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Rethinking public economics: the implications of rivalry and habit

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The aim of public policy should be to maximise people's happiness, suitably aggregated. This requires us to understand what actually produces happiness. In traditional economics, we simply assume that someone's current happiness depends on their current choice-set. The larger the choice-set the happier the person. So if my choice-set increases and everyone else's remains the same, social welfare must increase.

But this conclusion completely ignores the impact of one person's pay rise on the welfare of his colleagues. Such interdependencies are a basic part of human experience, and a theory which ignores them is deeply misleading. In consequence some critics would have us discard the whole approach. But this is wrong. Instead we should expand our framework to take into account the full range of human experience, rather than rejecting it.

But how? Until recently we had to rely mainly on introspection or on observations of behaviour – with no direct evidence about what produced happiness. But now we are accumulating more solid evidence on what actually affects happiness, and it confirms the powerful negative effect of other people's incomes. Whether we like it or not, human beings are rivalrous, and it is time for mainstream economics to incorporate this key fact of human nature.

There is a second key fact – habituation. Many forms of consumption give more pleasure at first than they do over the long haul. And people do not fully foresee this when they embark on a more expensive life-style.

Both these phenomena lead to serious market failures, which public policy needs to offset. Envy means that any income gain is a source of major negative externality – perhaps the biggest negative externality in modern society. Habituation involves major informational errors, which again lead to major inefficiency.

The purpose of this paper is to see (in Part 2) what policy responses these phenomena require and more generally to see how they modify the standard propositions of public economics.[1] We shall find that rivalry and habit provide major new arguments for state activity. But first we need to establish the pervasive nature of the phenomena (in Part 1).

[1] Many of these issues have been raised before by among others Easterlin (1973), Hirsch (1976), Scitovsky (1976), Layard (1980) and above all Frank (1985 and 1999). But their analyses have had remarkably little impact on mainstream public economics. For example the latest edition of J. Stiglitz, Economics of the Public Sector contains no treatment of these issues.

1. EVIDENCE

There are two types of evidence.[2] The first, which is only circumstantial, points out that over time and across OECD countries rises in aggregate income are not associated with rises in aggregate happiness. The second type of evidence is micro-econometric and tries to identify the actual mechanisms which are causing individual happiness.

In both cases we rely on people's response to questions about happiness and job satisfaction. There is much evidence to support the objectivity and comparability of these answers. Individual self-reports of happiness are highly correlated with reports by others and with physical measurements of brain EEGs and smiling behaviour (Diener and Suh, 1999). Individual job satisfaction is highly correlated with quitting behaviour and with absenteeism (Freeman, 1978). So let us look at what people say.

Aggregate time-series and cross-sections

At the aggregate level, there has been no increase in reported happiness over the last 50 years in the US and Japan, nor in Europe since 1973 when the records began.[3] Nor has there been any particular change in the shape of the happiness distribution. These facts are remarkable, given the astonishing widening of the choice-set open to people in the western world. The facts hold cohort by cohort – individual cohorts do not get happier over time despite the huge increase in their living standards.

The data here relate to questions like 'Taken all together, how would you say things are these days – would you say you are very happy, pretty happy or not too happy?' Figure 1 shows the graph for the US.

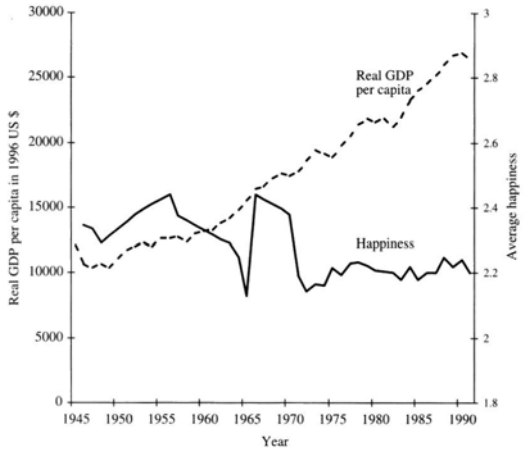

Figure 1. Happiness and income per capita in the United States, 1946–91. Data from World Database of Happiness, Bureau of Economic Analysis of the U.S. Department of Commerce and U.S. Bureau of the Census.

[2] For surveys see Diener and Biswas-Diener (2001) and Inglehart and Klingemann (2000).
[3] See for example Frey and Stutzer (2002).

Of course within countries the rich are always happier than the poor.[4] But over time, as absolute incomes rise, the happiness levels at each quartile fail to rise (see Table 1[5]). This suggests that the rich are benefiting from the level of their relative income, rather than from their absolute income.

	Top quarter		Bottom quarter	
	1975	1998	1970	1998
Very happy	39	37	19	16
Pretty happy	53	57	51	53
Not too happy	8	6	30	31
	100	100	100	100

Equally, if we compare countries, there is no evidence that richer countries are happier than poorer ones – so long as we confine ourselves to countries with incomes over $15,000 per head.[6] (For those who doubt whether happiness can be compared across countries I include Annex A which should reassure them.)

