. Then the signaling* *payoff for the consumer generated by signal $y_\varnothing$ is decreasing in the threshold type θ^*, and the signaling payoffs generated by signals y_ℓ and y_s are both increasing in θ^*.*

Proof. See Appendix A. □

3.2 Existence of Equilibrium

Let us briefly discuss conditions on prices p_s and p_ℓ that ensure the existence of a full equilibrium. Equation 5 suggests that the price of the loud good cannot be too high; otherwise non-consumption would always be preferred to loud consumption. Equation 6 suggests that the subtle good should be expensive compared to the loud good, so that some wealthy types prefer loud consumption over subtle consumption. These two points are made precise in the following lemma.

Lemma 2. *Suppose the observer maintains threshold beliefs.*

(a) Equation 5 holds for some threshold type $\theta^*_\ell \in \Theta$ if, and only if, the price of the loud good satisfies

$$p_\ell \ < \ w_H \ + \ \beta\,\mathbb{E}\big[\theta\big].$$

In this case, the inequality in Equation 5 is strictly satisfied for all $\theta^* > \theta^*_\ell$.

(b) Given threshold θ^*, there exists a unique $\delta(\theta^*) \in \mathbb{R}$ such that Equation 6 is satisfied for any pair of prices satisfying $p_s - p_\ell = \delta(\theta^*)$. Furthermore, $\delta(\cdot)$ is continuous and $\delta(\theta^*) \to \infty$ as $\theta^* \to \infty$.

Proof. See Appendix A. □

Note, from Lemma 2(b), that it is always possible to guarantee an interior threshold type who is indifferent between loud and subtle consumption by making the relative price of subtle consumption arbitrarily high. In other words, subtle consumption can be supported for a very large threshold θ^* by pricing the subtle status good sufficiently high. We apply Lemma 2 to show that a full equilibrium exists if (i) loud consumption is not too costly, and (ii) subtle consumption is sufficiently costly relative to loud consumption.

Proposition 2. *Given any $p_\ell < w_H + \beta\,\mathbb{E}\big[\theta\big]$, there exists $\hat{\delta} \in \mathbb{R}$ such that a full equilibrium exists for all $p_s \geqslant p_\ell + \hat{\delta}$.*

Proof. Fix $p_\ell < w_H + \beta\,\mathbb{E}[\theta]$. By Lemma 2(a), there exists θ^*_ℓ so that Eq. (5) holds for all threshold beliefs $\mu[\theta^*]$ with $\theta^* > \theta^*_\ell$. Because $\lim_{\theta^* \to \infty} \delta(\theta^*) = \infty$ by Lemma 2(b), we may pick a type $\hat{\theta} \geqslant \theta^*_\ell$ such that $\delta(\hat{\theta}) \geqslant \delta(\theta^*_\ell)$. Let $\hat{\delta} \equiv \delta(\hat{\theta})$ and choose any p_s such that $p_s - p_\ell \geqslant \hat{\delta}$. Because $\delta(\cdot)$ is continuous and increases without bound, there exists $\theta^* > \hat{\theta}$ such that $p_s - p_\ell = \delta(\theta^*) \geqslant \hat{\delta}$. It follows that both Eq. (5) and Eq. (6) hold, given the specified prices p_s, p_ℓ and threshold beliefs $\mu[\theta^*]$. □

Proposition 2 ensures existence but not uniqueness of full equilibria. In fact, multiple full equilibria may exist. Such multiplicity arises if complementarities in consumption choices are sufficiently strong. In particular, two thresholds θ^* and $\theta^{**} > \theta^*$ correspond to distinct equilibria if the rightward shift in the observer's beliefs from θ^* to θ^{**} increases the value of loud consumption relative to subtle consumption, so that in the equilibrium associated with the threshold θ^{**}, consumers in the interval (θ^*, θ^{**}) now prefer to consume loudly.

3.3 Comparative Statics

This subsection studies how changes in the economic environment affect consumption patterns of status goods. In particular, we are interested in understanding how the shares of loud and subtle consumption in a full equilibrium respond to variations in the exogenous parameters $\{\beta, w_H, \rho\}$. Note that given density f, these quantities are summarized by the equilibrium threshold type θ^*. One complication in our analysis is that for any given set of parameters values of the model, there may be multiple full equilibria which have different comparative static properties. We focus on what we call *normal* equilibria.

Definition 2. A full equilibrium $(\sigma[\theta^*], \mu[\theta^*])$ is said to be *normal* if $d\big\{U(s, \theta, \mu[\theta]) - U(\ell, \mu[\theta])\big\}/d\theta > 0$ at $\theta = \theta^*$.

One can readily provide conditions on prices to ensure that if equilibria exist, then at least one is normal.[5] Therefore, a unique full equilibrium must be normal. Normal equilibria are stable to small perturbations in beliefs, and thus are more likely to survive small amounts of noise in the economic environment. To formalize this point, in Appendix C we construct an intuitive tatonnement process and show that following a small perturbation of the observer's ex-ante beliefs away from equilibrium, the tantonnement process converges towards the original equilibrium if and only if it is normal.

This definition of normality also ensures that comparative statics are well-defined. In particular, suppose that $(\sigma[\theta^*], \mu[\theta^*])$ is a normal equilibrium for parameters $\{\beta_0, w_{H,0}, \rho_0\}$, and that Equation 5 holds strictly. Then by the Implicit Function Theorem, for any $\{\beta, w_H, \rho\}$ in some neighbourhood of $\{\beta_0, w_{H,0}, \rho_0\}$, there exists a locally unique threshold type $\theta^*(\beta, w_H, \rho)$ such that $(\sigma[\theta^*(\beta, w_H, \rho)], \mu[\theta^*(\beta, w_H, \rho)])$ is a normal equilibrium. The following proposition summarizes comparative static properties of $\theta^*(\beta, w_H, \rho)$.

Proposition 3. *Suppose* $(\sigma[\theta^*], \mu[\theta^*])$ *is a normal equilibrium. Then:*

(a) If $p_s \geqslant p_l$ *then* θ^* *is decreasing in* β*;*

(b) θ^* *is increasing in* w_H*;*

(c) θ^* *is increasing in* ρ*.*

Proof. See Appendix A. □

The extent of subtle consumption is increasing in β. Intuitively, a higher value in the parameter β increases the value of signaling high social status relative to the value of signaling wealth. The marginal consumer θ^*, who was previously indifferent to either form of conspicuous consumption, now finds subtle consumption more valuable. As a

[5] For example, if in addition to the condition in Lemma 2(a), the price difference between subtle and loud status goods satisfies $p_s - p_\ell > (1 - \eta(\underline{\theta}))\, \beta\, \mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big]$, then there exists at least one normal equilibrium. We comment on this point after the proof of Lemma 2 in Appendix A.

result, more consumers choose the subtle status good. We can interpret β as a measure of the returns to social capital in a community: the greater is β, the more valuable social connections are. This result thus generates the cross-sectional prediction that, ceteris paribus, communities where social capital is more important relative to material wealth engage in more subtle consumption and less loud consumption in aggregate. Applying a similar argument, we may show that subtle consumption is decreasing in wealth w_H. This may explain why societies that experience a sudden increase in wealth may develop 'nouveau riche' consumption patterns, devoting a large proportion of their expenditure to flashy conspicuous goods.

