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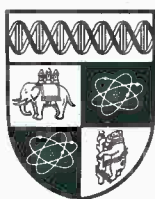
On Limiting the Market for Status Signals\*

By

Norman J. Ireland

No. 389

**WARWICK ECONOMIC RESEARCH PAPERS**



DEPARTMENT OF ECONOMICS

UNIVERSITY OF WARWICK  
COVENTRY

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Abstract:

In many societies, individuals care how others view them. In their efforts to impress, such individuals engage in consumption signals which attempt to establish higher levels of status than their true status type. This leads to an inefficiency which offers the possibility of a Pareto-improving tax policy. The impacts of tax policy and benefits on the signalling equilibrium are considered.

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This paper is circulated for discussion purposes only and its contents should be considered preliminary.

## *1. Introduction*

In many societies, individuals care how others ("spectators") view them. In their efforts to impress, such individuals have an incentive to engage in consumption signals which attempt to establish higher levels of status than their true status type. Spectators understand this and are not fooled, and the consumers are left with a choice of suboptimal consumption or, eschewing attempts to impress, being taken for types of too low status. Such a choice is a common outcome of signalling models since signals have to be costly to be credible. In this paper, we demonstrate the welfare loss involved and point out that a corrective tax could yield a Pareto improvement. We also consider how benefits of cash or kind granted to all consumers or to the poorest consumers affect the signalling equilibrium.

Our approach may be seen as adding to the existing literature in explaining the nature of the interdependence of consumer behaviour. The principal existing literature has been contributed by Frank (1984, 1985a, 1985b) and has highlighted the importance of "positional" goods in consumers' preferences. A consumer cares not only about how much of a particular "positional" good that he consumes but also about how his level of consumption compares with that of other consumers. This relative consumption effect can be implemented by including average consumption (within the social group) of the positional good as an extra term in the utility function: at least for a superior good, higher average consumption, *ceteris paribus*, reduces the consumer's utility since he believes himself to be relegated to a lower position within his social group. Moffit (1983) considers the stigma from welfare programmes in a related way: participation in welfare programmes is included as a variable in the utility function such that participation shifts utility downwards.

An interesting insight from this approach is that, when modelling questions of optimal taxation, the usual assumption that individual preferences are invariant to changes in tax policy may be inappropriate. Since tax changes affect other consumers' behaviour they also affect how a particular consumer views different baskets of goods due to the change in

average consumption of positional goods, as well as the changes in prices.

The signalling equilibrium that we will describe allows us to explain the nature of these shift effects and to link the consumer's preferences with and without the positioning or stigma effect by varying the assumption about social information. Our approach will also enable a precise analysis of policy measures which may be designed to limit such consumption interdependencies, or of policy measures which are influenced by such externalities while having a different principal motivation.

The importance of this topic is generally accepted since it offers an explanation for otherwise bizarre behaviour. Examples are the high premia paid for designer labels on clothes, the replacement of clothes merely to follow fashion, and the high expenditure in some households on cars or holidays. Sometimes such expenditure leads to social problems and demands for interference with the principle of consumer sovereignty. A recent case of a very expensive brand-named basketball shoe in the USA is perhaps extreme. The shoes became so much a passport to social success among poor urban teenagers that a campaign to limit their commercial promotion and advertising was initiated. More generally, heavy expenditure on childrens' toys at Christmas and birthdays, while insufficient is spent on nutrition or education, is put forward as one of many similar arguments to justify in-kind rather than in-cash benefits, and the general existence of "merit" goods, (see Barr (1987)).

Our analysis will be divided into two sections. First, the basic characterization of the signalling equilibrium will be presented in section 2. In later sections a particular quasi-linear form of underlying utility function will be used to find the consumer's demands in the signalling equilibrium and to investigate policy issues. This model is used since it gives a clear statement of priorities in consumption, and how these priorities are affected by the desire to achieve status within the social group. In section 4 the use of tax policy to achieve a Pareto-superior outcome is shown, and the reaction of the equilibrium to the introduction of various benefit systems is considered in section 5. The questions at issue involve whether the

benefit should be in-kind or in-cash, and whether it should be universal or targeted to the poorest members of the group. Some further issues and possible applications of the approach are considered in a final section.

## 2. Analysis

The simplest model for our purpose has consumers with a common utility function but different incomes,  $y$ . There are a continuum of consumers' incomes with lower support at  $b$ . A consumer's status is the level of utility that spectators infer for him. Inference is from observation of visible consumption levels of goods which are subject to income effects. Not all consumption is visible, else the value of the consumer's budget, and thus his maximum utility could be directly inferred. We will suppose that there are just 2 goods, denoted  $V$  and  $W$ , which are consumed at levels  $v$  and  $w$ . Good  $V$  is a superior good which is visible in consumption. Neither the consumer's income nor his consumption of good  $W$  is directly visible to spectators, but consumers' utility maximising behaviour allows spectators to work out  $w$  and hence income and utility from the observation of  $v$ . Spectators' conclusion about the consumer's consumption level, and thus income and utility, matters to the consumer since these reflect the status of the consumer in his social group.<sup>1</sup> The utility function assumed to hold for all individuals reflects all these demand characteristics and spectators' inference about status. It is assumed to be of the form:

$$U = F(f(v, w), s) \tag{1}$$

where  $f(v, w)$  can be considered the individual's private utility in the sense that this is what the consumer would maximise if the status level  $s$  were exogenous. Here, however the status