At income levels below $15,000 per head things are different, since people are nearer to the absolute breadline. At these income levels richer countries **are** happier than poorer ones. And in countries like India, Mexico and Philippines, where we have time series data, happiness has grown as income levels have risen.[7] Moreover, within each poor country the happiness gap between rich and poor people is greater than it is in more prosperous parts of the world.[8] So economic growth is indeed more important for poor than for rich countries – as the diminishing marginal utility of income would lead us to expect.

The aggregate statistics raise the basic question of why in the West happiness has stagnated while incomes have exploded. But they cannot uncover the mechanisms at work. That requires micro-econometric studies of happiness or of job satisfaction.[9]

Micro evidence: rivalry

The great majority of these studies show a strong negative effect of other people's incomes (rivalry) and of own lagged income (habit). On rivalry, in the US Blanchflower and Oswald (2000) found that a rise in the average income in the state where you live reduces your happiness by one third as much as a rise in your own income increases it.[10] In Britain, Clark and Oswald (1996) found that a rise in the wages of comparable workers reduces your job satisfaction by as much as a rise in

[4] There is a causal relationship running from income to happiness – see for example Winkelmann and Winkelmann (1998) and Gardner and Oswald (2001), who use panel data to prove it.
[5] US data. General Social Survey tapes
[6] Inglehart and Klingemann (2000)
[7] Diener and Oishi (2000).
[8] Inglehart and Klingemann (2000)?
[9] Show trends in job satisfaction from GSS.
[10] Table 8 column 4 – but the controls for prices and unemployment were poor. Diener *et al* (1993) claimed no effect of average income, but their statistical analysis was less comprehensive than Blanchflower and Oswald's.

your own wage increases it.[11] Clark (1996) also showed that job satisfaction was adversely affected by the pay of your spouse. Comparisons also affect behaviour: if a woman's husband earns less than her sister's husband, the first woman is more likely to go out to work – in order to keep up with the living standards of her sister (Postlethwaite *et al*, 1998).

But perhaps the most telling indicator of the problem comes from a simple questionnaire administered to Harvard graduate students in public health. They were asked to choose between living in worlds *A* and *B*:[12]

A	you earn \$50k, and others earn \$25k
B	you earn \$100k, and others earn \$250k

Over half the students chose world *A* – so sensitive were they to the earnings of others. One can discuss *ad nauseum* why we make these comparisons. Some would call it envy but is probably best thought of as a desire to exceed, or at least not fall below, the social norm.

Such sensitivity (though sad) would not distort choice if people were equally sensitive to all elements of other people's lives. For example, if people compared their leisure with others' as intensely as they compared their earnings, the private income-leisure choices of the individual would remain socially efficient. However that is not how things are. People are much less sensitive to other people's leisure than they are to other people's earnings. The same students were asked to choose between worlds A' and B':

A'	You have 2 weeks vacation and others have 1 week
B'	You have 4 weeks vacation and others have 8 weeks

Only 20% of the students chose world A'. People compare their conspicuous consumption with others but are much less concerned with their comparative access to leisure, public goods and inconspicuous consumption. That is why we should worry lest the latter get under-produced.

In reply to this, libertarians often argue that the rivalrous person has only himself to blame, and he should not be protected by public efforts to discourage conspicuous consumption. But this is to miss the mark. We are all rivalrous, to a greater or lesser degree. Which one of us would not suffer if all our colleagues except us got a raise? It is an intrinsic part of human nature, wired into the genes. When a monkey becomes top monkey, his serotonin count improves, and when he is displaced it falls.[13] This competitive instinct promoted survival in the wild. In our tamer world it is completely rational to limit those spheres of life where it survives in its more extreme forms, and to promote optimal levels of less rivalrous activity.

[11] Comparison income was measured using a regression equation of wages on characteristics.
[12] Solnick and Hemenway (1998), quoted in Frank (1999).
[13] McGuire *et al* (1993).

Micro evidence: habit

On the role of habituation, most studies find that lagged income has a negative effect on current happiness. In a panel study of individuals Clark (1999) found that job satisfaction in the UK is unaffected by the level of wages, and depends only on their rate of change – implying a strong negative effect of habituation coming from the lagged wage. At a more aggregate level, in a panel of countries Di Tella *et al* (2002) found that lagged income reduced happiness by two thirds as much as current income increased it. (Thus a steady rise in income did increase happiness somewhat, but in the historical record this effect was offset by the negative effects of other changes – higher divorce, crime and so on.)