The extent of subtle consumption is decreasing in the mass ρ of poor consumers. As ρ increases, an observer who observes $y_\varnothing$ decreases her posterior likelihood that the consumer is wealthy. On the other hand, ρ has no direct effect on the payoff to loud conspicuous consumption. As a result, subtle consumption becomes relatively less valuable (and less popular) because of the risk of inducing signal $y_\varnothing$. One implication of this result is that as wealth concentration becomes more severe (so that the proportion ρ of poor consumers and the wealth w_H of wealthy consumers both increase), there is a shift from subtle towards loud signaling.

4 Endogenous Prices

So far, our analysis has assumed that prices are exogenous. In this section, we consider the problem of a monopolist (it) who chooses prices of the loud and subtle goods at the start of the game to maximize profits. An equilibrium is then a pair of prices $p_\ell, p_s > 0$ together with a consumer's strategy and an observer's belief function that (given p_ℓ and p_s) constitute a perfect Bayesian equilibrium of the consumer-observer subgame. To keep matters simple, we assume that the monopolist produces both the loud and subtle good at zero marginal cost. The monopolist's profit function is then

$$\pi \;=\; m_s p_s \;+\; m_\ell p_\ell,$$

where m_x is the mass of consumers who choose good $x \in \{\ell, s\}$.

An equilibrium is called *profit-maximizing* if no other equilibrium produces strictly higher profits for the monopolist. Implicit in this definition is the premise that the monopolist can also resolve equilibrium multiplicity in its favor: given the exogenous parameters $\{\rho, w_H, \beta, f\}$ and given its choice of prices p_ℓ, p_s, the monopolist can select any threshold θ^* for which $(\sigma[\theta^*], \mu[\theta^*])$ constitutes an equilibrium of the consumer–observer signaling game.

We are interested the relative pricing of loud versus subtle goods. Consequently, we focus on profit-maximizing full equilibria. To allow for the existence of full equilibria with endogenous prices, we let the consumer's payoff be *concave* in the observer's beliefs about connectedness θ. This generalization does not affect the results from Section 3; specifically, Proposition 1, Proposition 2 and Proposition 3 continue to hold with minor adjustments. Let $v\colon \Theta \to \mathbb{R}$ be an increasing concave function, so that its inverse v^{-1} is increasing and convex. The consumer's signaling payoff given signal y and belief function

μ is now

$$\hat{u}(y,\mu) \;=\; \underbrace{\mathbb{E}_\mu\big[w \mid y\big]}_{\hat{u}_w} \;+\; \underbrace{\beta\, v^{-1}\big(\mathbb{E}_\mu\big[v(\theta) \mid y\big]\big)}_{\hat{u}_\theta}. \tag{10}$$

Notice that the payoff function in Eq. (1) from Section 2 corresponds to the expositionally convenient special case where v is linear. With concave v, consumers are better off when the observer's posterior belief about θ becomes more precise. In particular, $\hat{u}_\theta \leqslant \beta\left(\mathbb{E}_\mu\big[\theta \mid y\big]\right)$, with equality if and only if the observer knows θ with certainty, or v is linear. In other words, separation of types may increase the benefits from signaling when the function v is concave, but not if v is linear or convex. In fact, with a linear v, one can show that the profit maximizing equilibrium involves all (wealthy) consumers purchasing the loud good and nobody purchasing the subtle good. This outcome is clearly uninteresting given our focus on relative prices. On the other hand, with strictly concave v, the profit-maximizing equilibrium exists and is full for a wide range of parameter values.[6] For example, with $\beta = 1, w_H = 1, \eta(\theta) \equiv \frac{\theta}{1+\theta}, \underline{\theta} = 1, f(\theta) \equiv e^{-(\theta-\underline{\theta})}$, and $v(x) \equiv \sqrt{x}$, the profit-maximizing equilibrium is full for all $\rho > 0$.

Given this modification, we alter Assumption 2 accordingly to continue to rule out countersignaling.

Assumption 3. There is a large number of poor consumers, specifically,

$$\rho \;\geqslant\; \frac{\int_{\underline{\theta}}^{\infty}(v(\theta) - v(\underline{\theta}))(1-\eta(\theta)f(\theta)\,d\theta}{v(\underline{\theta})}.$$

In a profit-maximizing full equilibrium, the monopolist raises prices until all low types (up to the threshold consumer θ^*) are indifferent between non-consumption and loud consumption, given the correct threshold belief $\mu[\theta^*]$ by the observer. Combined with the condition that the threshold consumer must also be indifferent between loud and subtle consumption, this pins down prices as a function of the threshold θ^*:

$$p_\ell(\theta^*) \;=\; \hat{u}(y_\ell, \mu[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu[\theta^*]), \qquad \text{and} \tag{11}$$

$$p_s(\theta^*) \;=\; \eta(\theta^*)\big[\hat{u}(y_s, \mu[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu[\theta^*])\big]. \tag{12}$$

Following a line of argument similar to Lemma 1, we can use Assumption 3 to show that these two expressions are increasing in θ^*.

The main result of this section is that, in a full equilibrium, the monopolist optimally sets a strictly higher price for the subtle good than the loud good.

Proposition 4. *If the profit-maximizing equilibrium is full, then $p_s > p_\ell$.*

Proof. To obtain a contradiction, assume that there exists a profit-maximizing full equilibrium where $p_s \leqslant p_\ell$. Let θ^* be the corresponding threshold type. Using Eq. (11) and Eq. (12), total profits for the firm are equal to

$$\pi(\theta^*) \;=\; p_\ell(\theta^*)\,F(\theta^*) \;+\; p_s(\theta^*)\,(1-F(\theta^*)).$$

[6] In Appendix B we show that a profit-maximizing equilibrium always exists (see Proposition 5), but may not always be full.

Differentiating with respect to θ^* obtains

$$\begin{aligned}\frac{d\pi(\theta^*)}{d\theta^*} &= p'_\ell(\theta^*)F(\theta^*) + p_\ell(\theta^*)f(\theta^*) + p'_s(\theta^*)(1-F(\theta^*)) - p_s(\theta^*)f(\theta^*) \\ &= p'_\ell(\theta^*)F(\theta^*) + p'_s(\theta^*)(1-F(\theta^*)) + (p_\ell(\theta^*) - p_s(\theta^*))f(\theta^*) > 0.\end{aligned}$$

That is, a small increase in threshold from θ^* results in an increase in profits, which contradicts the premise that θ^* is the profit-maximizing equilibrium threshold. □

The intuition for Proposition 4 is as follows. Remember that the signaling payoff to both loud consumption and subtle consumption is increasing in θ^*; that is, fixing consumption choice, both loud and subtle consumers benefit from an increase in the threshold θ^* (at the expense of non-consumers). The monopolist can thus maximize rent extraction by pushing θ^* as high as possible; it does so by setting a high price for the subtle good relative to the loud good, so that only high-θ types choose the subtle good.

