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Emulation, Inequality, and Work Hours: Was Thorsten Veblen Right?

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Abstract

We investigate the importance of *Veblen effects* on work hours, namely the manner in which a desire to emulate the consumption standards of the rich influences individuals' allocation of time between labor and leisure. Our model of the choice of work hours captures Veblen effects by taking account of the influence of the consumption of the well-to-do on the marginal utility of consumption by the less well-off. The main result is that work hours are increasing in the degree of income inequality. We use data on work hours of manufacturing employees in ten countries over the period 1963-1998, along with three different measures of income inequality to explore this hypothesis. Using both OLS and country-fixed-effects estimates, we find that greater inequality predicts longer work hours. Its effects are large, and estimates are robust across a variety of specifications. Additional evidence suggests that while greater inequality may induce longer hours for conventional incentive reasons, this mechanism does not account for our results. We show that in the presence of Veblen effects, a social welfare optimum cannot be implemented by a flat tax on consumption but may be accomplished by more complicated (progressive) consumption taxes or by subsidizing the leisure of the rich.

Keywords: Interdependent utility, relative income, emulation, Veblen effects, work hours.

JEL classification: H23; D31; D62; J22

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1. Introduction

At the close of the 19th century, Thorsten Veblen proposed what he termed *pecuniary emulation* as the foundation of a theory of consumption: spending, he maintained, is driven by relative status considerations, that is by the desire to *be* a particular type of person as much as by the desire to enjoy the consumer goods *per se*. The Joneses, with whom one had to keep up, were not the neighbors but the rich; their level of living became the never-attainable objective in a consumption arms race among the less well-to-do. In *The theory of the leisure class*, he wrote:

> *The motive is emulation–the stimulus of an invidious comparison... especially in any community in which class distinctions are quite vague, all canons and reputability and decency and all standards of consumption are traced back by insensible gradations to the usages and thoughts of the highest social and pecuniary class, the wealthy leisure class.* Veblen (1899/1934):81.

While valued by some economists as capturing common-sense aspects of consumption as a form of status seeking, Veblen's view of social preferences was soon eclipsed by the simpler and more tractable neoclassical theory of the consumer. Relegated to the underworld of economics, Veblen's ideas have nonetheless resonated over the ensuing years in the writing of Duesenberry (1949), Leibenstein (1950), and Galbraith (1958) at the middle of the past century and Schor (1998) and Frank (1997) at the century's close.

We investigate the importance of *Veblen effects* in the determination of work hours, namely the manner in which a desire to emulate the consumption standards of the rich may influence an individuals' allocation of time between labor and leisure. Veblen effects are derived from a class of social-comparison-based utility functions on which there is a growing literature and some empirical evidence.[1] Clark and Oswald (1996) for example found that the satisfaction levels reported by British workers (in the British Household Panel Survey) vary inversely with the wage levels of peers. Neumark and Postlewaite (1998), using data from the U.S. NLSY, studied the labor supply decisions of relatives, finding some evidence that women whose sister's husband had a higher income than their own husband were more likely to be employed.

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[1] See Bagwell and Bernheim (1996), Layard (1980), Frey and Stutzer (2002), van Praag (1993), Sen (1983), Hirsch (1976), Scitovsky (1976), and Easterlin (1974). Frank (1997), Cole, Mailath, and Postlewaite (1995). Clark and Oswald (1996) provide extensive additional references to the empirical literature. By comparison to the economic literature, the relevant sociological and social psychological literature is extensive and venerable: Homans (1961) and Festinger (1957) are influential contributions.

These studies provide some support for comparison based utility functions, but do not test Veblen effects directly. An explicitly Veblen-inspired study by Schor (1998) using a U.S. sample asked respondents how their "financial status" compared to that of those in their reference group (primarily co-workers and friends). While a majority of her sample responded that they personally did not feel pressure to "keep up with the Joneses," Schor found that, independently of the effects of annual and permanent income and other standard regressors, those whose financial status was below their reference group saved significantly less than those who were better off than their reference group. Interestingly, those who watched TV more saved less, conditional on the other regressors.

