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

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Abstract

We investigate *Veblen effects* on work hours, namely the way that a desire to emulate the consumption standards of the rich induces longer work hours among the rest. Consistent with our model of these asymmetric social comparisons, greater inequality predicts longer work hours in ten OECD countries over the period 1963-1998. The country fixed effects estimates of the impact of inequality on hours are large, robust, and cannot be explained by conventional incentive effects. In the presence of Veblen effects, a social welfare optimum cannot be implemented by a flat tax on consumption but may be accomplished by progressive consumption taxes. Word count (abstract): 102

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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.* (p.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 labour 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 labour 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.

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

[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.

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 this hypothesis. 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. This result is consistent with the hypothesis that social comparisons are upwards to a richer reference group and is inconsistent with the alternative hypothesis that social comparisons are downward looking, people's consumption and work choices reflecting a desire to distance themselves from a poorer reference group. 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] Corneo and Olivier (1997) analyze optimal taxation in Veblen-inspired model of an

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 (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...*(p.81)

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

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*

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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.

ability to pay. (p.71)

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 ($\tilde{c}$). 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 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

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

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

$$u = u((wh - vc^{\sim}), h) \qquad (1)$$

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 an exogenous increase in the wages of the richest group (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 reduce effective consumption $wh - vc^{\sim}$, and thus raise the marginal utility of consumption relative to the marginal utility of leisure, inducing an increase in the hours of work. The effect on work hours of variations in the Veblen constant have the same sign ($dh^*/dv > 0$), reflecting an increase in the intensity of social comparison and perhaps

[4] If the utility function is Cobb-Douglas in leisure and effective consumption (with a the coefficient of c^* and $1-a$ the coefficient of $(1-h)$) 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 $v = 0$, $h = a$).

capturing the negative effect of TV watching on saving in Schor's study.

If, *contra* Veblen, the reference group were the poor (others seeking to *distance* themselves from the reference group), then an increase in inequality associated with a decline in the wages of the poorest group would induce a *reduction* in work hours of other higher income groups. Thus are able to empirically test whether the comparisons are upwards, to a rich reference group as in the Veblen hypothesis, or downwards to a poorer group from which others are seeking social distance.

For individuals less well off than the reference group, a simple labour supply function may be derived that is additive in its conventional and Veblen effects. To see this, normalize the wage of the less well-off to unity and suppose that all (the rich and the not-so-rich) share the following utility function (an example of (1) above).

$$u = \ln c^* - \delta h \tag{2}$$

In the absence of Veblen effects ($v = 0$, so $c^* = wh$) each utility maximizing individual would select h so as to equate the disutility of labour (δ) to the marginal benefit of labour via its contribution to consumption ($1/h$), thus setting $h=1/\delta$. With $v > 0$ the work hours of the rich are unaffected, but those not in the reference group (with superscript n) will now set their work hours at

$$h^n = 1/\delta + vw^r h^r \tag{3}$$

where the superscript r refers to the rich reference group. As can be seen from (3) those not in the reference group work more hours, as we would expect, the second additional term representing the Veblen effect. An extension of this model with many income groups each

of which (except the richest) takes the next richest group as its reference group (footnotes 8 and 10, below) shows than a increase in consumption by the rich generates a downward cascade of Veblen effects, increasing work hours throughout the income distribution.

One aspect of the model deserves 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. Böheim and Taylor (2004) report similar results using the British Household Panel Survey.

This evidence that work hours respond to employee preferences 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 labour 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 (Bowles (2004)). 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. Work Hours and Inequality

The importance of both social norms and labour market institutions in the 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 about here]

Because the reference group for Veblen effects is 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 see, it arises in part from covarying influences on hours and inequality.

[Figure 2 about here]

We therefore estimate a more complete model.

$$h^{it} = a + bg^{it} + cx^{it} + \lambda^{i} + \delta^{t} + \mu^{it} \qquad (4)$$

where h^{it} is the natural logarithm of work 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 conventional labour supply effects). The latter two were expressed in common units using purchasing power parity conversions. Because hours vary cyclically in response to labour demand rather than to individual labour 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. 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. Finally, we used measure of government expenditures relative to gross domestic product. The variable proved insignificant while having no appreciable effect on the results reported below.