5 Conclusion

We explain the consumption of subtle status goods as an attempt to signal social capital in addition to wealth. The defining characteristic of subtle consumption is that it is relatively easy to recognize in the context of social interaction. We argue that this theory explains important facts about consumption patterns —in particular, why "old money" types focus on subtle consumption such as cultural knowledge, whereas "nouveau riche" types focus on loud material consumption. Our theory suggests that the existing economic literature on conspicuous consumption is missing key aspects of status signaling by focusing solely on wealth. In particular, it is neglecting explicit treatments of social and cultural capital, both of which have been emphasized by the sociological literature on status.

Relatedly, a number of empirical studies have documented differences across ethnic, geographic and cultural groups in the extent of conspicuous consumption.[7] Our distinction between loud and subtle status goods suggests a novel perspective on this issue: differences in measured conspicuous consumption across groups may be driven by differences in the nature, rather than the extent, of conspicuous consumption. In particular, standard measures of conspicuous consumption may neglect less tangible forms of subtle consumption such as cultural capital, and thus underestimate the extent of conspicuous consumption in groups that favour subtle consumption.

In our discussion of cultural capital as subtle consumption, and throughout the paper, we have emphasized a specific interpretation of the model whereby observers recognize cultural knowledge through close social interaction. Let us briefly mention a distinct but complementary interpretation of our model whereby connectedness is not about interacting more closely with observers, but about interacting with particularly knowledgeable observers. Specifically, a subset of observers are *connoisseurs* who can discern subtle consumption from non-consumption. For example, connoisseurs may be cultural experts

[7]For example, Charles et al. (2009) show that differences in conspicuous consumption across ethnic groups can be attributed to differences in group-level income distributions. Relatedly, Feltovich and Ejebu (2014) and Roth (2015) demonstrate strong peer effects in individuals' conspicuous consumption choices.

who can distinguish true art aficionados from dilettantes. Connectedness is then a measure of the consumer's frequency of interaction with connoisseurs vs. non-connoisseurs. Highly-connected consumers are those who are more likely to interact with connoisseurs and thus have subtle consumption recognized. Both interpretations capture the idea that connectedness is about knowing the 'right' people, but they differ on specifying who the 'right' people are, and on what drives the interaction between subtlety and connectedness.

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Appendix

A Omitted Proofs from Main Text

Proof of Lemma 1. Under threshold beliefs $\mu[\theta^*]$ of the observer one has

$$u\left(y_\ell, \mu[\theta^*]\right) \;=\; \mathbb{E}_{\mu[\theta^*]}\big[w \,\big|\, y_\ell\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \,\big|\, y_\ell\big] \;=\; w_H \;+\; \beta\, \frac{\int_{\underline{\theta}}^{\theta^*} \theta f(\theta)\, d\theta}{F(\theta^*)} \tag{13}$$

and

$$u\left(y_s, \mu[\theta^*]\right) \;=\; \mathbb{E}_{\mu[\theta^*]}\big[w \mid y_s\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_s\big] \;=\; w_H \;+\; \beta\, \frac{\int_{\theta^*}^{\infty} \theta\, \eta(\theta) f(\theta)\, d\theta}{\int_{\theta^*}^{\infty} \eta(\theta) f(\theta)\, d\theta}. \tag{14}$$

The fact that $u(y_\ell, \mu[\theta^*])$ and $u(y_s, \mu(\theta^*))$ are both increasing in θ^* follows directly from differentiating Eq. (13) and Eq. (14) with respect to θ^*.

On the other hand, the signaling payoff of $y_\varnothing$ given threshold belief $\mu[\theta^*]$ is

$$\begin{aligned} u\left(y_\varnothing, \mu[\theta^*]\right) \;&=\; \mathbb{E}_{\mu[\theta^*]}\big[w \mid y_\varnothing\big] \;+\; \beta\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\varnothing\big] \\ &=\; \frac{\int_{\theta^*}^{\infty} w_H (1-\eta(\theta)) f(\theta)\, d\theta}{\rho + \int_{\theta^*}^{\infty} (1-\eta(\theta)) f(\theta)\, d\theta} \;+\; \beta\, \frac{\int_{\theta^*}^{\infty} \theta (1-\eta(\theta)) f(\theta)\, d\theta}{\rho + \int_{\theta^*}^{\infty} (1-\eta(\theta)) f(\theta)\, d\theta}. \end{aligned} \tag{15}$$

It is clear that the derivative of the first term of the right-hand side of Eq. (15) with respect to θ^* is negative. For the second term we obtain

$$\begin{aligned} &\frac{d}{d\theta^*} \left\{ \frac{\int_{\theta^*}^{\infty} \theta (1-\eta(\theta)) f(\theta)\, d\theta}{\rho + \int_{\theta^*}^{\infty} (1-\eta(\theta)) f(\theta)\, d\theta} \right\} \\ &\qquad =\; -\, \frac{(1-\eta(\theta^*)) f(\theta^*) \Big[\rho\theta^* - \int_{\theta^*}^{\infty} (\theta - \theta^*)(1-\eta(\theta)) f(\theta)\, d\theta\Big]}{\big(\rho + \int_{\theta^*}^{\infty} (1-\eta(\theta)) f(\theta)\, d\theta\big)^2}. \end{aligned}$$

Thus, it suffices to show that for all $\theta^* > \underline{\theta}$,

$$\phi(\theta^*) \;\equiv\; \rho\theta^* \;-\; \int_{\theta^*}^{\infty} (\theta - \theta^*)(1-\eta(\theta)) f(\theta)\, d\theta \;>\; 0.$$

Observe that for all such θ^*,

$$\phi'(\theta^*) \;=\; \rho + \int_{\theta^*}^{\infty} (1-\eta(\theta)) f(\theta)\, d\theta \;>\; 0.$$

Noticing that $\phi(\underline{\theta}) \geqslant 0$ by Assumption 2, we obtain the desired conclusion. □

Proof of Lemma 2. (a) Given that the observer maintains threshold beliefs $\mu[\theta^*]$, the utility difference between loud and non-consumption is

$$\Delta U_{\ell,\varnothing}(\theta^*) \;\equiv\; U(\ell, \mu[\theta^*]) \;-\; U(\varnothing, \mu[\theta^*]) \;=\; u(y_\ell, \mu[\theta^*]) \;-\; u(y_\varnothing, \mu[\theta^*]) \;-\; p_\ell.$$

From Lemma 1, $\Delta U_{\ell,\varnothing}$ is strictly increasing in the threshold type. Thus, to obtain existence of $\theta^*_\ell \in \Theta$ for which $\Delta U_{\ell,\varnothing}(\theta^*_\ell) \geqslant 0$, it is sufficient as well as necessary that

$$\lim_{\theta^*\to\infty} \Delta U_{\ell,\varnothing}(\theta^*) \;=\; w_H \,+\, \beta\,\mathbb{E}\big[\theta\big] \,-\, p_\ell \;>\; 0,$$

which is precisely what the restriction on p_ℓ requires. It is clear that for all threshold types above θ^*_ℓ, the expression becomes strictly positive.

