Peer Comparisons and Consumer Debt

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I. INTRODUCTION

A number of commentators have expressed concern about the high level of debt incurred by the average American. While high debt is an appropriate response to low interest rates and an expected growth in income, it has also been suggested that it reflects consumption patterns that are suboptimal.[1] One possibility is that a competition for social status, via the purchase of conspicuous goods, has led to excessive consumption.[2] Indeed, the purchase of many visible goods — such as cars, boats, home appliances, jewelry, and electronic equipment — appears to be motivated, at least in part, by a desire to advance in the social ranking. In this race, where one consumer's gain is another's loss, there can be no winners on average, and the resources deployed are thus wasted from a social perspective.[3]

Wasteful consumption, however, is not necessarily the same as excessive borrowing. Consumers, for instance, might be as eager to outspend their neighbors in the future as they are in the present—

1 For a general discussion, see Robert H. Frank, *Luxury Fever: Money and Happiness in an Era of Excess* (Princeton 1999).

2 See Thorstein Veblen, *The Theory of the Leisure Class* 43–62 (Dover 1994) (arguing that economic life is driven by notions of relative class, and that "conspicuous consumption" — spending in order to advertise class — is a form of social waste). See also Gary S. Becker, Kevin M. Murphy, and Edward Glaeser, *Social Markets and the Escalation of Quality: The World of Veblen Revisited*, in Gary S. Becker and Kevin M. Murphy, *Social Economics: Market Behavior in a Social Environment* 84, 92–93 (Belknap 2000) (arguing that elite groups may inefficiently purchase high-quality products in order to separate themselves from nonelite groups); Laurie Simon Bagwell and B. Douglas Bernheim, *Veblen Effects in a Theory of Conspicuous Consumption*, 86 Am Econ Rev 349, 349–51 (1996) (demonstrating "Veblen effects," where luxury brands command a premium price not because of functionality but because of their ability to signal wealth).

3 See Veblen, *The Theory of the Leisure Class* at 53 (cited in note 2) ("[I]t appears that the utility of [conspicuous leisure and conspicuous consumption] for the purposes of reputability lies in the element of waste that is common to both. In the one case it is a waste of time and effort, in the other it is a waste of goods.").

creating a motive to save.[4] In this case, what is sacrificed in the pursuit of status is not future consumption, but some other form of consumption that is less prone to social comparisons. For example, when buying a conspicuous wristwatch, rather than drawing on her retirement account (perhaps intended for a luxury retirement home), a consumer may decide to work more and sacrifice leisure time with her family.

In this Essay, we examine a simple mechanism that can link the status race with excessive borrowing even when this race also occurs in the future. Our premise is that goods that are more visible also tend to be more durable (of course, there are important exceptions). Thus, in the process of biasing consumption towards more visible goods—at the expense of less conspicuous alternatives—the status race biases consumption towards goods that are more durable. Moreover, when durable purchases increase, a consumer who smoothes her consumption flow over time will naturally borrow more—or save less in a financial sense.[5] For example, if I buy a $10,000 wristwatch to impress my peers, I can either reduce my remaining monthly budget by the necessary $10,000 or, better yet, smooth the burden over time by acquiring external financing or by drawing on my savings account—after all, the life of this watch extends beyond the current month. The same reasoning would apply to other durable goods.[6]

There are several reasons why conspicuous goods tend to be durable. Nondurables, by definition, disappear once consumed. Durables, in contrast, remain in the consumer's possession for further display. For example, if I consume an expensive lunch, only those present can directly observe it. In contrast, if I wear a fancy suit, any person crossing my path can be a witness. Durables can also be displayed while simultaneously engaging in other activities—my guests can instantly see my home appliances even when not under use. Finally, many durables are portable—a jewel being easier to display than a therapeutic massage.[7]

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[4] Alternatively, the accumulation of wealth may serve as a means to improve the social ranking of descendants, as argued, for example, by Harold L. Cole, George J. Mailath, and Andrew Postlewaite, *Social Norms, Savings Behavior, and Growth*, 100 J Polit Econ 1092, 1099–1105 (1992).

[5] Note that, depending on the definition of savings, the purchase of some durables—such as a home—could count as an investment, leaving savings intact. These purchases, however, will continue to have an impact on the consumer's financial position.

[6] Alternatively, the consumer could lease these goods every period and therefore maintain her original level of debt. However, for this to occur, some other economic agent must purchase (or build) the goods, and therefore increase his own level of debt. In either case, the combined debt of owner and user must rise.

[7] The consumption of nondurables could also be communicated to others by word of mouth, but so could the consumption of durables, thus retaining their advantage. On the other

An important example of a nondurable good is leisure, some of which is arguably sacrificed during consumption races in favor of durable goods. For instance, by taking a higher-paying job with longer hours, a consumer can afford a larger mortgage for a more luxurious home. In the process, her financial needs will rise. Thus, to the extent that she is motivated by status concerns (a zero-sum game), this added luxury is wasteful, and her mortgage is inefficiently high.

The plan for our investigation is the following: We first build a simple model formalizing the proposition that the search for status can be linked to excessive borrowing through the durable-goods channel. We then use this model to show how a general increase in wealth can further increase the borrowing rate by fueling the competition for status. As an economy grows, its financial needs expand at an increasing rate—together with the fraction of wealth wasted in the status race. The crucial condition for this to occur is that the direct marginal utility obtained from consumption (as opposed to the indirect utility obtained through status) decreases at a sufficiently fast rate—in particular, faster than under logarithmic utility.[8] For if this is the case, additional wealth has relatively little intrinsic value and is eagerly spent in an attempt to advance in the ranking.