Another, less direct, approach to habituation is to ask people how much income they would need in order to lead a reasonable life. The Gallup Poll in the US has for many years asked, 'What is the smallest amount of money a family of four needs to get along in this community?' Over time the answers rise in line with actual incomes. Many other studies have found similar results.[14]

A different approach is cross-sectional.[15] Each individual is asked, 'What after-tax income would you consider for your family to be: very bad, bad, insufficient, sufficient, good, very good?' From these answers we can identify for each individual the income level which is mid-way between sufficient and insufficient. This 'required income' varies strongly with the actual income of the individual – with a 10% rise in actual income predicting a roughly 5% rise in required income.[16]

The process at work here is the basic human process of adaptation, whereby people adjust to a change in circumstances, be it upwards or downwards. This is for example the mechanism that explains the famous endowment effect, whereby people suffer more from losing something than they would gain from obtaining it. One example of this is the mug experiment, where people are asked how much they would be willing to pay for a mug. They are then given the mug and asked how much they require to part with it. Their 'selling' price is typically more than 50% higher than their 'buying' price. This example illustrates, by extension, the importance which a standard of living acquires, once we have experienced it. It is what psychologists sometimes call the 'hedonic treadmill'.

But such processes of adaptation would cause no market failure if individuals foresaw them and took them into account. There is lots of evidence that people do not correctly forecast how they will adapt.[17] For example, academics think that gaining tenure will make them happier for longer than it does - and so on. Even the participants in the mug experiment fail to forecast how much they will value the mug once they have it.[18] And, as for smoking, people's plans to smoke may indeed by affected by the future price of cigarettes as shown by Becker and Murphy (1988). But people still greatly under-predict their future cigarette consumption, given what they

[14] Frank (1999) p.X
[15] Van Praag and Frijters (1999)
[16] Similar results are found in 10 different countries (?). The 'required income' also varies with family size in a way that produces sensible equivalent scales for family income requirements.
[17] Loewenstein and Schkade (1999).
[18] Loewenstein and Adler (1995).

now consume. For example, among high school students who smoked a pack a day, only 32% expected to be doing it in five years time, compared with 70% who actually did it.[19] In fact almost all of us underestimate how much the level of living we adopt today will affect our utility function in the future.

But, again, it is crucial whether we adapt to some things more than others. For example, if we had 10% more leisure would we soon take it for granted in exactly the same way in which we might take for granted a 10% increase in our material standard of living. So far as I know, there is little clear evidence on this[20], but Frank (1999) makes a powerful case for the view that we would experience 'gains that endure', if we had more social life, more time with our kids, less travel-time to work, more autonomy at work, more job security and better health care. By contrast we rapidly adjust to a better car and a bigger house, with little continuing benefit. Remarkably, the time series reveal that, as people's income increase, their level of financial anxiety remains as high as ever (?)

To conclude, the evidence shows that, at the level of society as a whole, both rivalry and habit limit the effect of higher consumption upon social well-being. They also distort choice. To examine the extent of the distortion, we need to know how the negative effects of average consumption and own lagged consumption compare in magnitude with the positive effect of own current consumption. The evidence presented above shows that the negative effects are substantial, but not precisely defined. In what follows we shall assume that (i) the negative effect of average consumption upon utility is 0.3 times the positive effect of own current consumption and (ii) the negative effect of own lagged consumption is also 0.3 times the positive effect of own current consumption. Unless the effects are at least this large, it is extremely difficult to explain why happiness has been so stable in the OECD countries while real living standards have risen so much.

[19] Loewenstein and Schkade (1999).
[20] HELP.

2. POLICY

We can now ask how far the findings of Section 1 require us to rethink the standard propositions of public economics. To make a crude beginning, let me examine the following fairly standard propositions.

1. Consumption-leisure choice
The first-best solution would involve no marginal taxation of earnings. If taxes were needed to finance public goods, they should ideally be levied in lump-sum form (or be made as intra-marginal as possible).

2. Cost-benefit analysis and public expenditure
Benefits should be valued by the amount that individuals would be willing to pay. Public expenditure should be undertaken when benefits exceed costs. Tax costs should allow for the excess burden of taxation.

3. Choice between goods
Any consumption tax should be levied at the same rate on all goods and services unless there is strong evidence about differential complementarities with leisure.

4. Redistribution
If lump sum transfers could be made, these should equalise the marginal utility of income experienced by each individual. Since they cannot, we face an equity-efficiency trade off.

How well do these propositions survive in the presence of the facts presented in Section 1? In answering, we shall assume all individuals to be identical, until we come to redistribution.

Consumption-leisure choice: the effect of rivalry

We can begin with the choice of hours of work. Since we are interested in how big an issue this is, we shall assume a specific utility function, the Cobb-Douglas[21], with

$$u_i = (c_i - \beta c)^{\alpha}(1-h_i)^{1-\alpha} = c_i^{\alpha}\left(1-\beta\frac{c}{c_i}\right)^{\alpha}(1-h_i)^{1-\alpha}$$

Here c_i is own consumption, c average consumption and h_i is the fraction of time worked. As the right hand expression shows, consumption is partly valued for its own sake, but partly also in relation to the consumption level in the rest of society. We shall assume that the wage is unity so that $c_i = h_i$.