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<sup>1</sup> Reasons why status matters may be complex. For example, Frank (1985a) section 3 considers visible consumption as indicating a positive signal of ability and so higher visible consumption then leads to higher wage offers. This operates similarly to the original Spence models of education signals: high income people can more easily enhance their visible consumption (as high ability students can more easily obtain degrees) and if income and ability are correlated potential employers can separate the pool of applicants.

level  $s$  is assumed to be an increasing function of spectators' inference about the consumer's private utility  $f(v, w)$ . Without further loss of generality, status can be defined as exactly this inference of  $f(v, w)$ . Since  $v$  is observable while  $w$  is not, this is

$$s = f(v, g(v))$$

where  $g(v)$  is the spectators' conclusion concerning the unobservable  $w$  from the observable  $v$ . Thus utility is

$$U = F(f(v, w), f(v, g(v))) \quad (2)$$

Finally, we will impose the conditions that  $f(v, w)$  is strictly quasi-concave, and that  $F(.,.)$  has strictly increasing partial derivatives (and is thus also strictly quasi-concave in  $(v, w)$ ). We also assume that  $F(.,.)$  is an averaging function of the values of private utility and the spectators' inference of private utility, in that

$$z = F(z, z) \text{ for any } z. \quad (3)$$

This is a stronger condition than homogeneity of degree one, and can be interpreted as a calibration mechanism. It implies that if private utility is correctly inferred then the value of utility is that of private utility. Thus utility is an identical function to private utility if the spectators have full exogenous information about  $w$  (or equivalently about the consumer's income). *It is not an identical function but it will have the same value as private utility* if spectators make correct inferences about  $w$ , that is  $g(v) = w$ . If  $g(v) > w$  then  $f(v, g(v)) > U > f(v, w)$ .

To the extent that the consumer is viewed as balancing two utilities - his utility as he sees it and his utility as spectators see it - the  $F(.,.)$  function has characteristics of a social welfare function; it certainly does not conform to purely ordinal utility. One example of the function

$F(.,.)$  which we will concentrate on is a simple convex combination

$$U = (1-a) f(v, w) + a f(v, g(v)) \quad 0 < a < 1 \quad (4)$$

where the weight  $a$  represents the relative importance of private utility and status. If  $a = 0$  then status effects disappear.

A consumer maximising (2), subject to the budget constraint

$$w + pv = y \quad (5)$$

and spectators' inference function  $g(v)$ , maximises the function  $Uy$ :

$$Uy = F(f(v, y - pv), f(v, g(v))) \quad (2')$$

The first-order condition for maximising (2'), writing  $F_i$  for the partial derivative of  $F$  with respect to the  $i^{\text{th}}$  argument, etc., noting that  $1 - F_1 = F_2$  (by differentiating (2) with respect to  $z$ ) and assuming an interior solution (this assumption will be further considered later) is

$$F_1 \{f_1(v, y - pv) - p f_2(v, y - pv)\} + (1 - F_2) \{f_1(v, g(v)) + f_2(v, g(v)) dg/dv\} = 0 \quad (6)$$

In a signalling equilibrium, consumers maximise their utility given spectators'  $g(v)$  function, and this function is the best inference that spectators can make. If spectators know the form of the common functions  $F(.,.)$  and  $f(.,.)$ , but do not know an individual's income or consumption of  $W$ , they can correctly infer these from rational behaviour of consumers.<sup>2</sup> To see this replace the unknown  $w = y - pv$  with  $g(v)$  in (6).

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<sup>2</sup> There is no "noise" in making inferences in our model. Noise would be introduced if the parameter  $a$  or other preference parameters varied across individuals in a random way. Then we would expect less notice to be taken of signals: inferences would be a form of weighted average of the direct inference and the pool means.



$$f_1/f_2 = (1-F_1)(-dg/dv) + F_1 p \quad (7)$$

The left-hand-side of (7) is simply the marginal rate of substitution (MRS) of private utility. The weights  $1-F_1$  and  $F_1$  are between zero and one, so that MRS is less than  $p$  if  $-dg/dv < p$ . This will hold provided  $V$  is superior.<sup>3</sup> The consumer acts as if the relative cost of  $V$  is less than  $p$ . As income for the consumer is constrained at  $y$ , the consumer spends more on good  $V$  than would maximise his private utility. This result corresponds to that of Frank (1985a) proposition 1. Rearranging (7) yields a differential equation of the first order and the first degree:

$$(-dg/dv) = (f_1/f_2 - F_1 p)/(1-F_1) = H(v, g(v)) \quad (8)$$

If we can find a solution to the differential equation (8) in the form of a  $g(v)$  function which always satisfies (8) then we know that spectators are correctly inferring consumers' status provided only that consumers wish to maximise their utilities given  $g(v)$ . There is however an additional consideration. This is that the consumers of the lowest income type  $b$  will be revealed as such. Hence these consumers can decline to play any status-seeking game which reduces their utility from their private utility. Thus  $g(v)$  must satisfy

$$w^* = g(v^*) \text{ where } v^*, w^* \text{ maximise } f(v, w) \text{ subject to } w + pv^* = b;$$

This condition is a boundary condition which Mailath (1987) calls the "initial value condition".