We treat *g* as exogenous. A more adequate approach would take *g* and *h* to be jointly determined.[5] A plausible exogenous instrument for g proved impossible to find. Thus our

[5] We have (in reduced forms): $g = g(h; z)$ and $h = h(g;k)$ where *z* and *k* are exogenous influences. We would like to estimate the partial effect on *h* of an exogenous shift in *g* that is h_g. What we observe, however, are intersections of these two functions, inferences from

results could capture the effect of exogenous shifts in labour supply on the degree of inequality. To test this possibility we use both contemporaneous and one year lagged inequality measures on the right hand side of (4). The results with lagged inequality measures (presented in Table 2) are virtually identical to those with contemporaneous regressions. Our view that the endogeneity problem is not accounting for our results is supported by a companion study (Park, 2004) of the U.S. in which the labor force participation of wives of full time full year working men covaries with measures of income inequality among men of similar age and of the same locality. Because it is unlikely that the labour force decisions of wives affected income inequality among men (especially during the period studied, 1969-1979) it appears inequality was the cause of increased work hours rather than the converse.

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

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which (unless $g_h = 0$) will over- or underestimate the true effect. If g varies inversely with h -- increases in work hours of those in the middle of the earnings distribution attenuating inequality -- we underestimate the true effect, and conversely.

difference between the hours of work in the two countries.

The estimates also suggest a small (and in the preferred estimate, not significant) negative labour supply elasticity consistent with other estimates of labour supply functions and with the derived labour supply function above (3). The unemployment rate has the predicted coefficient, as does the female proportion in employment. 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 Labour 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 labour hours series. Table 2 also presents the estimated coefficients of one year lagged inequality measures. The results with lagged inequality measures are very similar to or slightly stronger than those with contemporaneous regressions, suggesting that our results are not driven by the endogenous relation between work hours and inequality. Lastly, we show the coefficients of 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.

4. Other Explanations

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 social

comparisons 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. Two measures accomplish this. First, the previously-mentioned study (Park, 2004) showing that wives' labour force participation covaries with male income inequality cannot plausibly

be capturing the incentive effects, unless we have a reason to believe that having a wife with a job has positive implication on a husband's promotion.

Second, 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 III 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]

5. Consumption inequality as a public bad

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 proposed a tax exemption for savings on just this grounds.[7] Veblen effects are an example of this class of consumption externalities, but with two 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,

[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.

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

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 in the Veblen-inspired model 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 (as above) 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. Using the utility function (2) and the resulting labour supply function (3), suppose that a social planner wished to know what level of work hours of both groups would maximize the sum of utilities in this society, ω, where

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

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 (3) 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 labour (δ), social welfare optimization requires

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

where the first term on the right is the private cost (disutility of labour) 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

$$h^{r*} = 1/\delta(1 + n v w^r) \tag{7}$$

which shows that the welfare optimum requires the rich to work less than $1/\delta$ 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 for whom the next highest income class is the reference group, with a wage rate w^o and hours of work h^o, a tedious calculation shows that

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

the social optimum requires a change in the labour-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.

From (6) we see that the implied reduction in the work hours of the rich could be implemented by policies that enhance their marginal utility of leisure (or what is equivalent, increasing their marginal disutility of labour) by a proportional amount $\delta n v w^r$.[9] Suppose the social planner's only instrument is a linear tax on the consumption of the well-off. The particular utility function used here implies that the tax will not affect the labour 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:

$$\omega = \ln(h^r w^r(1-\tau)) - \delta h^r + n[\ln(h^m - v w^r h^r(1-\tau)) - \delta h^n] + \beta\tau w^r h^r \qquad (8)$$

The resulting optimal tax rate τ^* is given (using (3) and $h^r = 1/\delta$) by

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A comparison with (7) shows that the optimal work hours of the rich are further reduced by the consideration of additional poorer classes.

