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Abstract

This paper investigates how well-being varies with individual wage rates when individuals care about relative consumption and so there are Veblen effects – *Keeping up with the Joneses* – leading individuals to over-work. In the case where individuals compare themselves with their peers – those with the same wage-rate - it is shown that *Keeping up with the Joneses* leads some individuals to work who otherwise would have chosen not to. Moreover for these individuals well-being is a *decreasing* function of the wage rate - contrary to standard theory. So those who are worst-off in society are no longer those on the lowest wage.

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Introduction

Dating back to Veblen (1924), there is an extensive literature on conspicuous consumption whereby individuals lose esteem if their consumption of some good(s) which signal their status is below the average of the reference/peer group and gain esteem if their consumption exceeds the average. It is recognised that this can lead to a ‘rat race’ in which individuals over-consume, with a consequent need to fund this extra consumption by either working harder or saving less (Frank (1985), Schor (1998)). This over-consumption is referred to as the *Veblen Effect*² or the *Keeping up with the Joneses Effect*³.

This paper develops some further implications for behaviour and well-being when people are concerned about their consumption relative to their peers – taken to be those with a similar wage rate⁴. It is shown that the *Keeping up with the Joneses Effect* can lead people to work who would otherwise have chosen not to, and that, for such individuals well-being will be a strictly decreasing function of their wage rate. Thus those who are least well off in society are not those with the lowest wage.

1. The Model

Individuals are endowed solely with 1 unit of time that can be spent on work or leisure. There is a tax/benefit system whereby everyone receives a tax-free universal benefit, $\sigma > 0$ and all earned income is taxed at the rate τ , $0 < \tau < 1$. Individuals differ in their productivity which is reflected in their net wage rate $\omega \geq 0$. An individual with net wage ω who spends a fraction l , $0 \leq l \leq 1$ of time on leisure will end up with consumption $c = \omega(1-l) + \sigma$.

Individual well-being is a combination of well-offness, y , and happiness, h , as given by the function:

$$w = h^\theta y^{1-\theta}, \quad 0 \leq \theta \leq 1. \quad (1)$$

Here:

- (i) Well-offness, y , is captured by a utility function

$$y = u(c, l) \quad (2)$$

satisfying the standard assumptions – e.g. concavity.

- (ii) Happiness measures individuals’ perceptions of how well their life is going in comparison to their peers – those with the same net wage-rate, ω . It is assumed

² The Veblen effect has also been invoked to help explain the Easterlin Paradox – Easterlin (2001).

³ This has led to arguments for either taxing such conspicuous consumption or increasing the rate of income tax – see Boskin and Sheshinski (1978) – to correct the consumption externality.

⁴ Beath and Fitzroy (2009) also consider a model in which individuals compare their consumption to that of others with the same productivity/wage-rate. They also show that *Keeping up with the Joneses* can lead individuals to over-work. However their model and analysis differs in other respects from that considered here, and they do not obtain the crucial result set out in Proposition 1 below.

that this depends on an individual's consumption relative to the average consumption $\bar{c} > 0$ of their peers, and that happiness is given by:

$$h = \frac{\frac{c}{\bar{c}}}{1 + \frac{c}{\bar{c}}} = \frac{c}{c + \bar{c}} \quad (3)$$

The two reasons for adopting this functional form for happiness are:

- a) Happiness is thereby bounded between 0 and 1, reflecting the way happiness is traditionally measured on some finite scale.
- b) Labour supply decisions depend on the average consumption of others. If, instead, happiness depends solely on $\frac{c}{\bar{c}}$ then, given (1), the average consumption of others would exert a negative externality on individual well-being but would not affect behaviour – thereby missing a crucial feature of the *Keeping up with the Joneses* effect⁵.