Unfortunately it is not always possible to find the solution to (8) in terms of a finite number of known functions, see for example Piaggio (1958, chapter 2). However, solutions can be found for many cases of interest. A simplification that is productive is to consider the version

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<sup>3</sup> If  $v$  increases for constant  $p$ , then the inferred change in expenditure is  $\{p + (dg/dv)\} dv$  which has to be positive for  $V$  to be a superior good.

of  $F$  defined by (4). Then the differential equation can be written:

$$(-dg/dv) = (f_1/f_2 - (1-a)p)/a \quad (9)$$

Now a number of restrictions on the form of  $f(.,.)$  allow solutions to (9). Most obviously, two much-used classes of utility function can be applied. First, any  $f(.,.)$  which is homothetic will yield a MRS which is homogeneous of degree zero. Then (9) is a homogeneous equation (that is it can be written as  $dg/dv = H(g/v)$ ). Solutions are then reasonably straightforward. Second, any quasi-linear utility function will have one of  $f_1$  or  $f_2$  as a constant and the other as a function of one of  $g$  or  $v$  but not both. Thus the MRS is a function of only one variable, and the differential equation can often be solved by separation of variables. In either case the initial value condition determines the constant of integration.

In the next section we will take a quasi-linear form of  $f(.,.)$  and find a complete solution. Our choice is prompted by the issue we wish to investigate. A quasi-linear utility function has the property that, for some range of price and at low incomes, the consumer will consume only one of the products, while at higher incomes all *additional* income is spent on the other good. This property allows us to model the concept of priority consumption. On the other hand the possibility of a corner solution for the consumer's problem has to be incorporated within the signalling framework.

### 3. A Quasi-Linear Example

Our example will take the following form:

$$f(v, w) = v + \log(1+w)$$

so that when combined with (4) and the budget constraint the consumer's maximand is

$$Uy = (1-a) \{v + \log(1 + y - pv)\} + a \{v + \log(1 + g(v))\} \quad (10)$$

We assume that  $p > 1$  so that, at least in the absence of any status-seeking effect, the consumer will never consume just  $V$ . The consumer's choice of  $v$  satisfies the first order condition

$$1 - (1-a) p/(1 + y - pv) + \{a/(1 + g(v))\} dg/dv \leq 0 \quad \text{complementary with } v \geq 0 \quad (11)$$

When (11) has an interior solution for  $v$ , the differential equation (9) becomes (for  $a > 0$ )

$$-dg/dv = \{(1 + g) - (1-a) p\}/a \quad v > 0 \quad (12)$$

If  $a=0$  so that there are no status effects then the solution will be as if all consumers' incomes were public knowledge and no signalling took place. In this full information case (or when  $a=0$ ) the consumer's optimum consumption choice is:

$$w^0 = \min \{(p - 1), y\}$$

$$v^0 = \max \{(y - (p - 1))/p, 0\}$$

Thus in the full information case (or  $a=0$  case) those with incomes less than  $(p - 1)$  only purchase good  $W$ , while those with greater incomes spend all income in excess of  $(p - 1)$  on the visible good  $V$ .<sup>4</sup> We might interpret  $W$  as "necessary" or priority goods and  $V$  as "luxury" goods, which are only purchased after sufficient necessities have been acquired. The income consumption path in the full information case is shown in Figure 1 as  $0AB$ , where  $A = ((p - 1), 0)$ .

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<sup>4</sup> The equivalence of common knowledge of people's incomes (no unobservable consumption) and the absence of status effects ( $a=0$ ) is of interest. In some countries, and in some social groups, incomes are more nearly common knowledge. For example Switzerland and Sweden have public registers of their citizens incomes. There is some (admittedly heresay) evidence to support the notion that consumption signals play less role in these countries.

If  $a > 0$  and spectators have no prior information of an individual's income then spectators will infer a consumer's private utility by solving (12) for the rational inference  $g(v) = w$ . The general solution to (12) is

$$g(v) = Ge^{-v/a} + ((1-a)p - 1) \quad (13)$$

where  $G$  is a constant of integration. This function, for a given  $G$ , would yield a rational and consistent inference for any  $v > 0$  because spectators believing (13) would have made correct inferences, given the consumers knew that (13) was the inference function that spectators used. The remaining questions relate to the inference from observing  $v=0$  (so far (12) holds only when (11) is an equality) and the determination of  $G$ . Consider the individual with least income of level  $b$  and assume that  $b < p-1$ . He can always ignore the status game and get utility  $\log(1 + b)$  by consuming only good  $W$ , since spectators can think no worse of him than that he is of type  $b$ . If he consumes any  $v > 0$  then it would pay all higher income consumers to do so as well in any fully separating equilibrium. Thus he will only consume good  $W$ .<sup>5</sup> Suppose that all consumers with incomes less than or equal to some value  $\tilde{y} > b$  only purchase  $W$ . Then a reasonable inference for spectators observing a zero value for  $v$  is that  $g(0) < \tilde{y}$ . However by the expenditure of a tiny amount  $\epsilon$  on  $V$  the consumer can lift himself out of the "pool" and obtain a status relating to an inference  $g(\epsilon)$  given by (13). Thus the inference function cannot have a discontinuity at 0. The only type who will register exactly zero consumption of  $V$  is the consumer with least income. Basically, consumers have to buy inefficiently large amounts of  $V$  to show their types. In an equilibrium the lowest income individual will find it most costly to buy any  $V$  and so will still show the lowest type. The individual with the next lowest income only has to buy enough  $V$  to make it unprofitable for the lowest type to pretend to be better than him.