[9] This could be accomplished, for example by subsidizing the leisure activities of the rich. Under these conditions the rich would maximize

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

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

$$nvw^r + \beta w^r h^r = 1/(1-\tau^*), \quad (9)$$

This requires that the tax rate be selected to equate the marginal benefits of additional taxes (that is the reduced Veblen effects for the less well-off plus the expenditure benefits, shown on the left-hand side of (9)) to the marginal costs (in reduced consumption) to the well-off (the right-hand side).

Setting β=0 so as to abstract from the expenditure related benefits of the tax policy), and assuming that $nvw^r < 1$,

$$\tau^* = 1 - 1/nvw^r \quad (10)$$

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.[10]

6. Conclusion

We have shown that increased inequality induces people to work longer hours and have also provided evidence that the underlying cause is the Veblen effect of the consumption the rich on the behavior of those less well off. The effects are large enough to invite attention from policy makers.

The design of policies to attenuate possible market failures arising from Veblen

[10] 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 increases to

$$\tau^* = 1 - [nvw^r(1+mv(1-\tau^m)/nw^o]^{-1} \quad (10')$$

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.)

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 advocated by many) 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 taxed at a higher rate than the consumption of those who are models to none or to few.[11] Such a policy would be doubly attractive as it as it would enhance the welfare of the less well-off by limiting the downward cascade of welfare-reducing Veblen effects while funding valued social projects or allowing the reduction of other incentive-distorting forms of taxation. As (10) shows, the richer and smaller is the reference group, the higher is the tax rate that maximizes total social utility.

For well known reasons, policies that raise average living standards while favoring the less well off should be attractive to vote-maximizing political parties and candidates. Specific taxes on high-end consumption items have occasionally been advocated, and the

[11] 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.

village of Mamaroneck, New York even placed a limit on house size specifically to curb Veblen effects (Foderano, 2001). But Veblen-inspired policies are a rarity in both academic and policy circles.[12] Trends in work hours have responded to other influences.

Over a century ago Veblen thought that conspicuous consumption would increase in importance.

> *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... the present trend of*

[12] This may be due to their seemingly punitive stance towards the welloff. It is easy to see, however, that one could design a Pareto-improving policy to attenuate negative consumption spillovers. Let the rich have a utility function that values some form of "inconspicuous consumption" that does not stimulate emulation, in addition to both conspicuous consumption and leisure. Suppose that instead of a tax on the consumption of the rich, a restriction on their work hours was introduced. Because in the pre-restriction allocation they selected their work hours to maximize their utility (choosing h^r so that $du^r/dh^r = 0$), a sufficiently small reduction in their work hours would have only second-order effects on their utility while conferring a cascade of first-order benefits on those below them in the social comparison ranking. Thus there exists some Pareto improving hours restriction on the rich, accompanied by a transfer of income to the rich from the rest, with the proviso that it must be spent on inconspicuous consumption.

the development is in the direction of heightening the utility of conspicuous consumption as compared with leisure. (pp. 71-72)

The description seems almost contemporary, and could well apply now across nations, as large cosmopolitan elements in many populations now take their consumption standards from the well to do in New York, Milano or Tokyo rather than their domestic exemplars of style and respectability.

But since he wrote, leisure has not been crowded out by consumption, conspicuous or otherwise. Indeed in the nations on which data are available, since 1870 work hours have declined substantially, by roughly fifty percent in continental Europe and by about a third in the English-speaking nations (Huberman, 2004a,b). It seems plausible, and consistent with our estimates for a much shorter period, that among the causes included the sustained increase in per capita income, the increase in women's labour force participation, and the very long term decline in the income share of the top income earners, in many countries extending from the early part of the 20th century until well into its final quarter.[13]

[13] See the Dell (2003) on Germany and the data on France, UK and the U.S. presented in Piketty and Saez (2003)

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). The number of observations is limited by the fact that our inequality measures are not available for all years.