(b) Under threshold beliefs $\mu[\theta^*]$ from the part of the observer, the utility difference between subtle and loud consumption for the wealthy θ^* consumer is

$$\begin{aligned}
\Delta U_{s,\ell}(\theta^*) \;&\equiv\; U(s,\theta^*,\mu[\theta^*]) \,-\, U(\ell,\mu[\theta^*]) \\
&=\; \eta(\theta^*)\big\{w_H \,+\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_s\big]\big\} \\
&\qquad +\; (1-\eta(\theta^*))\big\{\mathbb{E}_{\mu[\theta^*]}\big[w \mid y_\varnothing\big] \,+\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\varnothing\big]\big\} \\
&\qquad -\; w_H \,-\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\ell\big] \,-\, \{p_s \,-\, p_\ell\}.
\end{aligned} \tag{16}$$

For fixed θ^*, let $\delta(\theta^*)$ be the unique value to satisfy

$$\begin{aligned}
\delta(\theta^*) \;=\; &\eta(\theta^*)\big\{w_H \,+\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_s\big]\big\} \,+\, (1-\eta(\theta^*))\big\{\mathbb{E}_{\mu[\theta^*]}\big[w \mid y_\varnothing\big] \,+\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\varnothing\big]\big\} \\
&-\; w_H \,-\, \beta\,\mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\ell\big].
\end{aligned}$$

It is easy to check that $\delta(\cdot)$ is continuous in θ^* and goes to infinity as $\theta^* \to \infty$. Moreover, setting $p_s - p_\ell = \delta(\theta^*)$ obtains $\Delta U_{s,\ell}(\theta^*) = 0$. This is clearly equivalent to the constraint of Eq. (6). □

Remark. We comment now on the existence of normal equilibria. Evaluated at $\underline{\theta}$, the difference in Eq. (16) takes value

$$\begin{aligned}
\Delta U_{s,\ell}(\underline{\theta}) \;&=\; \eta(\underline{\theta})\big\{w_H \,+\, \beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_s\big]\big\} \,+\, (1-\eta(\underline{\theta}))\big\{\mathbb{E}_{\mu(\underline{\theta})}\big[w \mid y_\varnothing\big] \,+\, \beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big]\big\} \\
&\qquad -\; w_H \,-\, \beta\,\underline{\theta} \,-\, \{p_s \,-\, p_\ell\} \\
&\leqslant\; \eta(\underline{\theta})\,\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_s\big] \,+\, (1-\eta(\underline{\theta}))\,\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big] \,-\, \beta\,\underline{\theta} \,-\, \{p_s \,-\, p_\ell\}.
\end{aligned}$$

Note that $\mathbb{E}[\theta\eta(\theta)] \geqslant \underline{\theta}$. When prices are such that $p_s - p_\ell > (1-\eta(\underline{\theta}))\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big]$, we see that

$$\begin{aligned}
p_s \,-\, p_\ell \;&>\; (1-\eta(\underline{\theta}))\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big] \,+\, \beta\,\mathbb{E}\big[\theta\eta(\theta)\big] \,-\, \beta\,\underline{\theta} \\
&=\; (1-\eta(\underline{\theta}))\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big] \,+\, \beta\,\frac{\eta(\underline{\theta})\int_{\underline{\theta}}^{\infty}\theta\eta(\theta)f(\theta)\,d\theta}{\int_{\underline{\theta}}^{\infty}\eta(\underline{\theta})f(\theta)\,d\theta} \,-\, \beta\,\underline{\theta} \\
&\geqslant\; (1-\eta(\underline{\theta}))\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big] \,+\, \beta\,\frac{\eta(\underline{\theta})\int_{\underline{\theta}}^{\infty}\theta\eta(\theta)f(\theta)\,d\theta}{\int_{\underline{\theta}}^{\infty}\eta(\theta)f(\theta)\,d\theta} \,-\, \beta\,\underline{\theta} \\
&=\; (1-\eta(\underline{\theta}))\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_\varnothing\big] \,+\, \eta(\underline{\theta})\beta\,\mathbb{E}_{\mu(\underline{\theta})}\big[\theta \mid y_s\big] \,-\, \beta\,\underline{\theta}.
\end{aligned}$$

Combining these two observations obtains $\Delta U_{s,\ell}(\underline{\theta}) < 0$. On the other hand, it can be readily check that $\Delta U_{s,\ell}(\theta) \to \infty$ as $\theta \to \infty$. Since $\Delta U_{s,\ell}(\theta)$ is continuous in θ, there must be a type $\theta^* \in (\underline{\theta}, \infty)$ such that $\Delta U_{s,\ell}(\theta^*) = 0$, $\Delta U_{s,\ell}(\theta) < 0$ for $\theta < \theta^*$ sufficiently close to θ^*, and $\Delta U_{s,\ell}(\theta) > 0$ for $\theta > \theta^*$ sufficiently close θ^*. It follows that this θ^*-threshold constitutes a normal equilibrium.

Proof of Proposition 3. Let $(\sigma[\theta^*], \mu[\theta^*])$ be a normal equilibrium for $\theta^* = \theta^*(\beta, w_H, \rho)$.

(a) Explicitly considering the argument β in the difference function $\Delta U_{s,\ell}(\theta)$, we write $\Delta U_{s,\ell}(\theta, \beta)$ and seek to sign

$$\frac{\partial \theta^*}{\partial \beta} \;=\; -\,\frac{\partial \Delta U_{s,\ell}(\theta^*, \beta)/\partial\, \beta}{\partial \Delta U_{s,\ell}(\theta^*, \beta)/\partial\, \theta^*}.$$

Observe that

$$\begin{aligned}
\frac{\partial \Delta U_{s,\ell}(\theta^*, \beta)}{\partial \beta} \;&=\; \eta(\theta^*)\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_s\big] \;+\; (1-\eta(\theta^*)\, \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\varnothing\big] \;-\; \mathbb{E}_{\mu[\theta^*]}\big[\theta \mid y_\ell\big] \\
&=\; \frac{1}{\beta}\Big\{\Delta U_{s,\ell}(\theta^*, \beta) \;+\; (1-\eta(\theta^*))\big(w_H - \mathbb{E}_{\mu[\theta^*]}\big[w \mid y_\varnothing\big]\big) \;+\; p_s \;-\; p_\ell\Big\} \\
&>\; 0,
\end{aligned}$$

whenever $p_s \geq p_\ell$. Since $(\sigma[\theta^*], \mu[\theta^*])$ is assumed to be a normal equilibrium, we have that $\partial \Delta U_{s,\ell}(\theta^*, \beta)/\partial \theta^* > 0$. The desired conclusion now follows.