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<sup>5</sup> If  $b > p-1$ , then all consumers would consume some  $V$  in a full-information equilibrium; however the consumer with income  $b$  would not change his behaviour in the signalling equilibrium. all other consumers would shift to buying more  $V$  in order to signal their higher incomes.

Since (13) cannot have a discontinuity at  $v=0$ , and since  $g(0)$  can only be  $b$ , we can solve for the constant of integration  $G$  to yield a unique signal extraction or inference function  $g(v)$ .<sup>6</sup> Solving  $G$  from  $g(0) = b$  in (13) and substituting back yields

$$g(v) = \{(b - ((1-a)p - 1))e^{-v/a} + ((1-a)p - 1)\} \quad (14)$$

and the full signalling equilibrium is given by a signal  $v^*$  indicating a consumer with income  $y^*$  and consumption of  $W$  of  $w^*$ :

$$y^* = g(v^*) + pv^* \quad (15)$$

$$w^* = g(v^*) \quad (16)$$

Finally the maximum utility associated with the signal  $v^*$  is given by

$$\begin{aligned} U_{y^*} &= (1-a) \{v^* + \log(1 + y - pv^*)\} + a \{v^* + \log(1 + g(v^*))\} \\ &= v^* + \log(1 + y - pv^*) \end{aligned} \quad (17)$$

Although explicit solutions for  $v^*$ ,  $w^*$  and  $U_{y^*}$  cannot be found, the qualitative form of consumption paths for different values of  $a$  are shown in Figure 1. An important conclusion can be drawn from the analysis. This we will state as

*Proposition 1:* The consumption bundles of all but the lowest income individuals are biased away from the full-information choices; in particular even those individuals, with  $p-1 > y > b$ , who would consume no good  $V$  in the absence of the status motive, will consume positive amounts in the signalling equilibrium.

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<sup>6</sup> The solution is unique given the belief that there is a rational expectation that any  $v$  could be observed. Other beliefs might support other kinds of equilibria. For example if it was believed that all observations of  $v_{i-1} < v < v_i$  imply the same income level  $y_i$ , then a pool of individuals with average income  $y_i$  might choose  $v_{i-1}$ .

Only if there were some (strictly positive) minimum quantity of  $v$  that had to be bought would there be any pool of consumers who only bought  $W$ . The status-seeking pervades virtually all society.

There are at least two features of the effects of status-seeking that appear to differ from the Frank model. First, the initial value condition ties the behaviour of the least income individual to his private utility maximising behaviour. Second, even when consumption of  $V$  is far from optimal for some individuals in the absence of status effects, these individuals will buy  $V$  if there is an arbitrarily small status effect.

The extent of the utility loss from status-seeking by society is indicated in Table 1 where three levels of status effect are used for numerical calculation. Results in the first three parts of the Table are reported for  $p=2$  and four different income levels, ranging from .1 to 3. The three levels of status effect are  $a = 0$ ,  $a = .02$ , which is very nearly no status effect at all, and  $a = .2$  which has very considerable utility effects. The choice of parameter values is such that  $A = 1$  in Figure 1. The following conclusions can be drawn from the numerical analysis:

- i. Small status effects are unimportant since the consumers are deviating only marginally from optimal choices. However they are more important for low income consumers since these consumers would not have bought  $V$  at all in the absence of status effects. For them a more than marginal change in  $p$  would have been necessary to provoke the consumption choice observed under status-seeking, and thus for them first order rather than only second order effects are relevant. This is seen from the Table. The effect on the relative consumption levels of goods  $V$  and  $W$ , and on the proportional reduction in utility is greater the smaller the consumer's income until the very lowest income consumers. For example, a consumer with income of .5 loses 11% of his utility, while one of 3 loses only 1.5%, as  $a$  increases from 0 to .2. Thus status-seeking can have relatively more damaging consequences for those with low incomes.

ii. The income propensity to consume good  $V$  is approximately  $1/5$  for low incomes when status effects are large ( $a = .2$ ). Thus this explains how it is that people who cannot afford to properly feed their children may still give them expensive birthday presents. The individual with an income of  $.5$  (half the level at which consumers begin to buy  $V$  in the full information case) spends over 40% of his income on  $V$  when  $a = .2$ .