Next, we study the optimal corrective tax policy for a government that is capable of targeting the conspicuous goods. In order to achieve Pareto-efficient allocations, the marginal tax rate must vary across consumers according to the size of the externality imposed over their particular segment of wealth. A distinctive implication is that the Pareto-optimal marginal tax will not necessarily increase with a consumer's level of wealth. Rather, the marginal tax should be higher, ceteris paribus, for those wealth segments where the competition for status is more intense. In our model, this competition occurs where the wealth distribution is densest—which corresponds to intermediate levels of wealth. In contrast, along the highest and most sparsely populated segment of the wealth distribution, little status is gained per additional dollar of conspicuous consumption. As a result, a smaller corrective tax is required.

Finally, we discuss a related mechanism that can further extend our results. So far, we have considered the case where the goods consumed in the status race are intrinsically durable: they provide a direct consumption service over some length of time. When it comes to social status, however, goods can also be durable in a different sense: the

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hand, one could produce evidence of nondurable consumption for public display, such as a picture of an expensive trip. But consistent with our argument, this evidence is itself a durable good.

    8   Logarithmic utility means that the utility of consumption equals the natural log of the amount that is consumed.

social rank gained by a higher consumption can be long-lasting itself (consider, for instance, an extravagant dinner that leaves a lasting impression). As a result, a good that is intrinsically nondurable (such as the dinner) can potentially be treated as durable by mere virtue of serving as a status good—leading once again to a status-borrowing link.

II. MODEL

As a benchmark, we first present a simple model with a single consumer and no search for social status. We then progressively add features towards a richer model that delivers our main results. Throughout the presentation, we attempt to stress the economic intuition rather than the technical aspects of the model. The most technical material is confined to footnotes and the Appendix.

Consider a consumer who lives for two periods, denoted $t = 1, 2$. Her total wealth, given by W in present value, is spent on two goods every period: a nondurable c (for example, food, entertainment, leisure) and a durable d (for example, home appliances, cars, jewelry). Let c_1 and c_2 denote the total expenditure on the nondurable in periods 1 and 2, respectively, and d_1 and d_2 on the durable. Assuming an interest rate r between periods, the consumer's budget constraint is

$$c_1 + d_1 + \frac{1}{1+r}[c_2 + d_2] = W,$$

which implicitly assumes that the consumer can freely borrow and save across periods at the going interest rate.

The nondurables can only be enjoyed in the period in which they are purchased, whereas the durable purchased in period 1 can be enjoyed during this period and, subject to depreciation, during period 2 as well. In particular, assuming the durable depreciates at rate δ across periods (a number between zero and one), the actual consumption of this good in period 2 is given by

$$d_1[1 - \delta] + d_2,$$

where the first term represents the quantity inherited from period 1, net of depreciation, and the second term represents the new purchases of this good.

The utility obtained from consumption takes a simple form. The nondurable creates utility $u(c_i)$ in each period, while the durable creates utility $v(d_1)$ in period 1, and utility $v(d_1[1 - \delta] + d_2)$ in period 2. Assuming a personal discount factor of β across periods, the total discounted utility is given by

$$u(c_1) + v(d_1) + \beta u(c_2) + \beta v(d_1[1 - \delta] + d_2).$$

We assume that the functions u and v have a standard concave shape. We refer to both these utilities as "intrinsic" because they represent a

direct benefit obtained from consumption, as opposed to an indirect benefit obtained through social comparisons.

We also assume that $\beta = 1/(1 + r)$, so that the personal discount factor equals that of the market. This condition is by no means critical for the results, but simplifies the analysis. In particular, it implies that the consumer fully smoothes her nondurable consumption flow over time, namely, $c_1 = c_2$. Consumption of the durable, on the other hand, is weakly biased towards the present:

$$d_1 \geq d_1[1 - \delta] + d_2.$$

The reason for this bias is that an increase in d_1 benefits the consumer in both periods, whereas an increase in d_2 only benefits her in period 2. This inequality is equivalent to $d_2 \leq \delta d_1$, which means that the additional expenditure on the durable in period 2 is, at most, the amount required to offset the depreciation of the quantity purchased in period 1. In other words, we can write $d_2 = \rho \delta d_1$, where ρ is a number between zero and one.

A.   The Saving and Borrowing Rates

We define the saving rate, denoted S, as the fraction of wealth not spent in the first period:

$$S = \frac{W - c_1 - d_1}{W}.$$

Regardless of when W is earned, S is proportional to the consumer's net financial assets (or the negative of her liabilities). Symmetrically, we define the borrowing rate as

$$B = -S,$$

which is always proportional to her net liabilities.

In equilibrium, S and B are determined by the allocation of wealth between the nondurable and durable goods. Let c^* and d^* denote the optimal consumption of these goods in period 1, namely, $c_1 = c^*, d_1 = d^*$, and from the above discussion, $c_2 = c^*$, and $d_2 = \rho \delta d^*$. Using the budget constraint to solve for c^*, this consumption pattern implies

$$S = \frac{\beta}{1 + \beta} \cdot \frac{W - d^*[1 - \rho\delta]}{W}. \tag{1}$$

This saving rate decreases with d^*. The reason is that when the consumer expands her consumption of the durable good (while sacrificing nondurable consumption), she optimally chooses to spend more resources in period 1—where the good is originally purchased—relative to period 2—where at most she compensates for depreciation. Thus, her expenditures become more biased towards the present. Conversely, in order to increase the stream of nondurable consumption c^*, while re-

ducing d^*, the consumer must save additional wealth in order to afford the higher expenditure on the nondurable in period 2.