Our model of the choice of work hours, presented in the next section, captures Veblen effects by taking account of the influence of the consumption of the well-to-do on the marginal utility of own consumption of the less-well-off. The main result is that work hours are increasing in the degree of income inequality. We then use data on average annual work hours in ten countries over the period 1963-1998, along with data on inequality of income to explore these hypotheses. Inequality is a predictor of work hours in both OLS and fixed-effects estimates; its effects are large, and estimates are robust across a variety of specifications. We then address an alternative interpretation in which a positive relationship between work hours and inequality is due to the incentive effects of the latter (Bell and Freeman (2001)). In the penultimate section we consider some of the normative implications of Veblen effects, identifying a class of policies which can implement a social welfare optimum: included are subsidies for the leisure of the rich and a graduated consumption tax (but not a flat consumption tax).[2]

2. Veblen Effects on Work Hours

Veblen held that consumption is motivated by a desire for social standing as well as for the enjoyment of the goods and services *per se* (page numbers are from Veblen (1899/1934):

> *the proximate ground for expenditure in excess of what is required for physical comfort is ...a desire to live up to the conventional standard of decency...*(81)

His key idea was that the best-off members of a community -- "the leisure class" -- establish the standards for the rest.

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[2] Corneo and Olivier (1997) analyze optimal taxation in Veblen-inspired model of an indivisible conspicuous consumption good with both snobbish and conformist consumers. As in the model below, the tax implications of the Veblen effects they model depend on the number of consumers.

> *The leisure class stands at the head of the social structure in point of reputability; and its manner of life and its standards of worth therefore afford the norm of reputability for the community.* (70)

But why is it the consumption of the leisure class that is emulated rather than their leisure? Veblen's response was that under modern conditions consumption is a more visible form of display.

> *The exigencies of the modern industrial system frequently place individuals and households in juxtaposition between whom there is little contact in any other sense than juxtaposition. One's neighbors, mechanically speaking, often are socially not one's neighbors, or even acquaintances; and still their transient good opinion has a high degree of utility. The only practicable means of impressing one's pecuniary ability on these unsympathetic observers of one's everyday life is an unremitting demonstration of the ability to pay. ..The means of communication and the mobility of the population now expose the individual to the observation of many persons who have no other means of judging his reputability than the display of goods...*71

As a result:

> *.... the present trend of the development is in the direction of heightening the utility of conspicuous consumption as compared with leisure.* (72)

Veblen's ideas are thus a precursor to the contemporary theory of costly signaling of otherwise unobservable qualities initiated in economics by Spence (1973) and in biology by Zahavi (1975).[3]

The following model embodies the two propositions underlying Veblen's account, namely that people compare consumption (or wealth) but not leisure, and that they refer upwards, choosing their work and spending activities in order to be more like a higher income group, rather than seeking social distance from lower income groups. Suppose individuals differ in some trait that influences hourly wages and that they choose their hours of work (h) to maximize a utility function, the arguments of which are leisure (which we normalize as 1-h) and what we term effective consumption, c* defined as their own consumption level (c) minus a constant v (for Veblen) times the consumption level of some higher income reference group ($c^{\sim}$). The individual's reference group might be the very rich, or it might be an intermediate group. The reference group's rank in the income distribution is taken as exogenous, as is the Veblen constant v. It may be convenient to think of each

[3] See the works cited in Gintis, Smith, and Bowles (2002).

individual as belonging to a homogeneous income class, each member of which takes the next highest income class as its reference group (the richest class have no reference group). Together, the reference group and v measure the nature and intensity of the relevant social comparisons. Individuals do not save, so c = wh, where w is the wage rate. Thus for some individual not in the richest group we have

(1) $u = u(c^*, h)$

$u = u((wh - vc^{\sim}), h)$

where u is increasing and concave in its first argument and decreasing and convex in the second. Leisure and consumption are complements so $u_{c^*h} < 0$. The effect of increased consumption by members of the reference group thus is both to lower the utility of the individual and to raise the marginal utility of effective consumption. The individual will choose hours to be h*, namely that which equates the marginal rate of substitution between leisure and effective consumption to the wage rate.[4]

We can now consider the effects of a mean-preserving spread of the distribution of income (raising $c^{\sim}$ relative to wh for every income class except the richest). Differentiating the individual's first order condition for the choice of work hours (and using the second order condition) we find that $dh^*/dc^{\sim}$ has the sign of $-(u_{c^*c^*} + u_{c^*h})$, which is positive. The effect of the larger gap between the consumption levels of the individual and the reference group is to raise the marginal utility of consumption relative to the marginal utility of leisure, inducing an increase in the hours of work. Variations in the Veblen constant have the same sign: $dh^*/dv > 0$ reflecting an increase in the intensity of social comparison and perhaps capturing the negative effect of TV watching on saving in Schor's study. It is readily shown that if in contrast to this Veblen model, the reference group were the poor (others seeking to distance themselves from the reference group) then an increase in inequality would induce a *reduction* in work hours, giving us an unambiguous and empirically testable Veblen hypothesis distinct from seeking distance from the poor, or social comparisons generally.