(b) As in (a), we want to sign

$$\frac{\partial \theta^*}{\partial w_H} \;=\; -\,\frac{\partial \Delta U_{s,\ell}(\theta^*, \beta)/\partial\, w_H}{\partial \Delta U_{s,\ell}(\theta^*, \beta)/\partial\, \theta^*},$$

where

$$\frac{\partial \Delta U_{s,\ell}(\theta^*, \beta)}{\partial w_H} \;=\; -\,\frac{(1-\eta(\theta^*)\rho}{\rho \;+\; \int_{\theta^*}^{\infty}(1-\eta(\tilde\theta))f(\tilde\theta)\, d\tilde\theta} \;<\; 0.$$

Since $(\sigma[\theta^*], \mu[\theta^*])$ is a normal equilibrium, the result follows.

(c) As before, we explicitly considered the argument ρ in the difference function $\Delta U_{s,\ell}(\theta, \rho)$ and obtain the sign of

$$\frac{\partial \theta^*}{\partial \rho} \;=\; -\,\frac{\partial \Delta U_{s,\ell}(\theta^*, \rho)/\partial\, \rho}{\partial \Delta U_{s,\ell}(\theta^*, \rho)/\partial\, \theta^*}.$$

Now,

$$\begin{aligned}
\frac{\partial \Delta U_{s,\ell}(\theta^*, \rho)}{\partial \rho} \;&=\; -\,\frac{1-\eta(\theta^*)}{\big(\rho + \int_{\theta^*}^{\infty}(1-\eta(\theta))f(\theta)\, d\theta\big)^2} \\
&\qquad \times \Big\{ w_H \int_{\theta^*}^{\infty}(1-\eta(\theta))f(\theta)\, d\theta \;+\; \beta \int_{\theta^*}^{\infty} \theta(1-\eta(\theta))f(\theta)\, d\theta \Big\} \\
&<\; 0.
\end{aligned}$$

Since by assumption $(\sigma[\theta^*], \mu[\theta^*])$ is a normal equilibrium, $\partial \Delta U_{s,\ell}(\theta^*, \rho)/\partial \theta^* > 0$. The conclusion now follows. $\square$

B Extensions

B.1 Existence of Profit-Maximizing Equilibria

In this section we show existence of profit-maximizing equilibria for the game discussed in Section 4.

Definition 3. An equilibrium $(\sigma[\theta^*], \mu[\theta^*], p_\ell, p_s)$ is *complete* if all consumers choose either loud consumption or subtle consumption. Otherwise, if any positive mass of consumers chooses non-consumption, the equilibrium is *incomplete.*

Notice that a full equilibrium is a complete equilibrium with an interior threshold type $\theta^* \in (\underline{\theta}, \infty)$. Denote an incomplete equilibrium by $(\sigma^\imath[\theta^*], \mu^\imath[\theta^*], p^\imath_\ell, p^\imath_s)$. Here, the marginal wealthy consumer θ^* must be indifferent between purchasing the subtle good and not entering the market. This determines $p^\imath_s$ as a function of θ^* (and implicitly the threshold belief $\mu^\imath$) via the expression

$$p^\imath_s(\theta^*) \;=\; \eta(\theta^*)\big[\hat{u}(y_s, \mu^\imath[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu^\imath[\theta^*])\big]. \tag{17}$$

Denote an complete equilibrium by $(\sigma^c[\theta^*], \mu^c[\theta^*], p^c_\ell, p^c_s)$. Here, the monopolist sets prices such that the threshold type θ^* is indifferent between purchasing the subtle good and purchasing the loud good, *and* in addition he is indifferent between purchasing the loud status good and not consuming at all, given the correct threshold belief $\mu^c[\theta^*]$ by the observer. If the threshold wealthy consumer instead strictly prefers loud consumption to the non-consumption option, then the monopolist can increase the price of both conspicuous goods in a way that maintains their difference constant and makes the threshold consumer indifferent between purchasing the loud status good and staying out of the market. This pins down both prices via the following expressions

$$\begin{aligned} p^c_\ell(\theta^*) \;&=\; \hat{u}(y_\ell, \mu^c[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu^c[\theta^*]), \qquad \text{and} & (18)\\ p^c_s(\theta^*) \;&=\; \eta(\theta^*)\big[\hat{u}(y_s, \mu^c[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu^c[\theta^*])\big]. & (19)\end{aligned}$$

Lemma 3. *One has that $\hat{u}(y_\varnothing, \mu^c[\theta^*])$ is decreasing in the threshold type θ^* if the observer maintains threshold beliefs $\mu^c[\theta^*]$, but $\hat{u}(y_\varnothing, \mu^\imath[\theta^*])$ is increasing in θ^* if the observer maintains threshold beliefs $\mu^\imath[\theta^*]$. Both $\hat{u}(y_\ell, \mu^c[\theta^*])$ and $\hat{u}(y_s, \mu^c[\theta^*]) = \hat{u}(y_s, \mu^\imath[\theta^*])$ are increasing in θ^*.*

Proof. The proof uses arguments similar to the proof of Lemma 1. We omit details. □

Proposition 5. *Suppose $v\colon \Theta \to \mathbb{R}$ is increasing and concave. Then a profit-maximizing equilibrium $(\sigma[\theta^*], \mu[\theta^*], p_\ell, p_s)$ exists.*

Proof. We start by focusing on complete equilibria, where the profit function for the monopolist is $\pi^c = p^c_\ell F(\theta^*) + p^c_s(1 - F(\theta^*))$. Using Eq. (18) and Eq. (19), this is

$$\begin{aligned} \pi^c(\theta^*) \;&=\; F(\theta^*)\big\{\hat{u}(y_\ell, \mu^c[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu^c[\theta^*])\big\}\\ &\quad+\; (1 - F(\theta^*))\eta(\theta^*)\big\{\hat{u}(y_s, \mu^c[\theta^*]) \;-\; \hat{u}(y_\varnothing, \mu^c[\theta^*])\big\}.\end{aligned}$$