B. The Optimal Allocation

In what follows, we focus on the case where the depreciation rate δ is zero. This simplifies the exposition without changing our results. In this case, all durable purchases are made in period 1, and because this good does not depreciate, the consumer enjoys a constant stream d^* of effective durable consumption over time (together with a constant stream c^* of nondurable consumption). The optimal allocation of wealth between the nondurable and durable goods is determined by the consumer's first-order condition

$$u'(c^*) = (1 + \beta) \cdot v'(d^*).$$

This condition states that the marginal utilities derived every period from the consumption streams c^* and d^*, adjusted by their relative price $(1 + \beta)$, must be equal.[9]

III. MULTIPLE CONSUMERS AND SOCIAL STATUS

Here we extend the model to include a large number of consumers who compete for status. Formally, suppose there is a consumer for every number in the interval $[0, 1]$. We refer to each consumer by her type θ, which corresponds to her position in the interval. This representation is convenient because, after normalization, the fraction of consumers with a type lower than θ equals θ. In other words, type θ occupies the θth percentile of the population. Each consumer θ is endowed with a level of wealth $W(\theta)$, which increases with θ: higher types are wealthier. In what follows, we continue to assume that the relative price of the goods is constant (for example, there exists a technology that can transform one type of good into the other), and we also take the interest rate r as given (for example, there is a large international capital market).

Initially, suppose consumers are indifferent to each other's consumption levels, and each consumer faces the same decision problem as above. Accordingly, the optimal consumption streams for each type θ, denoted $c^*(\theta)$ and $d^*(\theta)$, are those satisfying her budget constraint together with the same first-order condition as before:

$$u'(c^*(\theta)) = (1 + \beta) \cdot v'(d^*(\theta)). \tag{2}$$

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[9]   In order to derive the relative price $(1 + \beta)$, notice that the cost of increasing c^* by one unit equals $1 + 1/(1 + r)$ units of wealth (in present value), because the nondurable must be repurchased every period; whereas increasing d^* by one unit costs only 1, because in period 2 no depreciation must be covered. The ratio follows from dividing these prices and setting $1/(1 + r) = \beta$.

Because higher types are wealthier, both $c*(\theta)$ and $d*(\theta)$ rise with θ. Moreover, because consumers do not interfere with each other, and they individually maximize their own intrinsic utilities, these consumption levels are also Pareto-efficient. For future reference, we denote these efficient levels by $c^E(\theta)$ and $d^E(\theta)$.

We now introduce the competition for social status. We incorporate our premise that conspicuous goods tend to be more durable by means of a simple assumption: consumers can observe each other's consumption of durable goods, but not their consumption of nondurables. This sharp distinction makes the analysis more transparent, but the same results would follow from a less extreme formulation as long as the average depreciation rate for conspicuous goods is lower—that is, they are more durable—than the average rate for nonconspicuous goods.

Next, we assume that consumers also care about their social ranking, or status. This ranking is determined by their relative consumption of the durable good—visible to all. In particular, for any durable consumption level $d*$ in a given period, let $F(d*)$ denote the fraction of the population consuming less than $d*$ during this period. This is the ranking obtained by a consumer who chooses $d*$. From this ranking, the consumer derives a utility level $w(F(d*))$, which is added to the intrinsic utilities $u(c*)$ and $v(d*)$. We refer to w as "status" utility. In this extended model, it is still the case that consumption is equated across periods, and therefore the status obtained by each consumer remains constant over time.[10]

The desire to advance in the social ranking provides an additional incentive to purchase the durable good. This incentive is reflected in a new first-order condition for every type θ, which also incorporates status utility:

$$u'(c*(\theta)) = (1+\beta) \cdot \left\{ v'(d*(\theta)) + \frac{\partial w(F(d*(\theta)))}{\partial d*(\theta)} \right\}. \qquad (3)$$

The difference with the original first-order condition (2) is the second term in the braces, which represents the additional status utility w that can be obtained from a marginal increase in durable consumption $d*(\theta)$.

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[10] Throughout, we assume that consumers do not participate in lotteries in order to change their wealth position. But see Gary S. Becker, Kevin M. Murphy, and Iván Werning, *Status and Inequality*, in Becker and Murphy, *Social Economics* 105, 113–14 (cited in note 2) (arguing that consumers may have an incentive to gamble in order to change their relative wealth position). For another general discussion, see Arthur J. Robson, *Status, the Distribution of Wealth, Private and Social Attitudes to Risk*, 60 Econometrica 837 (1992) (exploring a model of social status with lotteries that allow for changes in wealth position). In the present model, a sufficient condition for lotteries to be undesirable is that the composition of the functions w and F is concave.

A well-known result in the literature is that conspicuous goods used to acquire social status are inefficiently overconsumed in equilibrium.[11] Our model is no exception. As shown in Part IV, the new term in (3) will lead to a suboptimal use of wealth.

IV. THE FUTILITY OF THE SEARCH FOR STATUS

We begin by comparing the durable consumption levels $d^*(\theta)$ that arise when consumers care about status (the solutions to (3)) against the levels $d^E(\theta)$ that maximize intrinsic utilities alone (the solutions to (2)). Because status is allocated to the highest bidder, consumers are now eager to spend more on the durable good. By the same token, in order to maintain their original status, all consumers — except for the lowest type — must spend more than before so that they are not outbid by lower types eager to advance in the ranking. As formally shown in Lemma 1 in the Appendix, this logic implies that all types $\theta > 0$ end up selecting a consumption $d^*(\theta)$ that is strictly larger than $d^E(\theta)$.[12] The lowest type, in contrast, who is not concerned about lower types outspending her, and cannot outbid higher types with more wealth, selects the same consumption as before: $d^*(0) = d^E(0)$. Figure 1 illustrates this result.