As the purpose of the model is simply to motivate an empirical investigation, it would be unilluminating to take account of many income groups and reference groups and to study

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[4] If the utility function is Cobb-Douglas in leisure and effective consumption (with *a* the coefficient of c*) then the choice of hours is such that

$h^*/(1-h^*) = a/(1-a) + vc^{\sim}/w(1-h)$

with the increased hours indicated by the second term on the right hand side representing the Veblen effect (if v = 0, h = *a*).

the way that an income increase among the well-to-do may affect a sequence of groups lower in the income distribution. One aspect of the model, however, does deserve comment, namely the assumption that individuals choose their hours of work. In a collective bargaining framework or an efficiency wage model, employers play a major role in setting work hours, and the relationship between individual preferences and observed hours may be considerably attenuated. Not surprisingly, a significant fraction of employees in the advanced economies would prefer hours different from what they have (Bell and Freeman (2001)) However in the studies reported, a majority preferred current pay with current hours (rather than more hours and more pay, or less hours and less pay) and Bell and Freeman report evidence that most European Community workers would prefer increases in pay (at the current hours) to decreases in hours (at the current total earnings) suggesting that they are close to the hours they would have chosen, even if the institutional setting allows no direct relationship between individual hours choices and outcomes. This may reflect the fact that employers and unions alike have an interest in taking account of employee preferences concerning hours of work (to maximize job rents and improve labor discipline, for example), even if this interest competes with tax and benefits arrangements which sometimes produce significant differences between actual and desired hours. As a result, individual preferences will affect observed work hours even in environments in which employees do not literally choose their work hours.

A second comment on the model concerns its behavioral foundations. We do not suppose that people engage in a conscious optimizing process in selecting their work hours. A more plausible view is that individuals have norms concerning the appropriate division of their time between family, friends, work, and other activities, and that these norms differ from group to group and evolve over time. Suppose this is the case, and that people simply seek to implement their "work hour norm", occasionally updating this norm in response to two kinds of information: their perceptions of the subjective well-being others and the hours of work of others. A plausible model of this learning process would combine payoff-based updating with conformism: that is, individuals adopt the norms of those in their social group perceived to be happier, but with a conformist bias towards adopting norms held by large numbers of their associates, independently of the associated utility levels.[5] Then the model just presented gives the payoff -based aspect of the updating of the work hour norm. The main result is that the work hour norm typical of a given group (other than the richest) is increasing in the level of inequality but that the short run Veblen effect might be attenuated by conformist effects.

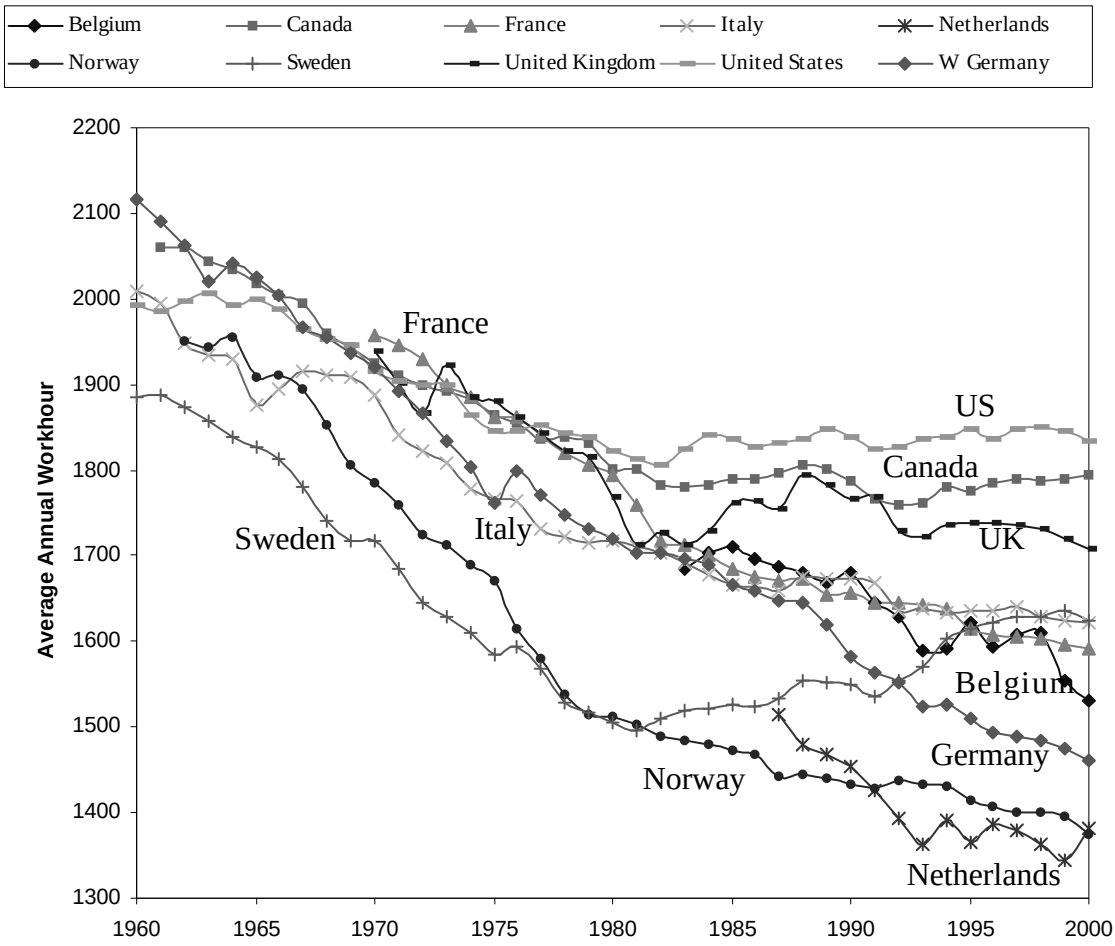
3. Empirical Results on Work Hours and Inequality