We can now compare the optimum hours of work for society and for the individual. The social optimum maximises utility taking c_i/c as fixed. Socially optimal hours

[21] This gives a vertical labour supply curve – which is about right for men and women taken together.

are therefore $h = \alpha$. But the individual maximises utility taking *c* as given. He therefore works for

$$h = \frac{\alpha}{\alpha + (1-\alpha)(1-\beta)}$$

He works longer than is optimal and the difference could be quite substantial. We shall assume that $\alpha = .4$ and (as we have said) that $\beta = .3$. Then optimal hours are 0.4 (say 40 actual hours out of a total of 100 'available'). But the individual, who ignores the negative externality which his work gives rise to, works nearly 20% more than is optimal. He is working only partly for the intrinsic value of consumption but also partly to compete with the consumption of others.

This is an externality problem. When someone works an extra unit and increases his consumption by one unit, this affects the average level of consumption faced by the other members of society. To be precise, average consumption is raised by $1/n$, which reduces the utility of each of the other *n* people by $-\beta(1/n)\partial u/\partial c_i$. Since there are *n* others, the total negative externality measured in utils is $\beta\partial u/\partial c_i$. To prevent this loss of utility requires a tax of equal magnitude.[22] The optimal money tax is this externality measured in utils divided by the marginal utility of consumption. Thus the optimal tax rate is β.

If we imposed such a tax, we should force individuals to internalise the externality, choosing their hours solely on the basis of the absolute value of consumption – and ignoring its relative value altogether. We cannot stop people losing utility because they enviously compare themselves with others. But we can stop them losing further utility through self-defeating efforts to out-do each other.

Relative consumption, or indeed relative status or relative position of any kind, is in fixed supply. There is no point in people devoting energy to acquiring it. It is simply inefficient. So in this case a positive tax is efficient and a zero tax is inefficient.

Consumption-leisure choice: the effect of habit

A second mechanism which induces overwork is habit. If people adopt a higher living standard, they lose the option to return to their former living standard and experience the same utility as before from a given consumption. This negative effect of current consumption on future utility has been called by Frank a negative 'internality'. The distortion arises if the habituation effect is not foreseen. It operates precisely like the effect of an unforeseen addiction. In order to obtain a given amount of utility from this consumption an individual has to consume more and therefore to work harder.

[22] See Layard (1980) for a fuller discussion.

Again, we are interested in the scale of the problem and the appropriate tax rate to offset it. Suppose that utility in period *t* is given as follows: [23]

$$u_t = f(c_t - \gamma c_{t-1}).v(1 - h_t)$$

We want the individual to maximise $\sum D^t u_t$, where *D* is the discount factor. This is subject to the inter-temporal budget constraint, where for simplicity we shall assume that the real wage is constant and equal to one unit of consumption per unit of work. The budget constraint is therefore

$$\sum R^t (h_t - c_t) = 0$$

There are now two possible cases. In one the individual chooses h_t, c_t with foresight – taking note of the negative effect of lagged consumption reflected in the term $(-\gamma c_{t-1})$. In the other case the individual is myopic, behaving as if γ were zero. In both cases if $R = D$, the solution is a constant level of consumption and work, with zero saving.[24] But, when there is foresight, the level of work and consumption is less than when there is myopia.

To understand how hours are determined, we can write out the first two terms in the maximand $\sum u_t$, beginning at period *0*:

$$f(c_0 - \gamma c_{-1})v(1 - h_0) + Df(c_1 - \gamma c_0)v(1 - h_1) + \ldots$$

We now differentiate by h_0, allowing for the fact that the wage is unity. If habituation were foreseen (as would be optimal), hours would be given by

$$f_0' v_0 - \gamma D f_1' v_1 = f_0 v_0'$$

So in the steady state, where $f'v$ is constant, optimality requires

$$f'v(1 - \gamma D) = fv'$$

But, if habituation is not foreseen, hours are given by $f'v = fv'$.

How different are hours in the two cases? We shall again assume that u_t is Cobb-Douglas, with

$$u_t = (c_t - \gamma c_{t-1})^{\alpha} (1 - h_t)^{1-\alpha}$$

Then, with foresight, hours and consumption are

[23] I am grateful to Stephen Nickell for the analysis which follows. It is more general than the 2-period case considered by Loewenstein *et al* (2000).