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[11] See, for example, Becker, Murphy, and Glaeser, *Social Markets and the Escalation of Quality* at 93 (cited in note 2) ("[T]he separating equilibria that result from [status] competition are not efficient .... The reason is that equilibrium prices of goods in competitive markets do not fully incorporate the desires of both followers and leaders to have leaders as peers."). See also Bagwell and Bernheim, 86 Am Econ Rev at 351 (cited in note 2) ("It is important to emphasize that, in equilibrium, the luxury brands are not intrinsically superior to the budget brands — they are simply goods of identical quality, sold at a higher price.").

[12] The intuition behind the formal proof is simple. Starting from the original consumption levels, a marginally higher expenditure on the durable good creates only a second-order loss in intrinsic utility, while simultaneously causing a first-order gain in status utility. Therefore, in order to restore the equilibrium, expenditures on the durable good must rise.

FIGURE 1
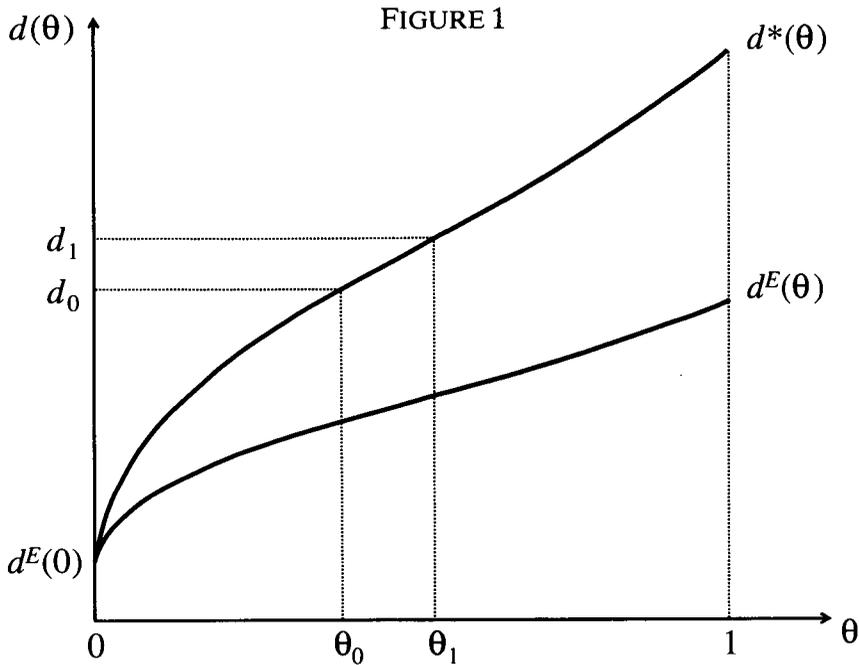
In equilibrium, the search for status is futile. In the end, even though consumers spend more than before, no single consumer manages to outbid her wealthier peers because their stronger financial position allows them to hold their ground. Accordingly, the entire social ranking remains unchanged. Formally, this follows from the fact that any schedule $d^*(\theta)$ that is increasing in θ, as occurs in equilibrium, trivially leads to a ranking function such that, for all θ,

$$F(d^*(\theta)) = \theta.$$

In other words, every consumer invariably receives a social ranking equal to her underlying type—and this would also occur under the lower schedule $d^E(\theta)$.

From this observation, we can readily see that the equilibrium is inefficient. Suppose every consumer simultaneously reverted back to $d^E(\theta)$. This would leave the social ranking unchanged together with status utility, but would increase the intrinsic utility of every consumer other than the lowest type (because, by definition, $d^E(\theta)$ maximizes intrinsic utility), while the lowest type would remain unaffected. As a result, $d^E(\theta)$ Pareto dominates the equilibrium allocation. The difficulty, of course, is that $d^E(\theta)$ cannot be sustained without some form of collective action that curtails the status race—a point to which we return in Part VII below.

We now turn to the borrowing rate. Because the competition for status shifts resources from the nondurable to the durable good, it also

shifts expenditures from the future to the present. As a result, the inefficient over-accumulation of durables translates into an excessive level of borrowing:

> *Proposition 1. In equilibrium, only the lowest type $\theta = 0$ selects an efficient borrowing rate. For all other types $\theta > 0$, the borrowing rate is inefficiently high.*

Proof. From equation (1) we know that the borrowing rate is proportional to the consumption of the durable good. Moreover, from Lemma 1,[13] only the lowest type selects an efficient consumption of this good, while the consumption of all other types is inefficiently high. The Proposition follows from combining these facts. QED

V. THE PRICE OF SOCIAL STATUS

A deeper understanding of the model comes from analyzing the term

$$\frac{\partial w\big(F(d*(\theta))\big)}{\partial d*(\theta)},$$

which represents the marginal gain in status utility when spending an extra dollar on the durable good. Recall that this derivative enters the first-order condition (3), and is responsible for the distortions created by the status race.

This derivative can be represented more explicitly using the fact that $F(d*(\theta)) = \theta$ for all θ. Applying the chain rule, this relation implies[14]

$$\frac{\partial w\big(F(d*(\theta))\big)}{\partial d*(\theta)} = w'(\theta) \cdot \left[\frac{\partial d*(\theta)}{\partial \theta}\right]^{-1}. \tag{4}$$

The right-hand side has a simple structure. The first term $w'(\theta)$ is the marginal utility of status. It represents the extra utility obtained by a consumer who, starting at the θth percentile of the social ranking, moves up an additional 1 percent in the ranking. On the other hand,

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[13]   See Appendix.