The importance of both social norms and labor market institutions in the

[5] Bowles (2004) presents models of this type.

determination of work hours suggests that it may be illuminating to study work hours averaged over individuals. We use data on average annual hours of work for ten advanced economies. The annual data for the ten countries presented in Figure 1 indicate substantial and growing differences between economies. The work year in Germany exceeded that in the U.S. by 231 hours in 1960, and had fallen to 365 hours less than the U.S. by 1998. Many countries show a decline in hours prior to the early 1980s followed by a leveling off or increase (in Sweden the work year fell by 388 hours over the first two decades and then increased by 128 hours over the next two decades)

Figure 1. Movement of Work Hours over Time

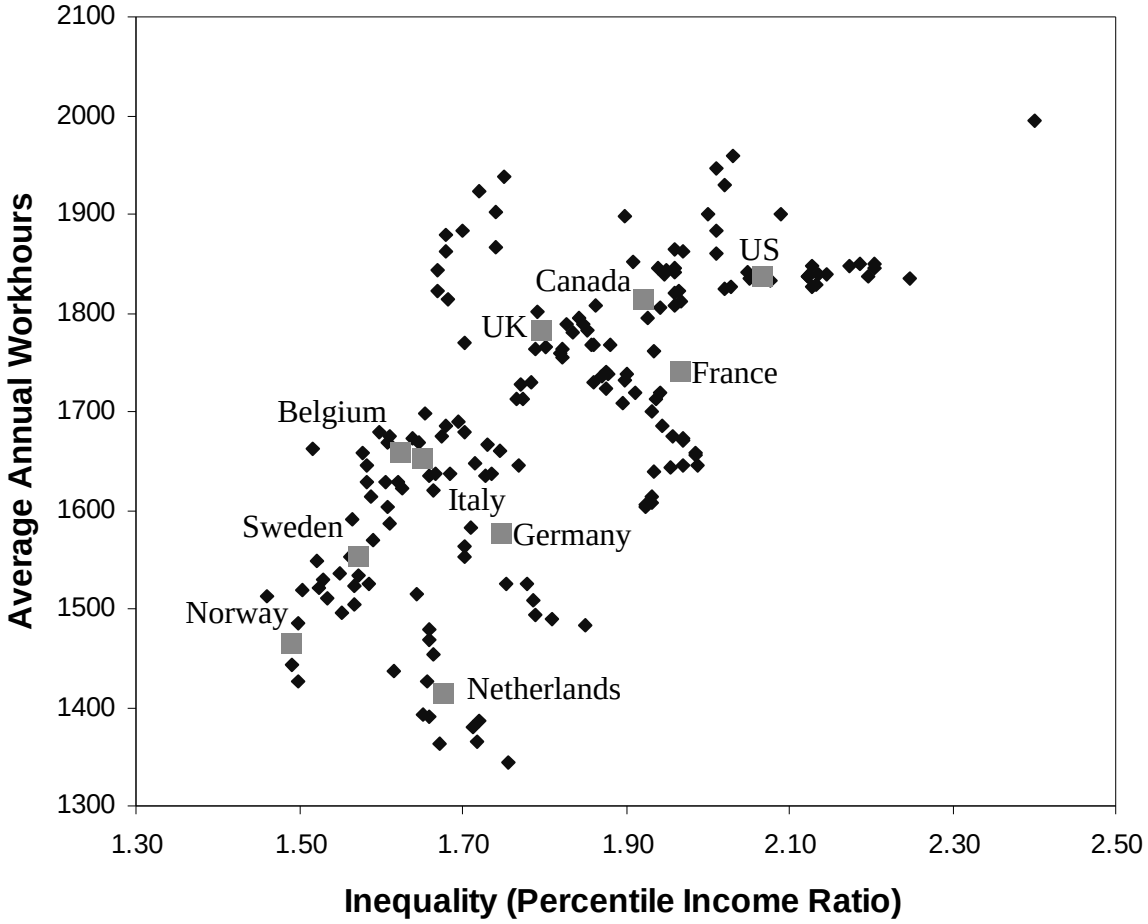


Source: OECD Labor Market Statistics Data Set

Because the reference group for Veblen effects are the rich, we chose a measure of income inequality that is sensitive to upper incomes, namely the ratio of the highest earnings in 90th percentile (that dividing the 90th from the 91st percentile) to the highest

earnings in the 50th percentile. (We also present estimates using two alternative measures of inequality, the Gini coefficient of after tax incomes from the Luxemburg Income Study and a Theil index of inter-industry wage differences.) Figure 2 presents the percentile data along with the annual hours, as well as the country means for these variables. The simple correlation (r = 0.66) is substantial, but as we will seee, it arises in part from covarying influences on hours and inequality.

Figure 2. Earnings Inequality (percentile ratio) and Average Annual Work Hours with Country Averages



Source: OECD Labor Market Statistics Data Set

We therefore estimate a more complete model.

(2) $h^{it} = a + bg^{it} + cx^{it} + \lambda^{i} + \delta^{t} + \mu^{it}$

where h^{it} is the natural logarithm of hours in country i in time t, g is the measure of inequality, x^{it} is a vector of other possible exogenous influences on hours (with c its vector of estimated coefficients), λ^i is a country fixed effect, δ^t is a year fixed effect, and μ^{it} is an error term. The country fixed effects will take account of cultural and institutional differences and other country-specific unobserved influences on hours. Among the x-variables we considered union density (to capture possible time varying institutional differences), real gross domestic product per capita (to measure possible influences of income levels on consumption and leisure preferences) and real manufacturing wages (to capture possible labor supply effects). The latter two were expressed in common units using purchasing power parity conversions. Because hours vary cyclically in response to labor demand rather than to individual labor supply decisions, we also include a measure of aggregate unemployment. To account