The parameter θ determines how much individual well-being depends on relative consumption⁶. So if $\theta = 0$ we have the conventional economists' story about well-being, and there will be no *Keeping up with the Joneses Effect*. If $0 < \theta \leq 1$ then the *Keeping up with the Joneses Effect* is present, and is increasing in θ . Combining (1) – (3) well-being can be written as:

$$w(c, l, \bar{c}; \theta) = \left(\frac{c}{c + \bar{c}} \right)^\theta u(c, l)^{1-\theta}, \quad (4)$$

2. Individual Labour Supply and Well-Being

Consider an individual with net wage rate ω . The individual takes as given $\bar{c} > 0$ - the average consumption of those with the same net wage rate - and chooses labour supply (effort) $e = 1 - l$ to maximise well-being,

$$w(\sigma + \omega e, 1 - e, \bar{c}; \theta) = \left(\frac{\sigma + \omega e}{\sigma + \omega e + \bar{c}} \right)^\theta [u(\sigma + \omega e, 1 - e)]^{1-\theta} \quad (5)$$

Let

$$e = f(\omega, \sigma, \bar{c}; \theta) \equiv \arg \max_{0 \leq e \leq 1} w(\sigma + \omega e, 1 - e, \bar{c}; \theta) \quad (6)$$

be the well-being-maximising labour supply decision, and

$$v(\omega, \sigma, \bar{c}; \theta) = \max_{0 \leq e \leq 1} w(\sigma + \omega e, 1 - e, \bar{c}; \theta) \quad (7)$$

the associated indirect well-being function.

The f.o.c. for maximisation is

⁵ This is true of the formulation adopted by Boskin and Sheshinski (1978).

⁶ This formulation is consistent with that adopted by Boskin and Sheshinski (1978).

$$\frac{\theta}{1-\theta} \omega \left[\frac{1}{\sigma + \omega e} - \frac{1}{\sigma + \omega e + \bar{c}} \right] + \frac{[\omega u_c - u_l]}{u} \leq 0, \quad e \geq 0, \quad (8)$$

where the inequalities hold with complementary slackness. From (8) there is a reservation net wage rate

$$\underline{\omega}(\sigma, \bar{c}, \theta) = \frac{u_l(\sigma, 1)}{u_c(\sigma, 1) + \frac{\theta}{1-\theta} \cdot \frac{\bar{c}}{\sigma + \bar{c}} \cdot \frac{u(\sigma, 1)}{\sigma}} \quad (9)$$

at or below which labour supply is zero and above which it is positive. This reservation wage rate is:

- a strictly increasing function of unearned income, σ ;
- a strictly decreasing function of average consumption, \bar{c} ;
- a strictly decreasing function of the weight, θ , given to happiness.

When $\theta = 0$, the reservation wage is just the conventional marginal rate of substitution between consumption and leisure at zero hours of work. The fact that it is decreasing in both \bar{c} and θ means that the *Keeping up with the Joneses Effect* is inducing people to work who would not otherwise have done so.

Since, conditioning on \bar{c} and θ , the labour supply decision is a conventional utility-maximising decision, it follows that, when individual labour supply is positive, it is a strictly decreasing function of unearned income, while the effect of an increase in the (net) wage rate is ambiguous, though the compensated labour supply response is positive. From (8) it follows that when labour-supply is positive it is a strictly increasing function of \bar{c} - the *Keeping up with the Joneses Effect* - and, consistent with this, is also an increasing function of θ . In summary we have the following comparative static labour-supply predictions in the case where labour supply is positive: i.e. $\omega > \underline{\omega}(\sigma, \bar{c}, \theta)$

$$\frac{\partial f}{\partial \sigma} < 0; \quad \frac{\partial f}{\partial \omega} > 0; \quad \frac{\partial f^c}{\partial \omega} = \frac{\partial f}{\partial \omega} - e \cdot \frac{\partial f}{\partial \sigma} > 0; \quad \frac{\partial f}{\partial \bar{c}} > 0; \quad \frac{\partial f}{\partial \theta} > 0^7. \quad (10)$$

Turning to the indirect well-being function, this again will satisfy the standard conditions, including Roy's identity, so:

$$\frac{\partial v}{\partial \sigma} > 0; \quad \frac{\partial v}{\partial \omega} = e \cdot \frac{\partial v}{\partial \sigma} = f(\omega, \sigma, \bar{c}, \theta) \cdot \frac{\partial v}{\partial \sigma} > 0, \quad (11)$$

So, **conditioning on average consumption, \bar{c}** , for individuals who work, well-being is a strictly increasing function of the net wage rate. From (5) and (7) the envelope theorem implies that

⁷ The superscript c denotes the compensated labour supply function.

$$\frac{\partial v}{\partial c} < 0 . \quad (12)$$

Thus individuals are worse off the greater is the average consumption of others.