We seek to show that $\sup\{\pi^c(\theta^*) \colon \theta^* \in [\underline{\theta}, \infty]\}$ is attained. Since the profit function is continuous, it suffices to show that $\lim_{\theta^*\to\infty} \pi^c(\theta^*) < \infty$. To that end, we express total profits as follows:

$$\begin{aligned}
\pi^c(\theta^*) \;&=\; F(\theta^*)\beta\, v^{-1}\left(\frac{\int_{\underline{\theta}}^{\theta^*} v(\theta) f(\theta)\, d\theta}{\int_{\underline{\theta}}^{\theta^*} f(\theta)\, d\theta}\right) \;+\; (1-F(\theta^*))\eta(\theta^*)\beta\, v^{-1}\left(\frac{\int_{\theta^*}^{\infty} v(\theta)\eta(\theta) f(\theta)\, d\theta}{\int_{\theta^*}^{\infty} \eta(\theta) f(\theta)\, d\theta}\right) \\
&\quad+\; \big(F(\theta^*) \,+\, (1-F(\theta^*))\eta(\theta^*)\big)\big[w_H \,-\, \hat{u}\big(y_\varnothing, \mu^c[\theta^*]\big)\big] \\
&\leqslant\; F(\theta^*)\,\beta\,\frac{\int_{\underline{\theta}}^{\theta^*} \theta f(\theta)\, d\theta}{\int_{\underline{\theta}}^{\theta^*} f(\theta)\, d\theta} \;+\; (1-F(\theta^*))\eta(\theta^*)\,\beta\,\frac{\int_{\theta^*}^{\infty} \theta\eta(\theta) f(\theta)\, d\theta}{\int_{\theta^*}^{\infty} \eta(\theta) f(\theta)\, d\theta} \\
&\quad+\; \big(F(\theta^*) \,+\, (1-F(\theta^*))\eta(\theta^*)\big)\big[w_H \,-\, \hat{u}\big(y_\varnothing, \mu^c[\theta^*]\big)\big].
\end{aligned}$$

Now note that for all $\theta^* < \infty$, one has $\eta(\theta^*)(1-F(\theta^*)) = \int_{\theta^*}^{\infty} \eta(\theta^*) f(\theta) d\theta \leqslant \int_{\theta^*}^{\infty} \eta(\theta) f(\theta) d\theta$, thus we deduce from the above expression that for all $\theta^* \in \Theta$,

$$\begin{aligned}
\pi^c(\theta^*) \;&\leqslant\; r\int_{\underline{\theta}}^{\theta^*} \theta f(\theta)\, d\theta \;+\; \beta\int_{\theta^*}^{\infty} \theta\eta(\theta) f(\theta)\, d\theta \\
&\quad+\; \big(F(\theta^*) \,+\, (1-F(\theta^*))\eta(\theta^*)\big)\big[w_H \,-\, \hat{u}\big(y_\varnothing, \mu^c[\theta^*]\big)\big].
\end{aligned}$$

The expression in the right-hand side of the above equation is strictly increasing in θ^* and converges to $w_H + \beta\,\mathbb{E}[\theta]$. It follows that $\lim_{\theta^*\to\infty} \pi^c(\theta^*) < \infty$, as desired.

It remains to show that analogous result holds for incomplete equilibria, where the monopolist profit function is $\pi^\imath(\theta^*) = p_s^\imath(1-F(\theta^*))$. Given threshold $\theta^* < \infty$ and Eq. (17), we can write this as

$$\pi^\imath(\theta^*) \;=\; \big(1 \,-\, F(\theta^*)\big)\,\eta(\theta^*)\big[\hat{u}(y_s, \mu^\imath[\theta^*]) \,-\, \hat{u}(y_\varnothing, \mu^\imath[\theta^*])\big].$$

As before, it suffices to show that $\lim_{\theta^*\to\infty} \pi^\imath(\theta^*) < \infty$. As mentioned, $\hat{u}(y_s, \mu^\imath[\theta^*]) = \hat{u}(y_s, \mu^c[\theta^*])$ for all threshold levels, thus we have

$$\pi^\imath(\theta^*) \;\leqslant\; r\int_{\theta^*}^{\infty} \theta\eta(\theta) f(\theta)\, d\theta \;-\; (1-F(\theta^*))\hat{u}(y_\varnothing, \mu^\imath[\theta^*]).$$

The first term of the above expression vanishes as θ^* tends to infinity. Also, $\hat{u}(y_\varnothing, \mu^\imath[\theta^*])$ is increasing in θ^* and converges to $w_H/(\rho+1) + \beta v^{-1}(\mathbb{E}[v(\theta)]/(\rho+1))$. It follows that $\lim_{\theta^*\to\infty} \pi^\imath(\theta^*) < \infty$. $\square$

B.2 When Posterior Beliefs depend on the Type of the Observer

In this section, we consider the case where the observer makes inferences based on both the signal y she receives and her own type ω. We focus on reproducing the main results in the paper, and discuss how they are restricted in this new setting. Formally, the observer's beliefs now depend on (i) the signal y that she receives, and (ii) whether she is discerning (ω_d) or non-discerning (ω_{nd}). Therefore, the wealthy consumer's *ex-post signaling payoff*, as a function of signals and observer's beliefs, becomes

$$u(y,\mu,\omega) \;=\; \mathbb{E}_\mu\big[w \mid y,\omega\big] \;+\; \beta\,\mathbb{E}_\mu\big[\theta \mid y,\omega\big].$$

The consumer's expected utility as a function of his consumption choice is

$$\begin{aligned}
U(\varnothing,\theta,\mu) &= \eta(\theta)\,u(y_\varnothing,\mu,\omega_d) \;+\; (1-\eta(\theta))\,u(y_\varnothing,\mu,\omega_{nd}),\\
U(\ell,\theta,\mu) &= \eta(\theta)\,u(y_\ell,\mu,\omega_d) \;+\; (1-\eta(\theta))\,u(y_\ell,\mu,\omega_{nd}) \;-\; p_\ell,\\
U(s,\theta,\mu) &= \eta(\theta)\,u(y_s,\mu,\omega_d) + (1-\eta(\theta))\,u(y_\varnothing,\mu,\omega_{nd}) \;-\; p_s.
\end{aligned}$$

The result of Proposition 1 that high (low) types consume subtly (loudly) continues to hold under additional assumptions.

Proposition 6. *Suppose $p_s \geqslant p_\ell$. Let σ be an equilibrium strategy for the wealthy consumer. If there is some type $\theta > \underline{\theta}$ that chooses $x = s$ with positive probability under σ, then all types $\theta' > \theta$ consume $x = s$ with probability one in equilibrium.*

Proof. Notice that $U(x,\theta,\mu)$ is linear in $\eta(\theta)$ for each $x \in \{\ell, s, \varnothing\}$, which means that each consumption choice must be optimal on a single (possibly zero length) interval. Let $I_\varnothing, I_\ell,\ I_s$ be, respectively, the intervals on which non-consumption, loud consumption, and subtle consumption are optimal. If I_s or I_ℓ is empty, we are done. So, we seek to show that I_s lies to the right of I_ℓ if both intervals are nonempty. It is sufficient to show that $U(s,0,\mu) < U(\ell,0,\mu)$.