for changes in the gender composition of the workforce we include the women as a fraction of employment. Finally we included year fixed effects to capture the possible influences of changes in preferences (or other determinants of work hours) possibly reflecting the diffusion of what Inglehart (1977) terms "post materialist values." (However, extensive experimentation with the available measures of "post materialist values" did not reveal any systematic results).

We treat g as exogenous. Changes in work hours affect total labor supply and thereby might influence g, but this effect would operate via wage rates, and we assume that these effects, if they exist, are captured by our wage variable. A plausible exogenous instrument for g proved impossible to find. But a companion study (Park (2003)) addressed this problem by exploring the effects of inequality in male earnings on wives' labor force participation in the U.S., with results similar to those presented below.

Our estimates appear in Table 1. Our preferred estimate (I) as well as alternative estimates using other measures of inequality (II) and (III) indicate significant positive effects of inequality on work hours. Moreover, these effects are large. A standard deviation change in 90/50 percentile ratio, Gini, and Theil, is associated with a predicted increase in annual hours of 3.4, 2.2 and 1.8 percent respectively. Taken literally this means that the difference in the U.S. and Swedish percentile ratio in 1992 accounts for 59 percent of the difference between the hours of work in the two countries.

The estimates also suggest a small (and in the preferred estimate, not significant) negative labor supply elasticity. The unemployment rate has the predicted coefficient, as does the female proportion in employment (with the exception of (II) the results of which may be less reliable, given the much smaller sample size). In OLS estimates (not shown) Union Density had a large and statistically significant negative coefficient; but in these country fixed-effects equations its coefficient is small and positive, suggesting that our country fixed effects may be capturing some of the institutional differences associated with the degree of unionization. The specific country effects across all of the equations indicate major

differences among the countries due to idiosyncratic effects of time invariant cultural, institutional and other country differences uncorrelated with the regressors. Sweden and Norway are similar in their short work year while the english-speaking countries are distinct and not significantly different from one another in their long work hours; the remainder of the continental countries occupy a middle ground with Belgium closest to the Nordic pattern. The country-effect difference between the English speaking and the Nordic group is about 295 hours per year, indicating large idiosyncratic effects presumably due to cultural, political, and other differences.