3. Nash Equilibrium Labour Supply and Well-being

So far we have examined labour supply and well-being for any arbitrary level of average consumption of the peer group - those with the same net wage rate. To complete the analysis we need to determine this average level of consumption. Since everyone maximises well-being taking as given the decisions of everyone else as reflected in the average consumption of the group, the relevant equilibrium concept is non-cooperative Nash. Since everyone in the comparator group is identical, in the Nash equilibrium everyone ends up with the same level of labour supply and consumption. This common consumption is therefore the average consumption of each group, which implies that for everyone $h = 1/2$

3.1 *Labour Supply*

From (6) the Nash equilibrium level of labour supply can be characterised as the implicit solution to the equation:

$$e = f(\omega, \sigma, \sigma + \omega e, \theta). \quad (13)$$

To ensure that there is a unique well-defined Nash equilibrium assume that:

$$\forall \omega \quad \omega \frac{\partial f}{\partial c} < 1. \quad (14)$$

Denote the Nash equilibrium labour supply function by $f^n(\omega, \sigma, \theta)$.

Note that it follows from (8) that the reservation wage is now given by:

$$\underline{\omega}^n(\sigma, \theta) = \frac{u_l(\sigma, 1)}{u_c(\sigma, 1) + \frac{\theta}{2(1-\theta)} \cdot \frac{u(\sigma, 1)}{\sigma}}, \quad (15)$$

which is a strictly increasing function of σ and a strictly decreasing function of θ with $\underline{\omega}^n \rightarrow 0$ as $\theta \rightarrow 1$. The fact that the reservation wage falls with θ is a manifestation of the *Keeping up with the Joneses Effect* since individuals are being induced to work who otherwise have chosen not to.

From (13) it follows that, when Nash labour supply is positive:

$$\frac{\partial f^n}{\partial \omega} = \frac{\frac{\partial f}{\partial \omega} + e \cdot \frac{\partial f}{\partial c}}{1 - \omega \cdot \frac{\partial f}{\partial c}}, \quad \frac{\partial f^n}{\partial \sigma} = \frac{\frac{\partial f}{\partial \sigma} + \frac{\partial f}{\partial c}}{1 - \omega \cdot \frac{\partial f}{\partial c}}, \quad (16)$$

so Nash labour supply responses to increases in the wage rate and unearned income differ from the individual labour supply response in two ways:

- (i) Increases in the wage rate and in unearned income raise the value of peer consumption which induces additional work effort;
- (ii) There is a *multiplier effect* at work whereby changes in labour supply induce changes in peer consumption which generates further changes in labour supply.

The sign of both of these terms is indeterminate. However, from (16) it follows that

$$\frac{\partial f^{nc}}{\partial \omega} = \frac{\partial f^n}{\partial \omega} - e \cdot \frac{\frac{\partial f^n}{\partial \sigma}}{1 - \omega \cdot \frac{\partial f}{\partial c}} = \frac{\frac{\partial f^c}{\partial \omega}}{1 - \omega \cdot \frac{\partial f}{\partial c}} > 0 \quad (17)$$

so the Slutsky-Hicks decomposition still applies to the Nash labour supply function, and the compensated Nash labour supply response is positive and is just the individual compensated response scaled up by the multiplier effect.

Now, from (8), the Nash labour supply can be characterised through the condition:

$$\omega \left[1 + \frac{\theta}{2(1-\theta)} \cdot \frac{u/c}{u_c} \right] \leq \frac{u_l}{u_c}, \quad e \geq 0. \quad (18)$$

So, when labour supply is positive, then, in the traditional case where happiness does not affect well-being ($\theta = 0$) the marginal rate of substitution between leisure and consumption equals the (net) wage. However when happiness does affect well-being, ($\theta > 0$), the marginal rate of substitution is greater than the wage rate multiplied by a factor that (a) depends on the ratio of average to marginal utility of consumption, and (b) is increasing in the weight individuals place on happiness. This additional term captures the distortion in Nash equilibrium labour supply induced by the *Keeping up with the Joneses Effect*. It is this distortion that leads individuals to supply too much labour since it increases the attractiveness of work⁸.