A final remark relates to comparative statics. We can consider a typical individual with income above the minimum. Suppose this individual moves social groups, but does not change his income. This would lead to possible changes in both the group minimum income  $b$  and the status effects parameter  $a$ . First assume that the only difference in the new social group was a higher value of  $a$ . Then the individual will increase his consumption of  $V$  (see Figure 1). Thus an academic who gets a job in a bank will buy more suits. This is of no surprise. However, now consider that the minimum income in the same social group decreases. This may be because of a business recession. Then our individual, whose income has not changed will increase his consumption of  $V$ , even though his status appears stronger. This prediction of the model can be seen by shifting the equilibrium curve in Figure 1 back to the left (and thus up) as  $b$  falls. Even those individuals whose incomes have fallen slightly will increase their consumption of  $V$ . This effect is one that can often be observed: it is the phenomenon of dancing while the Titanic sinks, of throwing a party when business is bad. It is even more important to secure proper status when there are very low status types around for whom you could be mistaken.

#### *4. Tax Policy*

We now consider how far the general over-consumption of  $V$  can be corrected by the imposition of a tax on  $V$ . To demonstrate the possibility of a Pareto improvement, continue to consider a sample of individuals with incomes  $.1, .5, 1$ , and  $3$  respectively and take  $a = .2$ . We may think of this as a non-random stratified sample from an income distribution with minimum income  $b = .1$  and maximum  $3$ . Consider a specific tax of  $t$  so that the price of  $V$

increases to  $p+t$ . Let the tax gathered from our (non-random) sample be given back to the individuals in proportion to their incomes, so that the government budget balances within the sample. Since  $W$  is the numeraire, we can think of the consumers having income in units of  $W$ , buying  $V$  and supplying tax (again in units of  $W$ ) which is then allocated as more income in direct proportion to the individuals' original incomes. Obviously this is simply taxing  $V$  and subsidising  $W$ . The first question we ask is what is the welfare maximising tax/subsidy policy which will leave all consumers (in our sample) at least as well off as before the tax policy? This is seeking the best (in a utilitarian sense) Pareto-improving tax policy, and reflects our concentration on removing the worst of the inefficiencies of the signalling equilibrium, rather than using tax policy for redistribution. As the tax on  $V$  increases, the individual with the highest income gains least since he spends the greatest share of income on  $V$ . Thus the problem is to maximise the sum of sample welfare subject to the utility of the highest income ( $y=3$ ) individual not falling.

The results are given in the part 1b of Table 1. Just less than one fifth of the welfare loss from status-seeking (compare  $a=.2$  with and without tax to  $a=0$  with no tax) has been saved by a tax on  $V$  of .09 and a subsidy on  $W$  of .029. This is despite a most unlikely preference system for Pareto-improving beneficial tax policy, due to the very different relative consumption choices at different incomes. Of course the exercise we have presented is only indicative. In particular, a different "sample" reflecting a different underlying income distribution, would yield a different outcome. However as the status-seeking leads *all* consumers to over-consume  $V$  some Pareto-improving tax policy will exist.

The final part 1c of Table 1 shows the simple utilitarian optimal tax policy for the sample individuals. Calculating the sum of utilities when  $a=.2$  with no tax at 2.7769, and that with the optimal tax at 2.8638 shows that most of the welfare loss from the status effect is made up. When there is no status effect ( $a=0$ ) welfare from the top panel of Table 1 is calculated as 2.8870. Presumably a non-linear tax exists which enables the first-best to be achieved, but the linear tax gets very near.



#### 4. Transfers

The effect of transfers to the poor on their consumption is of particular interest and will be considered in this section. It is often argued that such relief to the poor is better made as "in kind" transfers rather than as direct income supplements.<sup>7</sup> One reason for thinking this is society's view that the judgement of the consumer is lacking: thus in-kind transfers of education, health and childcare services are made in case the consumer does not fully recognise that these are "merit" goods. Our analysis has given an alternative interpretation to a possible need to restrict consumer sovereignty. If consumers seek status their consumption pattern will deviate from that which a benevolent observer would think appropriate, and create negative externalities for others. Indeed the consumers would wish for a policy which protected them from themselves by reducing the need to signal status. An example would be the family in financial difficulties which is stopped from taking on more debt by protective legislation. Since the legislation operates on all families excessive expenditure is curbed without changes in status. Benefits have an income-shifting effect and a possible consumption correcting effect. They might also have a direct signalling effect.

Our analysis will thus consider two related questions. First, if a flat rate of support is paid to all consumers, irrespective of income, does whether this support is paid in cash or in kind affect the consumer's consumption pattern? To approach this question, we compare the flat rate support of an amount  $w_0$  of  $W$  to each consumer when this can be transformed into good  $V$  and when it cannot. The second question is when income support is paid to only some consumers: those with incomes less than a value  $y^c$  and *who claim the support*. In this case we assume that the claim is public knowledge. Thus consumers with low incomes have to decide whether to claim the support, revealing their poverty, or do without. If they claim the support then their incomes are made up to the level  $y^c$  by an income supplement. Of course all these transfer programmes cost resources but we will assume that they are financed by an

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<sup>7</sup> See for example Barr (1987, ch 12) for an extensive discussion; also Blackorby and Donaldson, 1988.

income tax (on incomes before benefit) and that the  $y$  data is income net of this tax.<sup>8</sup> We will be concerned here simply with the possible different effects on consumption decisions of various transfer policies.<sup>9</sup>