We estimated the same fixed-effects equations as in Table 1, but using as our dependent variable the natural logarithm of the U.S. Bureau of Labor Statistics series on average annual hours of manufacturing workers. This series may provide a more accurate measure of hours (but for a more limited portion of the population.) The results in Table 2, which cover the same countries and time period, show that the coefficients of our three inequality measures are highly significant, and of approximately the same magnitudes as those using the OECD labor hours series. Table 2 also presents the estimated coefficients of our inequality measures for a specification without the country fixed effects (but with the year fixed effects.) As expected, the estimates of the Veblen effect are considerably larger, but these are likely to be upward biased because of the co-variation of both hours and inequality with time-invariant country-specific differences, the effects of which are captured in our fixed-effects estimates.

The fact that inequality predicts work hours is consistent with the Veblen effects proposed at the outset, but there are other consistent explanations. Bell and Freeman (2001)) have suggested that inequality induces longer work hours because those who work longer hours attain a higher percentile rank in the wage distribution at the workplace and an increase in rank implies greater wage gains the more unequal is the wage distribution. They provide convincing evidence for this effect: In the U.S. and Germany wage inequality within detailed occupation/industry cells is positively correlated with work hours for those working more thirty-five hours per week and longer.

Discriminating empirically between this incentive-based account and the Veblen effects interpretation offered here may be impossible, and it is very likely that both incentive and Veblen effects are at work. However, we are not persuaded that the Bell and Freeman model accounts for the relationship apparent in Figure 2 and Table 1. First, Bell and Freeman treat long hours as an effective signal of a difficult to observe quality likely to result in promotion. While this is true for young lawyers as in the account by Landers, Rebitzer, and Taylor (1996), we think it more likely that hard work when on the job (that is, effort, not hours) is a more common way to move up. Second, the fact that their inequality hours relationship is much weaker (in both the U.S. and Germany) for all workers (rather than just those working full time or more) is not easy to reconcile with their model. Finally Bell (1998)

found that black workers in the U.S. in 1990 are more responsive to measures of earnings inequality among blacks only. Bell suggests that this may be because the black-only distribution is a better indicator of the gains to working longer hours (but points out that it is not easy to explain why this would be so). A more parsimonious explanation might be that the relevant reference group for black workers is other black workers, and their response to measures of black-only inequality is picking up a Veblen effect.

These caveats about the Bell-Freeman interpretation are far from decisive, however. It would be valuable to see if the evidence for Veblen effects is robust when using a measure of inequality that could not plausibly be related to the incentive effects they stress. The most plausible measure of inequality for the incentive effects view would be within firm or within industry inequality, of the type Bell and Freeman used. The reason is that if workers are putting in extra hours to impress their employer, it is the firm's wage structure that is providing the incentive, not the level of inequality within *other* firms, and less still, the difference in *average wages between firms*. (Employers in other firms have no way of knowing how many hours a worker puts in.) Thus the Theil index of inter-industry average wage inequality provides such a test. The fact that this measure of inequality is a significant predictor of work hours (equation II in Table 1) suggests that the Veblen effects model captures some of the causal mechanisms at work, for this measure could not possibly be capturing the Bell-Freeman incentive effects. Notice (equation IV) that the estimate of its coefficient is reduced only marginally by the addition of the percentile ratio to the equation, suggesting that the estimated effect on work hours in equation III is not primarily due to the correlation of the Theil index with other measures of inequality that may be picking up incentive effects modeled by Bell and Freeman.

A second alternative interpretation of the inequality-hours relationship is that the acceleration of skill-intensive technical change over the last two decades may have increased inequality and at the same time increased hours of work. Freeman (2002) for example, found that in the U.S. those using computers or the Internet at work put in longer hours, and we know from Krueger (1993) that computer use has raised the economic returns to schooling. Taken together, these two facts suggest that an exogenous increase in computer use may account for a positive correlation between hours and earnings inequality. We do not think this accounts for our results, however, because when we split our time period (at 1983) using the Theil index (the only measure on which we have sufficiently long time series to do this) we find that its estimated coefficient in the early period is almost twice that in the later period.[6]

[6] Both estimates are smaller than the estimate in Table 1 and are only marginally significant, suggesting that inequality may explain much of the distinct nature of the two periods evident in figure 1, while providing a weaker account of the within-period movements.