[14]   To see why this is the case, differentiate the equation $F(d*(\theta)) = \theta$ with respect to θ to obtain

$$\frac{\partial F(d*(\theta))}{\partial d*(\theta)} \cdot \frac{\partial d*(\theta)}{\partial \theta} = 1 \text{, and therefore } \frac{\partial F(d*(\theta))}{\partial d*(\theta)} = \left[\frac{\partial d*(\theta)}{\partial \theta}\right]^{-1}.$$

On the other hand, applying the chain rule we obtain

$$\frac{\partial w(F(d*(\theta)))}{\partial d*(\theta)} = w'(F(d*(\theta))) \cdot \frac{\partial F(d*(\theta))}{\partial d*(\theta)},$$

which readily simplifies to the desired expression.

For a general definition of the chain rule, see David W. Pearce, ed, *The Dictionary of Modern Economics* 62 (MIT 1981).

the derivative $\partial d^*(\theta)/\partial\theta$, the slope of schedule $d^*(\theta)$, represents the incremental expenditure on the durable good that is necessary to advance this additional 1 percent. In other words, $\partial d^*(\theta)/\partial\theta$ is the price of an additional unit of status. Accordingly, the above expression is the marginal utility of status divided by its price—or the marginal utility per dollar spent.

The price of status can be illustrated graphically using Figure 1. Suppose that, in equilibrium, durable expenditures are given by the larger schedule $d^*(\theta)$. In order to purchase a specific social ranking, say θ_0, the consumer must purchase d_0 units of the durable good (so that all types below θ_0, representing θ_0 percent of the population, spend less than she does). Now suppose that, starting from this point, the consumer wishes to move up to a higher ranking θ_1. This requires an additional expenditure of $d_1 - d_0$. The resulting per-unit price of status is therefore given by the ratio $(d_1 - d_0)/(\theta_1 - \theta_0)$, which is precisely the slope of $d^*(\theta)$.

Because status is in fixed supply, a more intense competition for this good is directly translated into a higher price. For example, if all consumers double their expenditures on status, the schedule $d^*(\theta)$ becomes twice as steep—and status twice as expensive—as before. In the results that follow, this price channel plays a central role.

VI. WEALTH AND THE BORROWING RATE

In this section we show that an increase in wealth can potentially aggravate the borrowing inefficiency. To do so, we adopt a particular functional form for the intrinsic utility functions u and v, namely,

$$u(c) = A_1 c^{1-\alpha} \text{ and } v(d) = A_2 d^{1-\alpha},$$

where A_1, A_2, and α are constants. These functions have a coefficient of relative risk aversion that is constant and equal to α. Since this coefficient is equal for both functions, it follows from equation (2) that the efficient borrowing rate is independent of the level of wealth (that is, the percentage of wealth spent on each good remains constant). This constant borrowing rate will serve as a benchmark for the actual equilibrium rate.

As commonly assumed in the literature, we take $\alpha > 1$.[15] This means that the intrinsic utility functions have a high degree of curvature, and therefore the intrinsic satisfaction derived from both goods

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[15] For an empirical investigation of this parameter, see Robert E. Hall, *Intertemporal Substitution in Consumption*, 96 J Polit Econ 339, 343–45, 350, 356 (1988) (arguing that the data support a small coefficient of intertemporal substitution, and therefore, under common assumptions, a large coefficient of risk aversion).

drops rapidly with the level of consumption (notice the negative exponents on these functions). In particular, as consumption of either good increases, the associated marginal utility decreases at an even faster rate. The implication is that, as wealth increases, consumers become increasingly eager to sacrifice intrinsic utility in favor of social status—which in the end translates into a steep increase in the price of status, together with durable expenditures.

> *Proposition 2. Suppose both* u *and* v *have a constant coefficient of relative risk aversion* α > 1. *Then, a proportional increase in wealth across consumers leads to an increase in the borrowing rate for all types* θ > 0.

Proof. See Appendix.

Because the efficient borrowing rate is independent of the level of wealth, and the equilibrium borrowing rate is inefficiently high to begin with (from Proposition 1), this result tells us that an increase in wealth further deteriorates efficiency. To understand this result, we return to the first-order condition (3). Using the representation in (4) from the previous section, and rearranging terms, this condition becomes

$$u'(c*(\theta)) - (1+\beta) \cdot v'(d*(\theta)) = (1+\beta) \cdot w'(\theta) \cdot \left[\frac{\partial d*(\theta)}{\partial \theta} \right]^{-1}. \quad (5)$$

The left-hand side can be interpreted as the net marginal loss in intrinsic utility when purchasing an additional unit of d (that is, the opportunity cost of purchasing the durable good), whereas the right-hand side represents the marginal gain in status utility from this additional expenditure.

Now consider a 1 percent increase in wealth for all consumers θ, and suppose both $c*(\theta)$ and $d*(\theta)$ also increase by 1 percent, so that all borrowing rates remain unchanged. Because the coefficient of risk aversion exceeds one, the left-hand side decreases by more than 1 percent, implying that the opportunity cost of spending on the durable falls by more than 1 percent. This means that consumers are willing to pay a price for status more than 1 percent higher than before in order to advance in the ranking. The price of status, however, has increased by only 1 percent (since $d*(\theta)$ increased by only 1 percent), implying that the right-hand side of (5) exceeds the left. As a result, consumers are induced to increase their expenditure on the durable beyond the original 1 percent until the equality in (5) is again restored. In the process, the borrowing rate must rise.