⁸ Indeed it follows from (15) and (18) that in the extreme case where $\theta = 1$ then $\underline{\omega}^n(\sigma, 1) = 0$ and $f^n(\omega, \sigma, 1) \equiv 1$, so everybody spends their entire time in work.

3.2. Well-being

By substituting the Nash equilibrium level of effort back into the well-being function given in (4) we obtain the Nash *indirect well-being function*:

$$v^n(\omega, \sigma, \theta) = \left(\frac{1}{2} \right)^\theta \left[\vartheta(\omega, \sigma, \theta) \right]^{1-\theta} \quad (19)$$

where

$$\vartheta(\omega, \sigma, \theta) \equiv u \left[\sigma + \omega f^n(\omega, \sigma, \theta), 1 - f^n(\omega, \sigma, \theta) \right] \quad (20)$$

is the *Nash indirect well-offness function*. To understand what happens to well-being all we need to understand is what happens to well-offness.

If $\omega \leq \underline{\omega}^n(\sigma, \theta)$ labour supply is zero and

$$\vartheta(\omega, \sigma, \theta) = u(\sigma, 1) \Rightarrow \frac{\partial \vartheta}{\partial \omega} = \frac{\partial \vartheta}{\partial \theta} = 0; \quad \frac{\partial \vartheta}{\partial \sigma} = u_c(\sigma, 1) \quad (21)$$

so Roy's identity holds:

$$\frac{\partial \vartheta}{\partial \omega} = e \cdot \frac{\partial \vartheta}{\partial \sigma}. \quad (22)$$

If $\omega > \underline{\omega}^n(\sigma, \theta)$ labour supply is positive, then, by differentiating (20) and using (18) we get:

$$\frac{\partial \vartheta}{\partial \omega} = u_c \left[e - \omega \cdot \frac{\partial f^n}{\partial \omega} \cdot \frac{\theta}{2(1-\theta)} \cdot \frac{u/c}{u_c} \right]; \quad (23)$$

$$\frac{\partial \vartheta}{\partial \sigma} = u_c \left[1 - \omega \cdot \frac{\partial f^n}{\partial \sigma} \cdot \frac{\theta}{2(1-\theta)} \cdot \frac{u/c}{u_c} \right]; \quad (24)$$

In the traditional case where individuals place no weight on happiness ($\theta = 0$) then (24) and (23) just reduce to their conventional forms. In particular Roy's identity (22) holds. However if $\theta > 0$ a marginal change in the wage or benefit induces an additional effect on well-being that is positive (resp. negative) if the change causes labour supply to fall (resp. rise) and so reduce (resp. increase) the distortion on labour supply.

In certain circumstances an increase in the wage rate could actually make people worse off as the distortion-intensifying effect dominates the direct benefit from a higher net wage.

Proposition 1 If $\theta > 0$ well-being is a strictly decreasing function of the wage rate for those individuals for whom $\omega \approx \underline{\omega}(\sigma, \theta) \Rightarrow e \approx 0$ i.e. for some of those who are being induced to work only because of their desire to *Keep up with the Joneses*.

Proof: If $e \approx 0$ the first term on the RHS of (23) is approximately zero. Moreover from the Slutsky-Hicks equation, (17), $\frac{\partial f^n}{\partial \omega} \approx \frac{\partial f^{nc}}{\partial \omega} > 0$ so the only effect of the higher wage is to intensify the distortion and so make people worse off.

Corollary 1.1 The individuals with the lowest level of well-offness and hence well-being are no longer those with the lowest level of ability.

4. Example

If the well-offness function is Cobb-Douglas, $u(c, l) = c^\alpha l^{1-\alpha}$, $0 < \alpha < 1$. It is straightforward to check that