4. Normative implications

If Veblen effects of the type modeled here are important, there may be a case for public policies to limit consumption on the conventional grounds that it generates social costs not accounted in the private calculations of the consumer. Frank (1997) and others have recently proposed a tax exemption for savings on just this grounds.[7] Veblen effects are an example of this class of consumption externalities, but with the two following special characteristics.

First, note that the usual consumption externalities are symmetrical (my consumption reduces the well being of the Jones' I am trying to keep up with, just as theirs reduces mine). But Veblen effects are asymmetrical: if the Jones' are richer than me, they do not care about my consumption but instead are trying to keep up with some even richer reference group. Thus Veblen effects cascade downward through the income distribution with the richest group inflicting subjective costs on the next group, whose emulation of the consumption of the rich then augments its own consumption level thus passing additional subjective costs to the groups further down.

A second difference is that the influence of a reference group may be substantially independent of its size, so a relatively small number of well-off but visible consumers may constitute the reference consumption standard for a much larger number of less well-off individuals. In this case their consumption decisions may inflict subjective costs on large numbers of less well-off individuals. For both reasons -- the asymmetry of the effects and the differing sizes of various ranks in the income distribution -- an appropriate policy response to Veblen effects may be a progressive consumption tax rather than the flat consumption tax implied by symmetrical consumption externalities.

To see why this is true take a simple two-class society in which there are a number (normalized to unity) of well-off individuals indicated by the superscript r, and a larger number, n, of less well-off people. As our point is to clarify the logic of policies to correct Veblen-effects rather than to advocate particular policies, we will retain our simplifying assumptions (including that there is no saving). We also set the wage of the less well-off at unity. Suppose that all (the rich and the not-so- rich) share the following utility function (a variant of (1) used above).

(3) $u = \ln c^* - \delta h$

[7] Among others, Boskin and Sheshinski (1978), Ireland (1994) and Oswald (1983) have made similar proposals.

which in the absence of Veblen effects (v = o, so c*=wh) would lead each utility maximizing individual to set h=1/δ. However, with v > 0 the work hours of the rich are unaffected, but the rest will now set their work hours (h^n) at

(4) $h^n = 1/\delta + vw^r h^r$

that is, they work more hours, as we would expect, the second term representing the Veblen effect.

Suppose a social planner wished to know what level of work hours of both groups would maximize the sum of utilities in this society or

(5) $\omega = \ln(h^r w^r) - \delta h^r + n[\ln(h^m - vw^r h^r) - \delta h^n]$.

The planner would know that in the social optimum the consumption of the well-off will be less than under private optimization, and because there are no savings, the only way to accomplish this is to reduce the work hours of the well-off. As the work hours of the lower group generate no externalities (they are the reference group for no one) the planner would simply vary h^r to maximize ω, using (4) to take account of the endogenous response of h^n to the planner's chosen level of h^r. While private optimization induces the rich to equate the marginal contribution of work to (private) consumption utility $(1/h^r)$ to the (private) disutility of labor (δ), the planner's optimum problem shows that social welfare optimization requires

(6) $1/h^{r*} = \delta + \delta n v w^r$

where the first term on the right is the private cost (disutility of labor) experienced by the rich and the second is the sum of the marginal social cost imposed on those attempting to emulate the well-to-do. The aggregate-welfare maximizing level of work hours of the rich is thus given by

(7) $h^{r*}(1 + nvw^r) = 1/\delta$

which shows that the welfare optimum requires the rich to work less than 1/δ by a proportional amount nvw^r which is equal to the sum of the loss in effective consumption imposed on the lower income group. The required change in the work hours of the rich is proportional to both the relative size of the two income groups and to their wage rates.[8] As

[8] Were there m members of a third (poorer) class with a wage rate w^o and hours of work h^o, a tedious calculation shows that

$h^{r*}(1 + vw^r(n + mv/w^o)) = 1/\delta$

the social optimum requires a change in the labor-leisure allocations of the higher-income reference group but not of the lower income group, the social planner will not introduce an across the board consumption tax (applying to both groups). A well designed policy will target the consumption of the rich specifically, as it is this which generates the negative externalities.

It is obvious from (6) that the implied reduction in the work hours of the rich could be implemented by policies which enhance their marginal utility of leisure (or what is equivalent, increasing their marginal disutility of labor) by a proportional amount δnvw^r. This could be accomplished, for example by subsidizing the leisure activities of the rich. Under these conditions the rich would maximize

(8) $u^r = \ln(h^r w^r) - \delta h(1+nvw^r)$

and their private optimization would give the first order condition (6) thus implementing (7).