Notice that this result is independent of the curvature of the utility function $w(\theta)$. This stems from the fact that status is in fixed supply: regardless of the general level of wealth, type θ always receives status θ, and therefore her marginal utility of status $w'(\theta)$ never falls (in contrast to the marginal utilities of c and d).

VII. GOVERNMENT INTERVENTION

The inefficiencies arising from the status race open the door for a corrective tax policy. By taxing the conspicuous good, the government can induce consumers to internalize the negative externalities they cause over their peers when attempting to outspend them, and Pareto-efficient allocations can be achieved. Here we characterize the optimal policy, and show that it differs significantly from the optimal policy for a conventional externality, such as pollution.[16]

As a benchmark, consider a conventional externality. Its first distinguishing feature is that the identity of the consumer causing this externality is irrelevant; only her consumption decision matters. Consider, for instance, carbon dioxide air pollution. What creates the externality is the emission of CO_2 itself, regardless of who is behind this emission. The implication is that the optimal corrective tax must be equal across consumers—and equal to the size of the externality. The second feature of a conventional externality is that its external impact is direct: the decision variable of one consumer (for example, her pollution level) enters as a primary argument in the utility function of her peers (for example, their disutility from pollution).

The externalities arising in our model differ in both respects. When a consumer decides to increase her expenditure on the conspicuous good and advance in the social ranking, she does not affect all of her peers equally. Rather, she affects only those displaced in the ranking. A wealthy consumer, for instance, only affects other wealthy consumers with similar consumption patterns. Indeed, the competition for status occurs at many different local levels (the ultrawealthy compete with the ultrawealthy, and the medium classes among themselves), and therefore the externalities it creates are local as well. As shown below, this calls for a corrective tax that differs across consumers.

Moreover, the status externalities are indirect. When a consumer increases her expenditure on the conspicuous good, she affects her peers only to the extent that she raises the "price" associated with a given level of status. As a consequence, this price enters in the calculation of the optimal tax.[17]

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[16] For a general discussion of corrective policies when peer comparisons are present, see R. Layard, *Human Satisfactions and Public Policy*, 90 Econ J 737, 738–45 (1980) (considering fiscal, institutional, and moral means of offsetting the status race). See also James S. Duesenberry, *Income, Saving, and the Theory of Consumer Behavior* 101–03 (Harvard 1949).

[17] The fact that these externalities are mediated by the price of status makes them similar to pecuniary externalities in a market for traditional goods. There is, however, a crucial difference. Unlike traditional goods, the wealth spent on status is not transferred to a third party supplying this good—instead, it is used up in wasteful display. This is why status externalities, unlike pecuniary externalities, create inefficiencies.

We begin by characterizing the optimal value-added tax (imposed over the conspicuous good) for the case where the government can target each type with a separate rate—assuming that the government knows these types. The optimal rate, denoted $\tau(\theta)$ for each type, follows from combining two equations. The first equation is the first-order condition for consumers, adjusted to reflect the presence of the tax:

$$(1+\tau(\theta)) \cdot u'\left(c^{\tau}(\theta)\right) = (1+\beta) \cdot \left\{ v'\left(d^{\tau}(\theta)\right) + w'(\theta) \cdot \left[\frac{\partial d^{\tau}(\theta)}{\partial \theta}\right]^{-1} \right\},$$

where $c^{\tau}(\theta)$ and $d^{\tau}(\theta)$ represent the after-tax equilibrium consumption levels.

The second equation, on the other hand, captures the requirement that the tax is optimal—meaning that the resulting consumption levels are Pareto-efficient. The relevant requirement is that the intrinsic marginal utilities of $c^{\tau}(\theta)$ and $d^{\tau}(\theta)$, adjusted by their relative price, are equated:

$$u'\left(c^{\tau}(\theta)\right) = (1+\beta) \cdot v'\left(d^{\tau}(\theta)\right).$$

(Notice that this requirement is independent of how the government allocates tax proceeds.)

For both these equations to be satisfied, we require that

$$\tau(\theta) \cdot u'\left(c^{\tau}(\theta)\right) = (1+\beta) \cdot w'(\theta) \cdot \left[\frac{\partial d^{\tau}(\theta)}{\partial \theta}\right]^{-1}.$$

This new equation means that the marginal cost imposed by the tax (the left-hand side of the equation) must equal the marginal benefit, in terms of social ranking, of spending an additional dollar on the conspicuous good. Since the latter benefit must equal another consumer's loss, it represents the size of the externality. Accordingly, the optimal tax forces the consumer to internalize this cost. From the last two equations, we finally obtain

$$\tau(\theta) = \frac{w'(\theta)}{v'(d^{\tau}(\theta))} \cdot \left[\frac{\partial d^{\tau}(\theta)}{\partial \theta}\right]^{-1}. \tag{6}$$

Before analyzing this equation, consider the case where the government has no prior knowledge of the consumers' types. The only difference is that in order to target individual consumers, the government must now design a nonlinear tax that depends on the total expenditure on the conspicuous good. Let $\mu(d)$ denote the tax paid on the last unit of the conspicuous good when the total expenditure is d. From the same argument used above, the optimal tax must solve

$$\mu(d^{\tau}(\theta)) = \tau(\theta).$$

As a result, analyzing μ is equivalent to analyzing τ. In either case, we are solving for the optimal marginal rate imposed on consumer θ.

We now return to equation (6). The right-hand side is the product of two terms. The first is the ratio of marginal status utility to marginal intrinsic utility obtained from the durable good. A large ratio means that the consumption of the durable good is primarily motivated by status concerns. Accordingly, it should be more heavily taxed. The second term is the reciprocal of the price of status. A high price acts as a deterrent to purchasing additional status, which reduces the role for a corrective tax—thus, the inverse relation between price and optimal tax.