$$\begin{aligned} \underline{\omega}^n(\sigma, \theta) &= \frac{(1-\alpha)\sigma}{\left(\alpha + \frac{\theta}{2(1-\theta)}\right)}; \quad f^n(\omega, \sigma, \theta) = \begin{cases} 0, & \omega \leq \underline{\omega}^n(\sigma, \theta) \\ \frac{\left(\alpha + \frac{\theta}{2(1-\theta)}\right)\omega - (1-\alpha)\sigma}{\left(1 + \frac{\theta}{2(1-\theta)}\right)\omega}, & \omega \geq \underline{\omega}^n(\sigma, \theta) \end{cases} \\ \vartheta(\omega, \sigma, \theta) &= \begin{cases} \sigma^\alpha, & \omega \leq \underline{\omega}^n(\sigma, \theta) \\ \frac{\left(\alpha + \frac{\theta}{2(1-\theta)}\right)^\alpha (1-\alpha)^{1-\alpha}}{\left(1 + \frac{\theta}{2(1-\theta)}\right)} \cdot (\omega + \sigma) \cdot \omega^{-(1-\alpha)}, & \omega \geq \underline{\omega}^n(\sigma, \theta) \end{cases} \end{aligned} \quad (25)$$

From (29) it follows that $\frac{\partial \vartheta}{\partial \sigma} > 0$ and that, for $\omega > \underline{\omega}^n(\sigma, \theta)$

$$\frac{\frac{\partial \vartheta}{\partial \omega}}{\frac{\partial \vartheta}{\partial \sigma}} = \left[\alpha - \frac{(1-\alpha)\sigma}{\omega} \right] \Rightarrow \frac{\partial \vartheta}{\partial \omega} < 0 \quad \forall \omega, \underline{\omega}(\sigma, \theta) < \omega < \underline{\omega}(\sigma, 0) \quad (26)$$

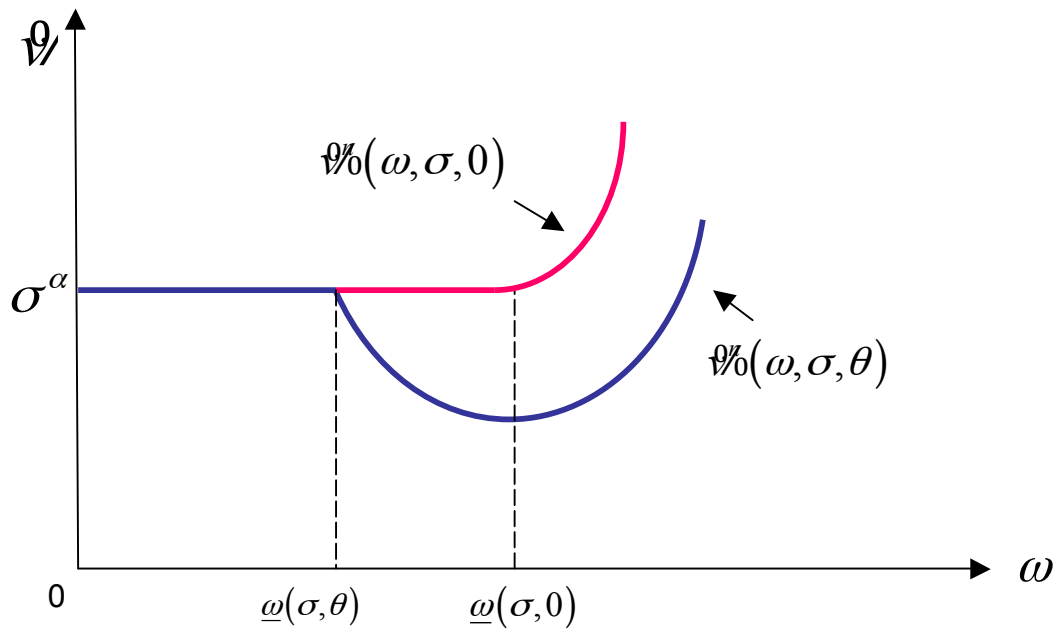
Thus well-offness and hence well-being are strictly decreasing in the wage rate for **precisely** the group of individuals that are being induced to work purely because of the *keeping up with the Joneses* effect.

This is illustrated in Figure 1 in the Appendix.

5. Conclusion

When we situate consumers in a social context and their consumption may depend on that of others, then many of the standard predictions of the conventional theory of consumer behaviour may be overturned. Most strikingly those who are worst off in society are no longer those on the lowest wage. The worst off will be people with a sufficiently high wage that they are induced into work because of the *Keeping up with the Joneses Effect*. This has implications for the understanding of poverty and inequality and the design of tax/benefit systems that warrant further investigation.

Figure 1: Well-Offness and Wages



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