Suppose the social planner's only instrument is a linear tax on the consumption of the well-off. The particular utility function used in this model implies that the tax will not affect the labor hours they perform, so a tax at rate τ will reduce the consumption of the reference group by the same rate. Assuming that the tax revenues, when spent, yield a per dollar contribution to aggregate welfare of β, the planner will vary τ to maximize (9)

(9) $\omega = \ln(h^r w^r(1-\tau)) - \delta h^r + n[\ln(h^m - vw^r h^r(1-\tau)) - \delta h^n] + \beta\tau w^r h^r$

The optimal tax rate τ^* will equate the marginal benefits (reduced Veblen effects for the less well-off, as well as β) to the marginal costs (in reduced consumption) to the well-off. This can be seen (using (4) and $h^r = 1/\delta$) to require that

(10) $nvw^r + \beta w^r h^r = 1/(1-\tau^*)$,

so, assuming $\beta=0$ (as we are not concerned with unrelated benefits of the tax policy), and $nvw^r < 1$,

(11) $\tau^* = 1 - 1/nvw^r$

As expected the optimal tax is increasing in the relative size of the less well-off group, the size of the Veblen effect, and the relative wages of the better-off group.[9]

[9] If there exists a third, poorer class, as defined in the previous footnote, and the intermediate class is taxed at the rate $\tau^m < 1$, the optimal tax on the consumption of the rich

5. Conclusion

The design of policies to attenuate possible market failures arising from Veblen effects requires attention to considerations wholly absent above, including their effects on savings, distributional impacts and political viability (the public might not favor subsidizing wilderness retreats for the well-off, even if, as the leisure subsidy example requires, they were inconspicuous!) We will not address these issues here. It is clear, however, that policies designed to discourage consumption *per se* (such as the flat consumption tax discussed by many authors) are not optimally designed to address Veblen effects. The reason is that where Veblen effects are important, the social cost imposed by consumption depends on who is doing it, on the structure of reference groups (who cares about whom) and the size of the hierarchically ordered reference groups. The consumption of those who, like the well-to-do, are directly or indirectly reference models for many would ideally be treated differently from the consumption of those who are models to none or to few.[10]

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increases to

(11') $\tau^* = 1- [nvw^r(1+mv(1- \tau^m)/nw^o]^{-1}$

to take account of the indirect Veblen effects (via increased work and consumption by the middle group) on the well-being of the poorest group (the increase in τ^* varying positively with the relative size of the poorer class and inversely with its wage.)

[10] A government that sought to increase output (rather than maximizing the sum of utilities) could mobilize Veblen effects by shifting the tax burden from the rich to the less well-off, thereby inducing higher levels of work hours among the latter.

Table 1. Estimates of the relationship between work hours and inequality

	I	II	III	IV
Constant	9.635	7.833	10.279	9.878
	(16.95)	(12.16)	(30.18)	(16.27)
PERCENTILE EARNINGS RATIO	**0.177**			**0.126**
	(4.81)			(2.95)
GINI COEFFICIENT (After-tax Income)		**0.030**		
		(2.22)		
INTER-INDUSTRY EARNINGS INEQUALITY			0.023	0.020
			(5.74)	(2.81)
Ln(Real Wage)	-0.021	-0.041	-0.055	-0.017
	(-0.69)	(-2.56)	(-7.47)	(-0.51)
Ln(Real GDP per capita)	-0.234	-0.065	-0.256	-0.243
	(-3.70)	(-0.98)	(-7.30)	(-3.57)
Union Density	0.023	0.002	0.002	0.018
	(3.60)	(0.30)	(0.64)	(2.65)
Unemployment Rate	-0.005	-0.008	-0.005	-0.005
	(-5.17)	(-5.67)	(-6.25)	(-4.34)
Female Proportion in Employment	-0.094	0.038	-0.070	-0.106
	(-3.82)	(1.17)	(-4.35)	(-4.18)
Country and Year Fixed Effects	YES	YES	YES	YES
Observations	155	89	240	143
Adjusted R-squared	0.958	0.979	0.967	0.961

Note: The dependent variable is Ln(Average annual work hours).

Table 2. Alternative Measures

	P90/50	*GINI*	*THEIL2*
Using BLS Hours (Manufacturing)	**0.090**	**0.042**	**0.033**
	(2.47)	(2.66)	(7.60)
Without Country Fixed Effect	**0.528**	**1.015**	**0.066**
	(9.30)	(7.20)	(11.36)

Note: The dependent variable is Ln(Average annual work hours).

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