Who Should Pay a Larger Tax? A distinctive implication of the status externalities is that the optimal marginal tax need not be higher for wealthier individuals, even if their durable purchases are more heavily driven by the status motive. We show this using a simple example. Suppose the intrinsic utilities u and v have constant relative risk aversion (as in Part VI) with coefficients $\alpha = 2$, and $A_1 = A_2$. The latter equality implies that, in any efficient allocation, half of each consumer's net expenditures (after tax) must be devoted to each type of good. On the other hand, let status utility be $w(\theta) = \theta$ for all θ, so the marginal utility of status is constant across types (and normalized to one). Finally, define after-tax wealth as $W^{\tau}(\theta) \equiv (1 + \beta)c^{\tau}(\theta) + d^{\tau}(\theta)$, which corresponds to the consumers' total after-tax expenditures in present value. For the current example, we assume that $W^{\tau}(\theta)$ is distributed standard log-normal across types.[18]

Under these conditions, because $d^{\tau}(\theta)$ equals $\frac{1}{2}W^{\tau}(\theta)$, the first term in (6) becomes

$$\frac{w'(\theta)}{v'(d^{\tau}(\theta))} = \frac{1}{v'(\frac{1}{2}W^{\tau}(\theta))}.$$

This term is increasing in $W^{\tau}(\theta)$ (since v' is a decreasing function), which implies that wealthier individuals derive a higher marginal utility from status relative to intrinsic utility. Accordingly, this term favors a marginal tax that is increasing in type.

The price of status, on the other hand, becomes

$$\frac{\partial d^{\tau}(\theta)}{\partial \theta} = \frac{1}{2}\frac{\partial W^{\tau}(\theta)}{\partial \theta}.$$

Because the function $W^{\tau}(\theta)$ corresponds to the inverse of the cumulative distribution of wealth (after tax), the derivative on the right is inversely proportional to the population density. This implies that status is cheapest where the population is most dense. The reason is

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[18]   Recall that the log-normal distribution is skewed to the right and has the property that the logarithm of its variable follows a normal distribution. See Pearce, ed, *The Dictionary of Modern Economics* at 258 (cited in note 14). On the other hand, notice that $W^{\tau}(\theta)$ is a function of both the initial gross wealth $W(\theta)$ and the specific tax redistribution policy. Here we assume a functional form directly over $W^{\tau}(\theta)$ in order to simplify the exposition.

that, when this density is high, an extra dollar devoted to conspicuous consumption allows a consumer to get ahead of more types. Under the log-normality assumption, in particular, the price of status reaches a minimum for the median type $\theta = \frac{1}{2}$, and is increasing towards the extremes where the population becomes increasingly sparse (and it is therefore harder to move ahead in the ranking).

Consequently, the second term in (6), the inverse of the status price, favors a marginal tax that is directly proportional to the population density: in regions where consumers are tightly packed, a larger tax is required because the status competition is more closely fought.
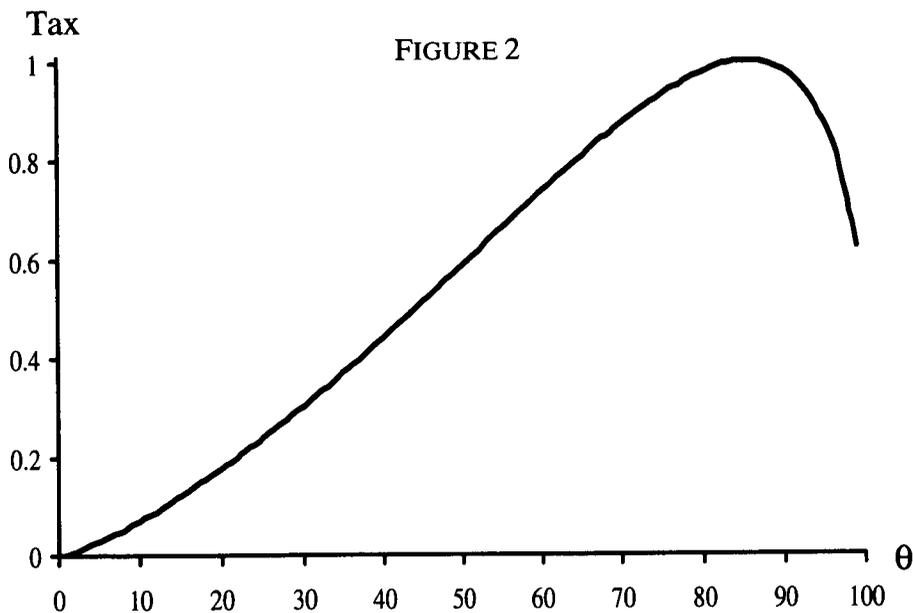

Figure 2 (drawn to scale) represents the optimal marginal tax, as a function of the wealth percentile θ, once the two terms in (6) are combined. This tax increases with wealth below the eighty-fifth percentile, and drops after that (the vertical axis measures the tax as a percentage of the tax for this eighty-fifth percentile). In this case, the wealthiest consumers are spared from the highest tax because an extra dollar of conspicuous consumption does little to change their rank.[19]

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[19] For an alternative view, see Frank, *Luxury Fever* at 216–19 (cited in note 1) (arguing that the wealthiest consumers should pay a larger tax because they most heavily influence the norms of acceptable consumption for the rest of the population). For further discussion of this type of "demonstration effect," see Duesenberry, *Income, Saving, and the Theory of Consumer Behavior* at 27–28 (cited in note 16) ("We can maintain then that the frequency and strength of impulses