Towards a contradiction, assume that $U(s,0,\mu) > U(\ell,0,\mu)$ and that both I_s and I_ℓ are nonempty. First, notice that

$$U(\varnothing,0,\mu) \;=\; u(y_\varnothing,\mu,\omega_{nd}) \;>\; u(y_\varnothing,\mu,\omega_{nd}) \;-\; p_s \;=\; U(s,0,\mu),$$

so we have $U(\varnothing,0,\mu) > U(s,0,\mu) > U(\ell,0,\mu)$. Consequently, $I_\varnothing$ (if nonempty) lies to the left of I_s, which in turn lies to the left of I_ℓ. Now, to establish a contradiction, we just have to show that $u(y_\ell,\mu,\omega_{nd}) > u(y_\varnothing,\mu,\omega_{nd})$ (remember that $p_s \geqslant p_\ell$). In fact,

$$u(y_\ell,\mu,\omega_{nd}) \;=\; w_H + \beta\frac{\int_{I_\ell}\theta'\,(1-\eta\,(\theta'))\,g\,(\theta')d\theta'}{\int_{I_\ell}(1-\eta\,(\theta'))\,g\,(\theta')d\theta'} \;>\; w_H \;+\; \beta\,\inf\{I_\ell\}$$

whereas

$$\begin{aligned}
u(y_\varnothing,\mu,\omega_{nd}) \;&=\; w_H\frac{\int_{I_s\cup I_\varnothing}(1-\eta\,(\theta'))\,g\,(\theta')d\theta'}{\rho+\int_{I_s\cup I_\varnothing}(1-\eta\,(\theta'))\,g\,(\theta')d\theta'} + \beta\frac{\int_{I_s\cup I_\varnothing}\theta'\,(1-\eta\,(\theta'))\,g\,(\theta')d\theta'}{\rho+\int_{I_s\cup I_\varnothing}(1-\eta\,(\theta'))\,g\,(\theta')d\theta'}\\
&<\; w_H \;+\; \beta\,\sup\{I_s\cup I_\varnothing\}\,.
\end{aligned}$$

Noting that $\inf\{I_\ell\} \geq \sup\{I_s \cup I_\varnothing\}$ because I_ℓ lies to the right of I_s and $I_\varnothing$, the contradiction is established and the result follows. $\square$

Proposition 6 assumes that the subtle good costs weakly more than the loud good. This assumption is consistent with the available pricing evidence, which we discuss in Appendix D. However, it was not required for Proposition 1, which indicates that our results are somewhat weakened in the new setting. To understand this difference, consider how the consumer's expected payoffs, given consumption choice x, change with θ. Unlike Section 3, the consumer's expected utility from non-consumption and loud consumption may now increase or decrease with connectedness θ. Consequently, the comparison of loud versus subtle consumption becomes less straightforward. By restricting attention to the case where the loud good is more affordable, we ensure that loud consumption is relatively attractive for low-θ types, and thus that Proposition 6 holds.

The comparative statics of Proposition 3 also continue to hold.

Proposition 7. *Suppose that $(\sigma[\theta^*], \mu[\theta^*])$ is a normal equilibrium, and that $p_s \geqslant p_l$. Then θ^* is (a) decreasing in β; (b) increasing in w_H; and (c) increasing in ρ.*

Proof. Omitted; similar to Proposition 3. □

Finally, let us briefly discuss endogenous prices in this setting. As before, consider the pricing problem that a monopolist with zero marginal cost of production faces. Similar to Proposition 4, we may show that whenever the profit-maximizing equilibrium involves high-θ (low-θ) types consuming subtly (loudly), it also has $p_s \geqslant p_\ell$. Indeed, this is the case for a range of parameter values. However, for some other parameter values, the profit-maximizing equilibrium may involve the reverse: (i) low-θ (high-θ) types consuming subtly (loudly), and (ii) $p_s < p_\ell$. The monopolist optimally sets a relatively low price for the subtle good so as to induce low types to consume subtly and high types to consume loudly. By inducing such a "reversed" equilibrium, the monopolist extracts more rents from high-θ types, but less rents from low-θ types for whom the subtle good is a particularly inefficient signaling device (because low-θ types are unlikely to encounter discerning observers).

C Stability of Normal Equilibria

This section states and proves the claim made in Section 3.3 that normal equilibria are generically stable to small perturbations. Define

$$\Delta U_{s,\ell}\left[\theta_1, \theta_2\right] \;\equiv\; U(s, \theta_1, \mu[\theta_2]) \;-\; U(\ell, \mu[\theta_2]).$$

Notice that the normality condition in Definition 2 becomes

$$\left(\frac{\partial}{\partial \theta_1} + \frac{\partial}{\partial \theta_2}\right)\left\{\Delta U_{s,\ell}[\theta^*, \theta^*]\right\} \;>\; 0.$$

Consider the following tatonnement process to model the joint evolution of the consumer's strategy σ and the observer's belief μ in continuous time. We'll restrict attention to threshold strategies and threshold beliefs; at each instant t, denote the threshold corresponding to the consumer's strategy by $\theta(t)$ and the threshold corresponding to the observer's belief by $\tilde{\theta}(t)$.

- The observer adjusts her belief gradually to changes in the consumer's beliefs: at each instant t, $d\tilde{\theta}(t) = \operatorname{sgn}\big(\theta(t) - \tilde{\theta}(t)\big)dt$.

- The consumer responds instantaneously to changes in the observer's belief, so that at each instant t, the consumer's strategy is the best-response to the observer's belief: $\Delta U_{s,\ell}[\theta(t), \tilde{\theta}(t)] = 0$.

Restrict attention to full equilibria whereby (i) $U(\ell, \mu[\theta^*]) > U(\varnothing, \mu[\theta^*])$, thus consumers *strictly* prefer loud consumption over non-consumption; and (ii) $\frac{\partial}{\partial\theta_2}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} \neq 0$. These two conditions ensure that the tantonnement process is well-behaved. The first condition ensures Equation 5 continues to hold following a small shock. The second condition ensures that small shocks beget small responses.

Now, at time $t = 0$, introduce a small shock to the observer's belief away from the equilibrium threshold θ^*, i.e., $\tilde{\theta}(0) = \theta^* + \tilde{\varepsilon}$. The following result states that beliefs revert to the equilibrium threshold following such a shock only if the equilibrium is normal.