First consider a fixed transfer of  $w_0$  of good  $W$  to all consumers, and that this transfer can be exchanged in whole or in part for good  $V$ . Thus this is essentially an income transfer, an "in-cash" benefit. Incomes now have a lower support of  $b+w_0$  rather than  $b$ . The income consumption paths for two values of  $w_0$  are shown in Figure 2. In both cases the value of  $b + w_0$  is assumed less than  $(p(1-a) - 1)$ . The value of  $w^*$  still tends to the same value  $[(p(1-a) - 1)]$ , but it is steeper: consumers spend at least  $b+w_0$  on good  $W$ , since this amount of income is outside the need for signalling. The consumption path has not just shifted to the right. For high income consumers the signalling equilibrium is little affected since a change in  $w_0$  does not much affect their need to signal their types. Providing  $b+w_0 < (p(1-a)-1)$ ,  $w^* > b+w_0$  and a restriction that the income benefit  $w_0$  could not be exchanged in whole or in part for good  $V$  is not binding. Thus we have Proposition 2:

*Proposition 2:* If  $b+w_0 < (p(1-a)-1)$  then whether the universal support  $w_0$  is in cash or in kind has no effect.

If  $b+w_0 > (p(1-a)-1)$  then the consumption paths will be very different depending on whether or not  $w_0$  can be exchanged, but this case is of limited interest since it is unlikely that a flat rate benefit would be so large.

In the case above we have been looking at the provision of cash or kind as a flat rate benefit to all consumers irrespective of their income. Much social provision is like this, often

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<sup>8</sup> One interpretation is that the benefit is financed by a progressive income tax where the incidence falls mostly on those individuals with high levels of consumption of  $V$ , even in a full information world, and whose consumption pattern is relatively little affected by signalling.

<sup>9</sup> We do not consider the case where acceptance of social provision or benefit of  $W$  prohibits further private purchase, or where private purchase prohibits the acceptance of social provision. Such models are discussed in Ireland (1990) and Besley and Coate (1991), but without consideration of the signalling aspects.

including health and education services. In the UK basic child benefit is also universally granted and the take-up rate is also extremely high. The outcome would not be very different if the benefit had been targeted to the poorest consumers, providing that take-up was not optional. For example, if all incomes less than  $y^c$  were made up to  $y^c$  by the government and  $y^c < (p(1-a) - 1)$ , then the consumption path would be as in Figure 2 with  $y^c = b + w_0$ . (Although of course the density of individuals along the path would be different. However it is a characteristic of our approach that it is the range of types rather than their density that matters.) The question arises as to whether all consumers with incomes less than  $y^c$  would in fact wish to take up the government benefit if they had to claim in order to obtain it. The answer is obviously "yes" if the identity of who receives the benefit is private information to which the spectators have no access. If however the spectators observe who claims benefit the situation is different. Consider an individual with income below  $y^c$ . This individual would reveal his income as being less than  $y^c$  by applying for the income supplement. He is then in a pool of consumers with pre-benefit incomes less than  $y^* \leq y^c$ , where  $y^*$  is the lowest type to apply for benefit. Within this pool, the consumer cannot decide to purchase some  $V$  to signal his position within the pool since all members have the same post-benefit income  $y^c$  and thus will not be able to act differently in order to separate themselves. Thus spectators infer an average pre-benefit income  $\phi(y^*)$  (the average  $y$  of all those with incomes less than  $y^*$ ) for all members of the pool. On the other hand, the consumer could forsake the benefit and perhaps buy some tiny positive amount  $\varepsilon$  of  $V$  to reveal that he was (just) more than marginal. The consumer with income  $y^*$  is indifferent between these courses of action. Thus  $y^*$  is defined by

$$(1-a) \log(1 + y^c) + a \log(1 + \phi(y^*)) = \log(1 + y^*) \quad (18)$$

Since  $\phi(y^*)$  is less than  $y^*$  if there are any consumers with  $y < y^*$ ,  $y^*$  is strictly less than  $y^c$ . This leads to the fairly obvious proposition:

*Proposition 3:* If the take up of an income supplement increasing income from  $y$  to  $y^c$  is

voluntary, take up is not 100%. Further the extent of non-application decreases the utility of those who do apply, and the take-up decreases as status becomes more important (the parameter  $\alpha$  increases).

The second part of the proposition of course relies on the independence of the support level  $y^c$  from the fiscal cost of the benefit provision. It may be that lower take-up allows a higher level of support. The income consumption path for the voluntary benefit is shown in Figure 3.

### *5. Conclusions and Extensions*

We have shown how the desire to achieve status can bias consumption bundles and lead to inefficient utility levels. It is an obvious corollary that an appropriate taxation policy may lead to a Pareto improvement. Further, universal benefits in cash or in kind reduce the inefficiency of status-seeking for the poor, but the situation is more complex when benefits are means tested, and the take-up decision is public information. In order to raise minimum income to  $y^c$  it would be necessary to offer supplementation up to a higher level income. This makes benefits a coarser targeting instrument.

Of course our analysis has been based on a fairly specific quasi-linear example. This has however enabled us to show how status-seeking leads to consumption of particular signalling goods even when private utility would suggest that such goods offer a very poor option. The use of a full-information baseline case (equivalent to no status effects), where good  $V$  is not consumed by low-income individuals, demonstrates that even a small status effect can cause significant distortions to the poor.