[24] For proof see Annex B. We assume that the initial level of lagged consumption is the same as the optimal level of present and future consumption.

$$h = c = \frac{\alpha}{\alpha + (1-\alpha)(1-\gamma)/(1-\gamma D)}$$

But, if habituation is not foreseen,

$$h = c = \frac{\alpha}{\alpha + (1-\alpha)(1-\gamma)}$$

which is substantially greater.[25] If we assume (as explained) that $\gamma = .3$ with $\alpha = .4$ and $D = .95$, then hours and consumption without foresight are 20% higher than with foresight. This is a serious error, and even if a half of the true habituation (γ) was foreseen, there would be roughly 11% more work and consumption than is optimal.[26]

Taxation is a natural way to remedy this. Assuming zero foresight, the optimal self-financing linear tax is given by

$$t = -D\frac{\partial u_1}{\partial c_0} \Big/ \frac{\partial u_0}{\partial c_0} = \frac{\gamma D f' v}{f' v} = \gamma D$$

In this analysis the distorting effect of habit is not upon inter-temporal choice but upon work effort. This is not obvious in a 2-period analysis, but, once we take a long enough view, it is clear that the main problem concerns the **level** of the consumption profile, not its shape.

Finally, we can reintroduce rivalry and ask, What is the **overall** distortion in hours and what would the efficient tax be? The social maximand is

$$\sum f(c_{0i} - \beta c_0 - \gamma c_{-1i}) v(1 - h_{0i}) + D\sum f(c_{1i} - \beta c_1 - \gamma c_{0i}) v(1 - h_{1i}) + etc$$

Without foresight the individual will work 52% too hard.[27] This is a massive distortion. To find the optimal tax we note that the sum of the 'externality' plus the 'internal' distortion that are together caused by an extra unit of c_{0i} is $f'v(\beta + \gamma D)$.

The optimal tax rate is therefore

$$t = \beta + \gamma D$$

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[25] It is also possible to show that, with a completely general concave utility function, hours and consumption fall as foresight increases.

[26] The individual chooses $h = \dfrac{\alpha}{\alpha + (1-\alpha)(1-\gamma)/(1-0.5\gamma D)}$

[27] The social optimum is $\dfrac{\alpha}{\alpha + (1-\alpha)(1-\beta-\gamma)/(1-\beta-\gamma D)}$ and the private optimum is $\dfrac{\alpha}{\alpha + (1-\alpha)(1-\beta-\gamma)}$

In our example this is *.585*.

The tax we have been discussing is efficient; it is not distorting. So the tax proceeds have no excess burden. There is however the crucial issue of how they should be spent. If we ignore redistribution until later, the tax proceeds could either be used for public expenditure or they could be redistributed. They should be used for public expenditure only if this passes the cost-benefit test. But in this context how should cost-benefit analysis be conducted?

Cost-benefit analysis and public expenditure

In order to highlight the issue, I shall begin with the case where no efficient tax of the kind discussed above is already being levied. The question we want to ask is this: 'Would the representative individual wish to see a given public expenditure happen if it were financed by him **and** by other citizens'?

Suppose the expenditure were on providing a bridge. The benefit of providing the bridge would then be

(i) the value attaching to the bridge, **and**
(ii) the benefit from reduced consumption by others.

The cost has to be compared with the sum of the two items – not as in the standard theory with the value of the bridge alone.

To be more precise, let us consider a bridge that costs (in flow terms) Q per citizen per period. Suppose $u_i = (c_i - \beta c)^{\alpha} + \phi D$ where D is a dummy taking the value 1 when there is a bridge. The bridge should be built if the benefits in utils exceed the cost in utils. In other words

$$\phi + \alpha(c_i - \beta c)^{\alpha-1}\beta Q > Q\alpha(c_i - \beta c)^{\alpha-1}$$

or

$$\frac{\phi}{\alpha(c_i - \beta c)^{\alpha-1}} > Q(1-\beta)$$

The left-hand side is the individual's willingness to pay *(WTP)* and this need not exceed the cost *(Q)*. It need only exceed the cost times $(1-\beta)$

However this assumes that when we undertake the extra expenditure we are changing taxes. Suppose instead that we already have the efficient tax. The issue is then whether to spend the money or hand it back in lump-sum form. In this case we should compare willingness to pay directly with the cost. But we should not, as in standard theory, augment the cost by the excess burden of the taxation which finances it.

The issue of excess burden would only arise if we needed more public expenditure than could be financed by the proceeds of the efficient tax. In this case excess burden

would begin to be an issue. But of course the tax distortion would be measured not by the tax rate but by the excess of the tax rate over the efficient tax rate.

Thus, whichever perspective we take, public expenditure is more likely to be justified than appears from the traditional analysis.

Inconspicuous consumption

Let us now consider a different dimension of individual choice, between different forms of consumption. Some forms of consumption are much more visible than others. For example, people compare their cars and houses with other people's. But they do not compete in this way over job security, safety at work, adequate insurance, crime-free streets, or health care services. Frank (1985) calls such items "inconspicuous consumption".[28] Others might call them merit goods. These goods (g_i) cannot be provided without extra work or reduced conspicuous consumption (c_i). If we leave matters to the market, they will be underprovided precisely because "conspicuous consumption", which is partly self-defeating, will be overprovided.