Proposition 8. *Consider a full equilibrium with $\frac{d}{d\theta}\{\Delta U_{s,\ell}[\theta, \theta]\} \neq 0$. There exists $\bar{\varepsilon} > 0$ such that $\lim_{t\to\infty}\{\theta(t), \tilde{\theta}(t)\} = \{\theta^*, \theta^*\}$ for all $\tilde{\varepsilon} < \bar{\varepsilon}$ if and only if the equilibrium is normal.*

Proof. Without loss of generality, assume $\varepsilon > 0$ so initially (i.e. for small t) $\varepsilon_t > 0$. First, write $\theta(t) = \theta^* + \varepsilon(t)$ and $\tilde{\theta}(t) = \theta^* + \tilde{\varepsilon}(t)$; note that $d\tilde{\varepsilon}(t) = \operatorname{sgn}(\varepsilon(t) - \tilde{\varepsilon}(t))$. Then since $\Delta U_{s,\ell}[\theta^*, \theta^*] = \Delta U_{s,\ell}[\theta(t), \tilde{\theta}(t)] = 0$, we have

$$\varepsilon(t)\,\frac{\partial}{\partial\theta_1}\Big\{\Delta U_{s,\ell}[\theta^*, \theta^*]\Big\} \;+\; \tilde{\varepsilon}(t)\,\frac{\partial}{\partial\theta_2}\Big\{\Delta U_{s,\ell}[\theta^*, \theta^*]\Big\} \;\approx\; 0,$$

which we rewrite as

$$\frac{\varepsilon(t)}{\tilde{\varepsilon}(t)} \;\approx\; -\,\frac{\frac{\partial}{\partial\theta_2}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\}}{\frac{\partial}{\partial\theta_1}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\}}.$$

Note that $\frac{\partial}{\partial\theta_1}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} > 0$. Consider a normal equilibrium; remember that $\left(\frac{\partial}{\partial\theta_1} + \frac{\partial}{\partial\theta_2}\right)\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} > 0$. In the case $\frac{\partial}{\partial\theta_2}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} > 0$, we infer that for small shocks $\varepsilon(t)$ and $\tilde{\varepsilon}(t)$ must have opposite sign, so $d\tilde{\varepsilon}(t) = \operatorname{sgn}(\varepsilon(t) - \tilde{\varepsilon}(t)) = -\operatorname{sgn}(\tilde{\varepsilon}(t))$. If $\frac{\partial}{\partial\theta_2}\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} < 0$, we infer that $\tilde{\varepsilon}(t)$ must have the same sign as, and greater magnitude than, $\varepsilon(t)$; so again $d\tilde{\varepsilon}(t) = \operatorname{sgn}(\varepsilon(t) - \tilde{\varepsilon}(t)) = -\operatorname{sgn}(\tilde{\varepsilon}(t))$. This means that $\tilde{\varepsilon}(t)$ (and thus $\varepsilon(t)$) decrease to zero over time, as the proposition claims.

Next, consider a non-normal equilibrium; $\left(\frac{\partial}{\partial\theta_1} + \frac{\partial}{\partial\theta_2}\right)\{\Delta U_{s,\ell}[\theta^*, \theta^*]\} < 0$. Then for small shocks $\tilde{\varepsilon}(t)$ must have the same sign as, and smaller magnitude than, $\varepsilon(t)$; so $d\tilde{\varepsilon}(t) = \operatorname{sgn}(\varepsilon(t) - \tilde{\varepsilon}(t)) = \operatorname{sgn}(\tilde{\varepsilon}(t))$. This means that $|\tilde{\varepsilon}(t)|$ is increasing in t for $\tilde{\varepsilon}(t)$ in some neighbourhood of zero, so $\lim_{t\to\infty}\tilde{\theta}(t) \neq \theta^*$. This establishes the proposition. □

D Endogenous Prices: Some Evidence

This section provides anecdotal evidence of luxury goods prices to support the predictions from Section 4. Between 27th and 30th July 2015, we accessed the websites of several luxury goods brands. We identified pairs of items that (i) are different versions of the same product and (ii) exhibit clear (albeit subjective) differences in brand visibility. For

Brand	*Style*	*Price Loud Good*	*Price Subtle Good*
Burberry	Bucket Bag	$1,595	$2,495
	Medium Banner Bag	$1,495	$1,695
	Holdall Bag	$1,150	$1,495
	Ziparound Wallet	$495	$650
	ID Wallet	$450	$475
Gucci	Miss GG Top Handle Bag	$1,490	$1,690
	Miss GG Hobo Bag	$1,240	$1,340
	Backpack	$1,200	$1,490
	Messenger Bag	$495	$670
	Bree	$1,300	$1,590
Armani	Baseball Cap	$125	$145
	Silk Tie	$145	$175
MCM	Bebe Boo Backpack	$595	$1,100
	Small Coated Canvas Backpack	$850	$1,895
Louis Vuitton	Speedy Bandouliere 30 Bag	$1,390	$3,050
	Pochette Accessories Bag	$760	$685
	Petit Noé NM	$1,270	$2,050

Table 1: Price comparisons between loud and subtle luxury goods.

example, with Burberry's "Holdall Bag", the checkered tartan fabric of the version in Figure 1a is Burberry's motif; whereas the version in Figure 1b uses unmarked black nylon, with the only concession to exterior branding being a small Burberry logo near the top. For each such pair, we compared the prices of the subtler version and the louder version — see Table 1. All prices were listed in U.S. dollars. In all but one case, the price information was collected from the seller's U.S. website.[8]

We find that in most cases, the item with a more visible logo or traditional fabric was cheaper than the less visible item —as our model predicts. For example, in Figure 2, the subtle version of the Gucci "GG Top Handle Bag" (Figure 2b) costs more than the loud version (Figure 2a). In many cases, the subtle version of the good uses more expensive materials than the loud version (e.g., leather versus canvas). This raises the possibility that price differences are due to the choice of material. However, this does not explain why subtler versions of a good almost always use a more expensive material: the seller always has the option of producing a loud version of the good using more expensive materials (and charge a high price for this version), but this seems to occur rarely. Our view is that the use of more expensive materials for subtle goods is merely a means for the consumer to emotionally rationalize the higher price of the subtle good.[9]

[8] Pricing information for MCM backpacks was from the English version of its 'worldwide' website.

[9] Note that Han et al. (2010) control for choice of material in their finding that prices of luxury goods are decreasing in conspicuity.

Figure (a) Original GG canvas, $1,490.

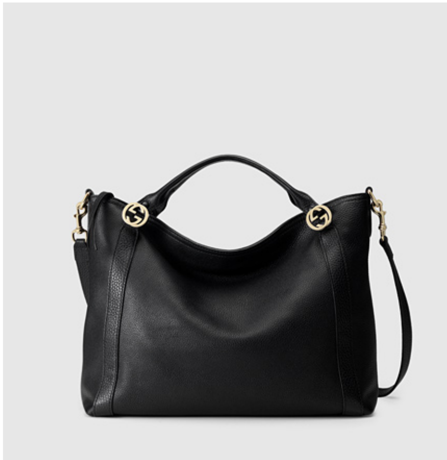

Figure (b) Black leather, $1,690.

Figure 2: Gucci Miss GG Top Handle Bag
Source: `https://www.gucci.com/us/category/f/handbags/top_handles`, accessed 27th of July 2015.