Table 2. Alternative estimates of the Veblen effect

	P90/50	*GINI*	*THEIL*
Using BLS (Manufacturing) Hours	0.090	0.042	0.033
	(2.47)	(2.66)	(7.60)
Using One-year Lagged Inequality	0.170	0.049	0.027
	(4.45)	(3.50)	(5.90)
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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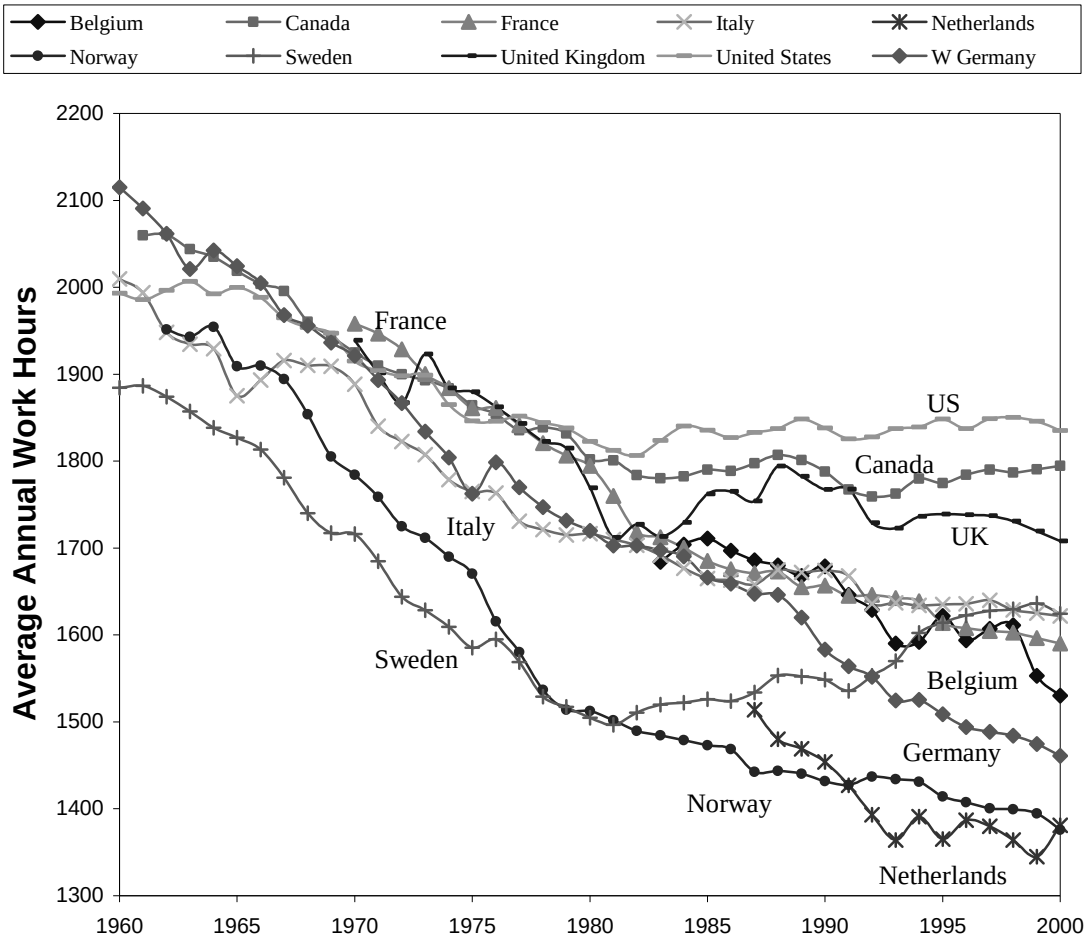
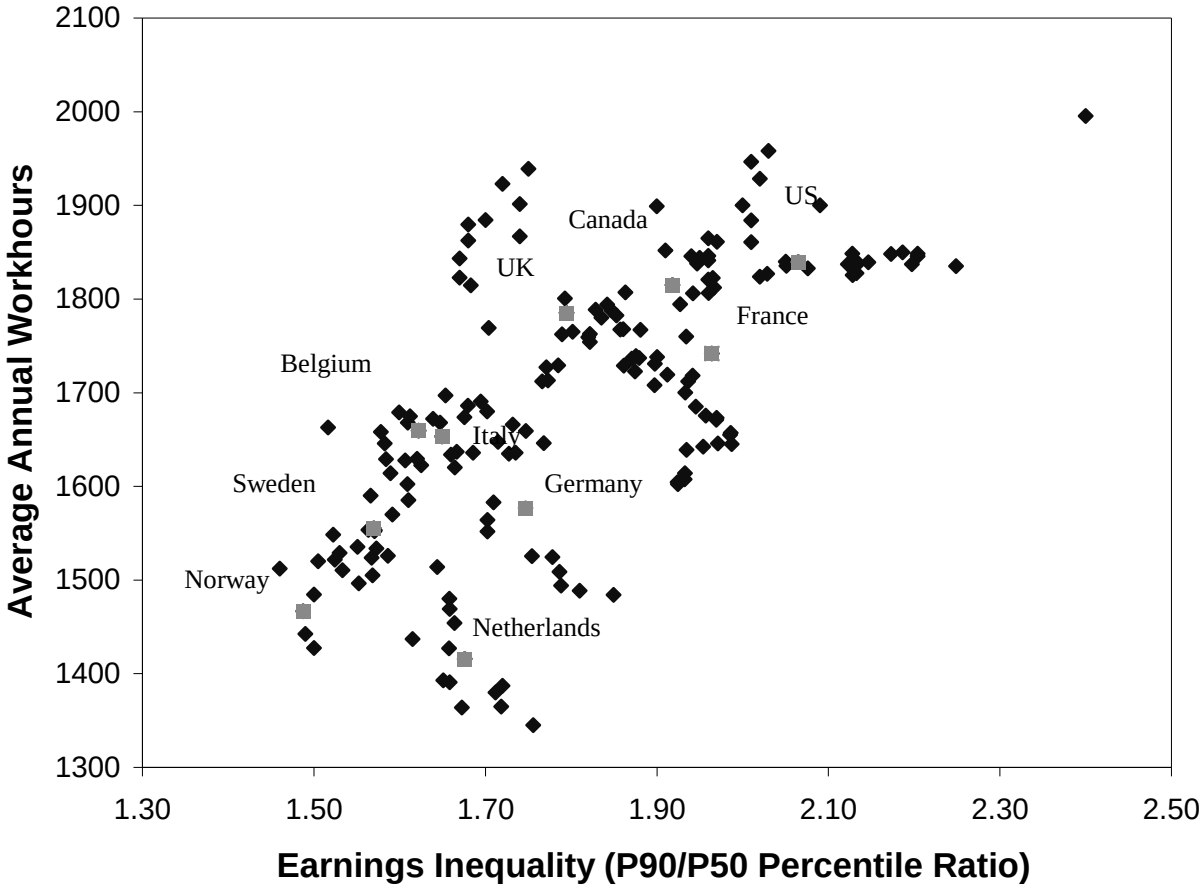
Figure 1. Work hours over time



Source: OECD Labor Market Statistics Data Set
(http://www1.oecd.org/scripts/cde/members/lfsdataauthenticate.asp)

* Average annual hours of work are the number of hours worked on average by persons for total employment (average employment over the year) Refer Data Appendix for detailed definition.

Figure 2. Earnings inequality and average annual work hours



Source: OECD Labor Market Statistics Data Set (http://www1.oecd.org/scripts/cde/members/lfsdataauthenticate.asp)

* Earnings Inequality (percentile ratio) is based on gross earnings of full-time workers and is the ratio of earnings at 90th percentile to the median earnings (as described in the text). Refer Data Appendix for detailed definition.

** Square blocks represent country average of each country and diamond shaped points are annual data.