For example suppose an employer is willing to offer increased job security at a price equal to its cost to the employer. The individual, when deciding how much security to choose, will take into account the loss of relative consumption involved, as well as the loss of absolute consumption. He will thus demand less job security than he would demand if all his colleagues demanded it as well.

Algebraically, we shall now think in terms of a utility function

$$u_i = (c_i - \beta c)^{\alpha} g_i^{\delta} (1 - h_i)^{1-\alpha-\delta}$$

We can readily see what difference a collective decision on the inconspicuous good might make. If the decision were collective, everyone would work for $(\alpha + \delta)$ units and spend δ units of income on merit goods and α on consumption proper. But the isolated individual's choice would be different. In a tax-free world, he would work

$$h = \frac{\alpha + \delta(1-\beta)}{1-\beta(1-\alpha)} > \alpha + \delta$$

And he would spend his money on consumption and merit goods according to

$$c = \frac{\alpha}{1-\beta(1-\alpha)} > \alpha$$

and

$$g = \frac{\delta(1-\beta)}{1-\beta(1-\alpha)} < \delta$$

[28] See also Frank (1982) for a mathematical analysis of its implications.

So he will overwork, overconsume and underspend on merit goods. The underspending on merit goods could be substantial.

It is interesting to explore magnitudes. In our exposition so far we have ignored habit. But it happens that, broadly speaking, those goods which are bought for effect are also those which lose their lustre most rapidly. So for simplicity we shall make β reflect both rivalry and habit, and we shall therefore assume $\beta = .585$. We shall also assume $\alpha = .3$ and $\delta = .15$.

So socially optimal hours are *.45*, with consumption being *.30* and expenditure on merit goods *.15*. But left to his own, the individual works for *.62* hours, consumes *.51* and spends only *.11* on merit goods.

How in practice could such an outcome be secured? Would it require regulation as Frank (1982) suggested? The answer is, not necessarily. We could simply forget about merit goods and tax conspicuous consumption correctly. If we did so, individual choice would reproduce the collective choice we have just described. The optimum tax rate on conspicuous consumption would now, as before, be β. The individual would then freely choose to work for $\alpha + \delta$ units and freely choose to buy δ units of the merit good. Provided the merit good is not itself taxed, its quantity will be correctly chosen. For example, suppose a firm could provide an extra unit of safety at work at a cost θ and a worker valued it more than $\theta(1-\beta)$. He would then be willing to accept the wage cut of θ for the sake of the extra safety, since his consumption would only be reduced by $\theta(1-t) = \theta((1-\beta)$.

The design of tax systems to protect inconspicuous consumption from taxation is therefore extremely important.

Redistribution

Finally, redistribution. We need a tax-benefit schedule which finances redistribution and other public expenditure, in a way that maximises the sum of utilities.[29] In the normal analysis there is an excess burden from any positive level of taxation. But our analysis shows that there may be no excess burden until quite high levels of taxation are reached. So the first obvious question is whether the tax levied in the name of efficiency could be high enough to achieve as much redistribution as was justified.

The answer is No. For at the efficient rate of tax there is no net excess burden of taxation. But unless the rate of tax is unity there will still be differences in net income, generating differences in the marginal utility of income. There will thus be a case for further redistribution, up to the point where the cost of further redistribution is as great as the gain from greater equality.

Consider the following example. Suppose first that everyone were the same and

$$u_i = (c_i - \beta c)^{\alpha}(1-h_i)^{\beta}$$

[29] See for example Mirrlees (1971)

With no tax, people would work

$$\alpha/(\alpha+(1-\alpha)(1-\beta))$$

rather than the efficient α. The efficient tax would be

$$-\frac{\partial u^i}{\partial c}\Big/\frac{\partial u_i}{\partial c_i}=\beta$$

leading everyone to work for α units.

Suppose now that people differ in productivity. There are two groups of equal size with wage rates w_1 and w_2. Suppose we introduce a self-financing tax with a tax rate β and a total tax per person given by[30]

$$T_i=\beta w_i h_i-\tfrac{1}{2}\beta(w_1h_1+w_2h_2)$$

With this tax each group will in fact work for α units.[31] Meantime the tax will have substantially reduced the income gap between the two groups. For example, if $w_1/w_2=3$ and $\beta=.585$, then the new ratio $c_1/c_2=1.5$. This difference means however that the marginal utility of consumption is still significantly different between the two groups, justifying a tax rate higher than β.

How much higher should the tax rate be? At the social optimum the marginal utility of income of the poor person relative to the rich should equal *1* plus the efficiency cost of a unit net transfer from rich to poor. How should we compute this cost?