The approach here can be extended to analyse a number of issues in the role of status and stigma within public policy. The question of whether to use a cheap or free social provision of a private good such as healthcare, education or pension, or whether to opt out of the social provision and instead choose from a private market has been considered by Ireland (1990)

and Besley and Coate (1991). Here the separating characteristic has been taken as quality of the provision, the richer members of the community choosing the private supply. Obviously, however, status is central to this choice, and the model used here could be adapted to consider whether status-seeking changes the relative qualities of private and social supply in general equilibrium. The extension of the model to incorporate many products is straightforward, provided a clear distinction is maintained between observable and non-observable consumption. The model could also be extended to a multi-period framework and the question of saving analysed. It is hoped to return to these questions in further work.

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Figure 1: Income Consumption Paths and the Status Effect

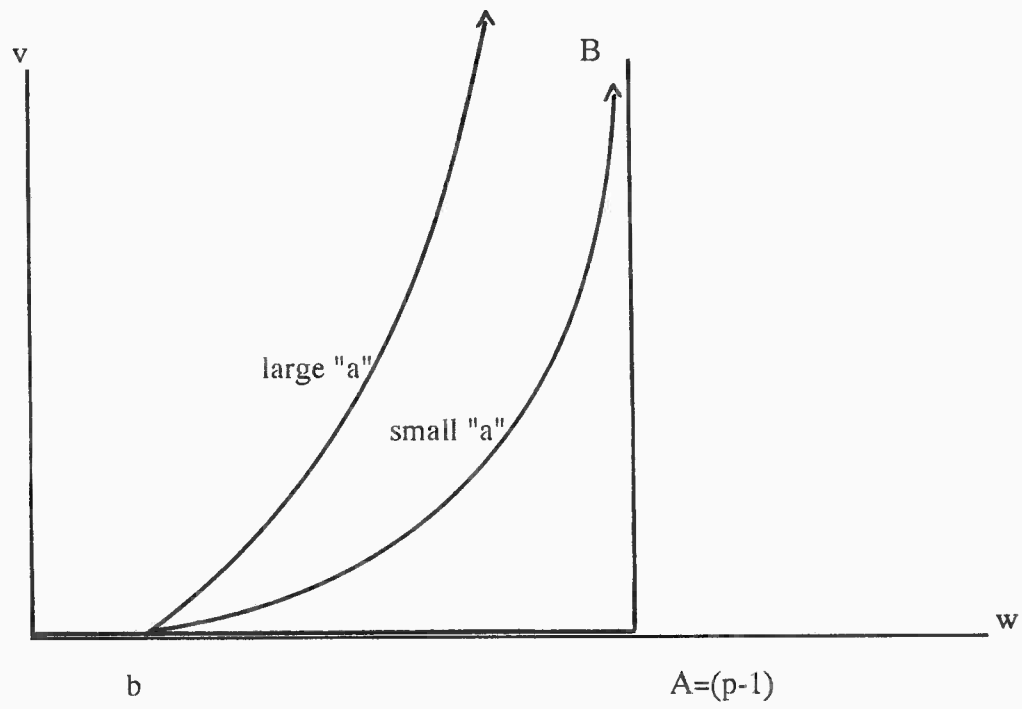


Figure 2: Income Consumption Paths and Universal Benefits: the case of  $b+w_0 > (p(1-a)-1)$