VIII. DISCUSSION

So far, we have relied on the notion that conspicuous goods tend to be durable in the sense that they are physically present and offer an intrinsic benefit over some length of time. Our results, however, can potentially extend beyond this case. One possibility is that the social rank conveyed by a conspicuous good is itself durable, which the consumer then enjoys over time. For if this is the case, she would be willing to incur debt in order to increase her rank, now viewed as an investment, regardless of the type of conspicuous good employed in the process. For example, if I host a lavish housewarming party (nondurable in itself), my guests are likely to remember me as wealthy for some time. Accordingly, if I am interested in such a thing, it makes sense to finance this party with credit.[20]

Moreover, some nondurables can be repeatedly displayed before they are consumed (such as a vintage bottle of wine or an expensive cigar), or can even leave lasting evidence after consumption (such as an extravagant trip). In either case, the same nondurable can be employed over multiple periods to signal one's wealth, and is therefore transformed, from the status-seeker's perspective, into a durable good.

APPENDIX

Lemma 1. In equilibrium, only the lowest type $\theta = 0$ *selects an efficient consumption level. For all other types, the consumption of the durable good exceeds the efficient level.*

Proof. In equilibrium, the consumption of the durable good must be increasing in θ (because wealthier individuals face a lower opportunity cost when purchasing this good). As a result, the social ranking function must satisfy $F(d^*(\theta)) = \theta$ for all types. From this fact, and the chain rule, the second term in braces in the first-order condition (3), namely, $\partial w(F(d^*(\theta)))/\partial d^*(\theta)$, becomes $w'(\theta) \cdot \partial F(d^*(\theta))/\partial d^*(\theta)$, which in turn equals

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to increase expenditure depends on frequency of contact with goods superior to those habitually consumed. This effect need not depend at all on considerations of emulation or 'conspicuous consumption.'").

   [20] In this case, the timing of the occasion to signal one's wealth becomes relevant. For example, the consumer can in principle save ahead of time for her party, in which case the search for status effectively increases savings for some time. For a related example, see generally Cole, Mailath, and Postlewaite, 100 J Polit Econ 1092 (cited in note 4) (introducing an economic model in which agents' saving and spending decisions are influenced by a desire to promote their own social status and that of their offspring). The above mechanism, in other words, requires that the signaling occasion arise early in life.

$$w'(\theta) \cdot \left[\frac{\partial d*(\theta)}{\partial \theta} \right]^{-1}.$$

Using this observation, the first-order condition (3) becomes

$$u'\left(\frac{1}{1+\beta}[W(\theta) - d*(\theta)] \right) = (1+\beta) \cdot \left\{ v'(d*(\theta)) + w'(\theta) \cdot \left[\frac{\partial d*(\theta)}{\partial \theta} \right]^{-1} \right\}, \qquad (i)$$

where $c*(\theta)$ has been expressed as $1/(1 + \beta) \cdot [W(\theta) - d*(\theta)]$ from the budget constraint.

On the other hand, from equation (2), the efficient schedule $d^E(\theta)$ must satisfy

$$u'\left(\frac{1}{1+\beta}[W(\theta) - d^E(\theta)] \right) = (1+\beta) \cdot v'(d^E(\theta)). \qquad (ii)$$

Because the last term in (i) is nonnegative, equations (i) and (ii) jointly imply that $d*(\theta) \geq d^E(\theta)$ for all types. Moreover, if $d*(\theta')$ happens to equal $d^E(\theta')$ for some type θ', then $\partial d*(\theta')/\partial \theta$ must equal infinity (so that the last term in (i) vanishes). Combining these facts, it follows that $d*(\theta)$ must be strictly larger than $d^E(\theta)$ for all types $\theta > 0$.

Finally, because type $\theta = 0$ obtains the lowest possible status in equilibrium, the consumption level $d^E(0)$—which cannot deliver a lower status—must dominate any other choice. As a result, $d*(0) = d^E(0)$. QED

Proof of Proposition 2. Suppose the wealth level for each consumer increases from $W(\theta)$ to $\lambda W(\theta)$, where $\lambda > 1$. Let $d*(\theta)$ denote the equilibrium schedule under wealth $W(\theta)$, and $d**(\theta)$ the equilibrium schedule under wealth $\lambda W(\theta)$. From equation (1), in order to prove the result it suffices to show that $d**(\theta) > \lambda d*(\theta)$ for all $\theta > 0$. Combining equations (3), (4), and the budget constraint, the schedules $d*(\theta)$ and $d**(\theta)$ must satisfy, respectively,

$$u'\left(\frac{1}{1+\beta}[W(\theta) - d*(\theta)] \right) = (1+\beta) \cdot \left\{ v'(d*(\theta)) + w'(\theta) \cdot \left[\frac{\partial d*(\theta)}{\partial \theta} \right]^{-1} \right\},$$

and

$$u'\left(\frac{1}{1+\beta}[\lambda W(\theta) - d**(\theta)] \right) = (1+\beta) \cdot \left\{ v'(d**(\theta)) + w'(\theta) \cdot \left[\frac{\partial d**(\theta)}{\partial \theta} \right]^{-1} \right\}.$$

From the specification of u and v, and the fact that $\lambda > 1$, these equations jointly imply that, for all $\theta > 0$, either $d**(\theta) > \lambda d*(\theta)$ or $\partial d**(\theta)/\partial \theta > \lambda \partial d*(\theta)/\partial \theta$. Moreover, because the lowest type $\theta = 0$ always chooses the efficient consumption level (solving equation (2)), we must have $d**(0) = \lambda d*(0)$. When combining these facts, it follows that $d**(\theta) > \lambda d*(\theta)$ for all $\theta > 0$. QED