Suppose $W_1=1$ and $W_2=\lambda<1$, and for simplicity we renormalise hours at unity (they will be little affected by a small additional self-financing tax). Then the total 'proceeds' of the linear tax are $t(1+\lambda)$. But the net transfer is only $0.5t(1-\lambda)$ since, although the rich man pays *t* in tax, he gets back $0.5t(1+\lambda)$ in handout. So the marginal tax 'proceeds' are $2(1+\lambda)/(1-\lambda)$ times the marginal net transfer. Now the marginal excess burden per unit of tax revenue is $\eta t/(1-t-\eta t)$ where η is the compensated elasticity of supply.[32] It follows that the marginal excess burden per unit of net transfer is higher than this and is in fact

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[30] The efficient tax is strictly $\beta\sum_j\frac{\partial u_j}{\partial c_j}\sum_k\left(\frac{\partial u_k}{\partial c_k}\right)^{-1}$

[31] Since the tax is self-balancing, $c=\frac{1}{2}(w_0h_0+w_1h_1)$. Thus

$$c_i-\beta c=w_ih_i(1-\beta)+\frac{1}{2}\beta(w_0h_0+w_1h)_1-\beta\frac{1}{2}(w_0h_0+w_1h_1)=w_ih_i(1-\beta)$$

[32] See Layard (1980).

$$\frac{\eta t}{1-t-\eta t}\frac{2(1+\lambda)}{(1-\lambda)}$$

As for the relative marginal utility of income of group 2, it is given by approximately

$$\left(\frac{c_2}{c_1}\right)^{\alpha-1} = \left(\frac{(1-t)\lambda + \frac{1}{2}t(1+\lambda)}{1-t+\frac{1}{2}t(1+\lambda)}\right)^{\alpha-1}$$

So we now know how to find the optimum tax rate – subject to one qualification. The excess burden has to be measured for the tax rate only in **excess** of its efficient level t^*.

To find the optimum overall tax rate *(t)* we set the relative marginal utility of group 2 equal to one plus the marginal excess burden per unit of net transfer. So

$$\left(\frac{(1-t)\lambda + \frac{1}{2}t(1+\lambda)}{1-t+\frac{1}{2}t(1+\lambda)}\right)^{\alpha-1} = 1 + \frac{\eta(t-t^*)}{1-(1+\eta)(t-t^*)}.\frac{2(1+\lambda)}{1-\lambda}$$

Thus as underlying equality (measured by λ) increases, so the appropriate tax rate *t* decreases.

But how much tax is needed? A crude approximation of the UK income distribution is $\lambda = 1/3$ - it gives the same coefficient of variation *(0.5)* as the existing income distribution. We can take $t^* = .585$. We have hitherto assumed $\alpha = .4$ and will continue to do so, though most of the work on public economics uses functions where marginal utility declines more rapidly. Since the compensated elasticity of supply (η) is $(1-\alpha)$, the implied tax rate is *0.67*.[33] This is a typical figure for the marginal tax rate in Europe including all direct and indirect levies.[34] (The share of taxes in GDP is considerably less, just under a half, due to tax exemptions.)

A quite different approach (not my own) might start from the libertarian view that redistribution should only be undertaken to the extent that those who pay for it wish it. We would then postulate that the rich care about the incomes of the poor, which are in effect for them a public good. However the rich find it painful to part with their wealth. But they find it less painful if all the other rich people are doing the same. This is an old argument in favour of collective decisions in favour of charity. Going back to our original welfare function, suppose that there are *n* rich people. Each of them has the following utility function

$$u_i = (c_i - \beta c)^{\alpha} + \phi \sum_j d_j$$

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[33] The solution to $1 = \left(\frac{1+t}{3-t}\right)^{-0.6} + \frac{2.4t-1.404}{1.6t-1.936}$.
For simplicity η is evaluated at zero lump-sum income.

[34] Even in Britain it is at least 55%.

where d_j is the amount given to the poor by the j^t person.

If the individual gives one unit on his own his benefit is only ϕ. If all individuals give at the same time, each gets an extra benefit, consisting of two parts:

(i) a bigger increase in receipts by the poor, and
(ii) a gain from reduced consumption by others.

So the gain from a unit gift by each is now

$$\phi n + \alpha(c_i - \beta c)^{\alpha-1}\beta$$

This greatly exceeds ϕ, but the main reason is the first term rather than the second. [Therefore perhaps omit this 'voluntaristic' section?]

3. CONCLUSIONS

This paper is intended as a challenge to the profession – not to throw away our tools, but to use them in a more realistic way. There is now enough evidence to demonstrate beyond doubt that, in the absence of taxes, rivalry and habit would lead to excessive, self-defeating effort.

To offset these distortions requires a significant tax rate. Such taxes are not distorting but efficient. Thus, when public expenditure is evaluated, the tax cost should not be increased for 'excess burden' on the scale currently allowed for. And inconspicuous consumption (consumption which is not compared with the consumption of others) should be taxed much less highly than conspicuous consumption.

Economists have long been puzzled that the public votes for high levels of 'manifestly distorting' taxation. But could it be that the public uses a more realistic model of human nature than many economists do? Could this explain why they agree to collective restraint of private spending for the sake of more public goods and a less frenzied life-style?