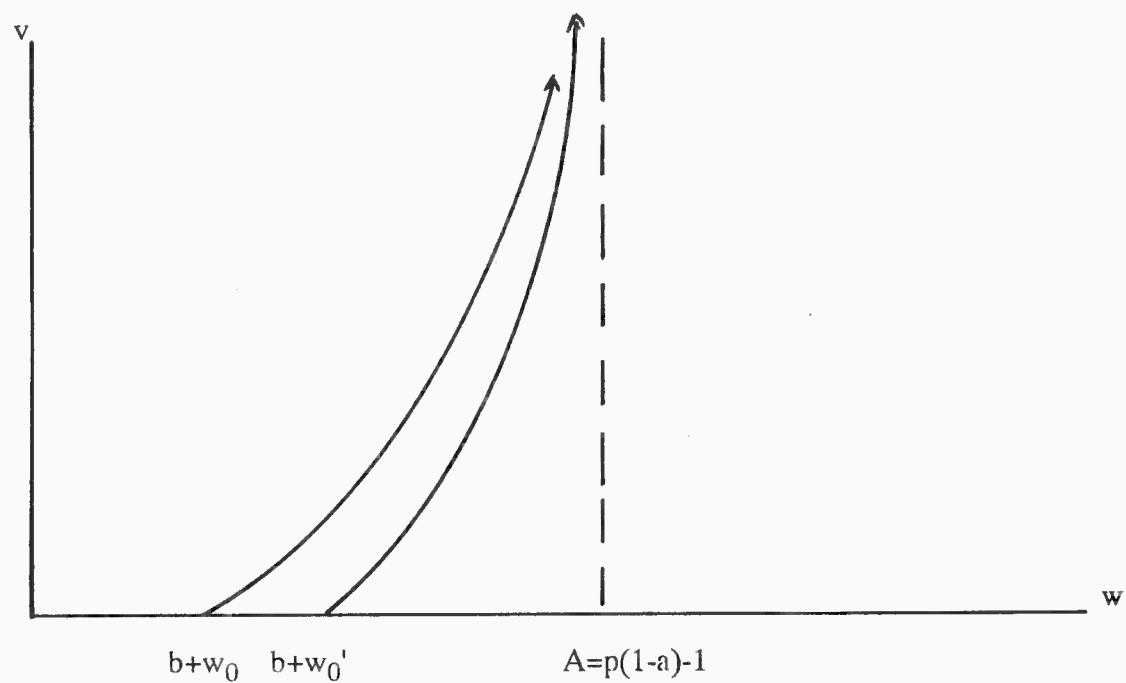
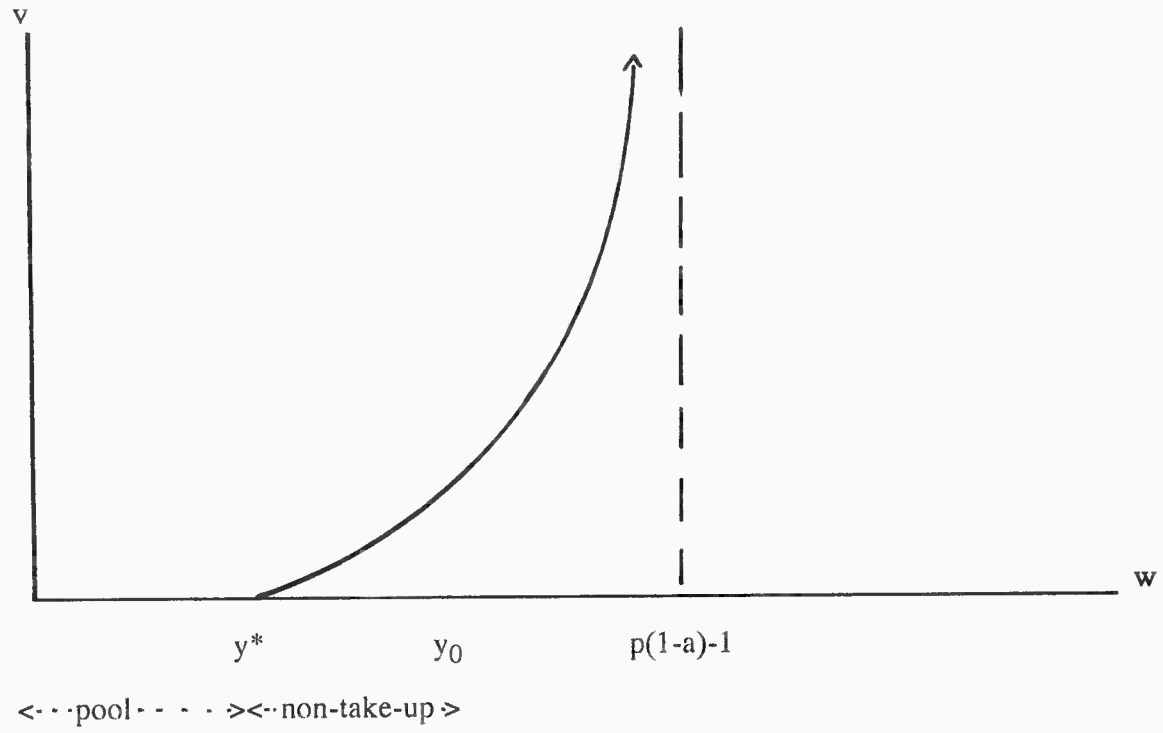




Figure 3: Income Consumption Paths when Benefits are Voluntary



**TABLE 1: Engel Curves for different values of a.****1a. Parameters  $p = 2$ ,  $b = .1$** **a = 0** ( no status effect)

y =	.1	.5	1	3
U =	.0953	.4055	.6931	1.6931
v =	.000	.000	.000	1.000
w =	.1	.5	1	1

**a = .02** (some status effect)

y =	.1	.5	1	3
U =	.0953	.4015	.6917	1.6929
v =	.000	.0115	.0520	1.0200
w =	.1	.4769	.8960	.9600

**a = .2** (strong status effect)

y =	.1	.5	1	3
U =	.0953	.3619	.6499	1.6698
v =	.000	.1009	.2661	1.2006
w =	.1	.2981	.4678	.5988

**1b. Optimal Pareto-Improving Tax****a = .2;  $p = 2.09$  (including a tax of .09);  $h = .029$  is the extra proportionate income, and the budget is balanced.**

y =	.1(1+h)	.5(1+h)	(1+h)	3(1+h)
U =	.0980	.3700	.6603	1.6698
v =	.000	.0945	.2493	1.1569
w =	.1029	.3172	.5084	.6702

**1c. Utilitarian Welfare-Maximising Tax****a = .2;  $p = 2.8229$  (including a tax of .8229);  $h = .1862$  is the extra proportionate income, and the budget is balanced.**

y =	.1(1+h)	.5(1+h)	(1+h)	3(1+h)
U =	.1121	.4119	.7121	1.6278
v =	.000	.0614	.1578	.8215
w =	.1186	.4198	.7406	1.2395