Social science is only beginning to examine the true determinants of utility, and to acknowledge that revealed preference reveals the part and not the whole. The studies we have so far yield variable parameters, and in addition we have our own introspection. All this evidence show that the phenomena we are discussing are big and important, and they should now be included in mainstream public economics.

Annex A

Inter-country comparisons

Of course one could question whether the word 'happy' (or 'satisfied') mean the same thing in different languages. If they do not, we can learn nothing by comparing different countries. However countries can be rated separately on three different measures: how 'happy' they are, how 'satisfied' they are, and what score they give to life, using a scale running from 'worst possible life' to the 'best'. The ranking of countries is almost identical on all three measures.[35] This suggests that words are not causing a problem.

Moreover there is direct evidence, for a number of languages, that the words do have a stable meaning in the different languages. For example a group of Chinese students were asked to answer the happiness question, once in Chinese and once in English, with three weeks between the two questions.[36] A control group of similar students were asked to answer the questions in English only on both occasions. The consistency between the first group's replies in Chinese and in English was as good as between the control group's two replies in English. Since the English and Chinese languages are very far apart, this finding is highly reassuring. Similarly we can take the three groups of Swiss – who speak French, German and Italian. They give similar replies. And each group of Swiss people is happier than those who speak the same language but live next door in France, Germany or Italy. So the country and the life, rather than the language, is the overriding factor influencing the replies.

But, again, might not people in some countries feel more impelled to give high or low replies to the question, because of local cultural norms? There is no evidence of this – for example no clear tendency for individualistic countries to vote high or collectivist cultures to vote low.[37] And the concepts seem equally familiar in all cultures – getting response rates of around 99%.

[35] Veenhoven (2000) p.10,
[36] Shao (1993),
[37] Veenhoven (2000) p.10-11.

Annex B

The effects of habit

In this note we examine first the optimal allocation (when the effects of habit are foreseen) and then the individual choice when the effects are not foreseen. We shall begin with the fairly general formulation

$$u_t = f(c_t - \gamma c_{t-1}).v(1-h_t)$$

We assume the wage equals unity, and $R=D$.

Optimum choice

The problem is

$$\begin{aligned}\text{Max } & f(c_1 - \gamma c_0)v(1-h_1) + Df(c_2 - yc_1)v(1-h_2) + etc \\ & + \lambda(h_1 - c_1 + D(h_2 - c_2) + etc)\end{aligned}$$

The first-order conditions for c_1, c_2, c_3 etc are

$$f_1'v_1 - D\gamma f_2'v_2 = \lambda \quad \text{(A1)}$$
$$f_2'v_2 - D\gamma f_3'v_3 = \lambda \quad \text{(A2)}$$
$$f_3'v_3 - D\gamma f_4'v_4 = \lambda \quad \text{(A3)}$$
etc.

We can multiply equation A2 by $D\gamma$, equation A3 by $(D\gamma)^2$, etc and then add equations A1, A2, A3 etc. This yields

$$f_1'v_1 = \lambda(1 + D\gamma + D^2\gamma^2 + etc) = \frac{\lambda}{1 - D\gamma} \quad \text{(B1)}$$

In addition, if we start one period later,

$$f_2'v_2 = \frac{\lambda}{1 - D\gamma}\ , \quad \text{(B2)}$$

and so on. The first-order conditions for h_1, h_2, h_3 etc are

$$f_1v_1' = \lambda \quad \text{(C1)}$$
$$f_2v_2' = \lambda \quad \text{(C2)}$$
etc.

The conditions B1, B2 etc and C1, C2 etc are satisfied by $c_t = c$ (constant), $h_t = h$ (constant), $c = h$ and

$$f'v(1 - D\gamma) = fv' \tag{D}$$

(This assumes that c_0 is the same as the solution for c_1, c_2 etc.)

Myopic choice

With myopia the individual behaves as if $\gamma = 0$. Thus he chooses $c_t = c, h_t = h, c = h$ but with

$$f'v = fv' \tag{E}$$

Comparison

We can compare *h* chosen optimally with *h* chosen myopically. If *u* is Cobb Douglas

$$u = (c - \gamma c)^{\alpha}(1 - h)^{1-\alpha}$$

So optimal choice (given by equation D) becomes

$$\frac{\alpha u(1 - D\gamma)}{c(1 - \gamma)} = \frac{(1 - \alpha)u}{1 - h}$$

Since *c*=*h*, this gives optimal hours of

$$h = \frac{\alpha}{\alpha + (1 - \alpha)(1 - \gamma)/(1 - D\gamma)}$$

By contrast private choice (given by equation E) yields

$$\frac{\alpha u}{c(1 - \gamma)} = \frac{(1 - \alpha)u}{1 - h}$$

So that

$$h = \frac{\alpha}{\alpha + (1 - \alpha)(1 - \gamma)}$$

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