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Habit, Prisoner's Dilemma and Americans' Welfare
Cost of Working Much More than Europeans

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Abstract

Europeans work much less than Americans. Some studies claim this is due to high taxes in Europe, which would benefit by adopting US tax rates and work time; others find that taxes have little or no impact on work time. I examine the hypothesis that Americans would benefit by reducing work time to Europe's level. Empirical and experimental studies show utility falls as other people's income rises. Due to its historical experience, Europe is able to internalize this and other negative externalities by restricting work time – through minimum vacation time and maximum weekly work hours – while the US is not, resulting in a Prisoner's Dilemma “overworking trap” equilibrium. A simple model and work time data are used to derive the US welfare gain from reducing work time to Europe's level. Findings are: i) parameter values are consistent with experimental results on the relative impact of own and other people's income; ii) the welfare gain's present value is about 120 percent of annual welfare; and iii) even if Europe's policy reduces work time excessively, it does remain beneficial as long as the reduction is less than twice the optimal one.

Keywords

Work, leisure, Europe, US, prisoner's dilemma, overworking trap

JEL codes: J22, D70

1. Introduction*

The number of hours worked has declined over the last century, especially in developed countries,¹ though the decline has been uneven, with Americans working much more than (Western) Europeans in the last half century (OECD, various years). One hypothesis is that incentives differ in the two regions (see Olovsson et al. 2003 and Olovsson 2009 for Sweden, and Prescott 2004 for Europe). Prescott argues that Europe's higher taxes fully explain the work time difference, and that these reduced welfare in Europe below the level it would have achieved under US taxes.

This paper examines the hypothesis that income's social value is below its private value because of negative spillover effects and that Europe takes these into account while the US does not. Hence, Americans are caught in an "overworking trap" and would gain by working less.² This view appears to be supported by studies (Webster 2008, Schulte 2014 a, b) showing that Americans suffer from sleep shortage, many claiming to be too busy to take a vacation or sleep, and some working seventy hours or more per week, stating they have no choice "because everyone else at work does," a negative externality. Another hypothesis proposed by Alesina et al. (2006), and which has similar implications, is that the social value of leisure is greater than its private value because of a positive spillover effect or "social multiplier" (Glaeser et al., 2003). A fourth hypothesis, that Europe's work time restriction is excessive, is also examined.

This paper makes several contributions to the analysis: i) it presents additional arguments as to why tax differences do not explain work time differences, and proposes a different hypothesis for Europe's lower labor supply; ii) it uses simple model and work time data to derive the private and social optimum for leisure and work time, and the US benefit from reducing work time to Europe's level; and iii) it derives the conditions under which a policy that restricts work time excessively remains beneficial.

The paper is organized as follows. Section 2 re-examines the literature on why Europe has restricted work time while the US has not, and provides an additional explanation based on a longer-term perspective. Section 3 presents a simple model that accounts for the negative income-related externalities. Section 4 uses work time data to determine parameter values and provides simulations of the US welfare gain from reducing work hours to Europe's level, and examines the results under an alternative production function, their consistency with the results of an experimental study, and the conditions under which a policy of excessive work time reduction remains beneficial. Section 5 concludes.

Section 2. Why the Difference in US and Europe's Work Hours?

Section 2.1 reviews the main results in the literature on this issue, and Section 2.2 provides some historical perspective and makes some additional points. Section 2.3 looks at the prisoner's dilemma (or Nash equilibrium) specific to this issue.

* I would like to thank Frédéric Docquier, Hillel Rapoport and seminar participants at Bar-Ilan, University of Chile, University of Liège and the World Bank, for their useful comments.

¹ The decline is smaller than some had predicted. For instance, Keynes (1930) expected people to work some 15 hours a week by 2030, devoting the rest of their time to leisure and culture.

² In a similar vein, Burda et al. (2008) find that US work behavior – with much more work at irregular hours (evenings and week-ends) than in Europe – may represent an inferior equilibrium.

2.1. What Does the Literature Say?

Prescott (2004) claims Europe's higher marginal income tax and consumption tax explain the entire US-Europe difference in work hours. However, a number of other empirical studies obtain a much smaller impact of marginal taxes on work time. Lundqvist and Sargent (2007), Blanchard (2007) and Levine et al. (2013) note that Prescott relies on assumptions that result in an elasticity of labor supply that is much higher than standard estimates. Lundqvist and Sargent (2007) further argue that to explain the labor supply differences, it is essential to include the fact that taxes are not returned in lump-sum fashion as Prescott assumes but rather are used to fund a host of public goods and services – including unemployment benefits, disability and retirement – and that once one accounts for this and for Prescott's assumptions that lead to a higher elasticity, differences in tax rates no longer explain labor supply differences.³

Alesina et al. (2006) critically review this literature and conclude that Europe's lower labor supply is essentially due to the importance of unions, especially after the 1970s' oil shocks. As unemployment increased, it made sense for unions to seek work-sharing arrangements involving reductions in work time rather than higher wages. This may have led to a rise in society's leisure habits because of a social multiplier effect, whereby the return to leisure rises as more people take longer vacations. The authors show in a panel covering the years 1960-1995 and 18 OECD countries that the impact of unionization is significant while that of taxes vanishes once unionization is included. They also find a small increase in wellbeing as leisure increases.

2.2. Taxes vs. Work Time Restrictions

An important point that seems to have been overlooked in the literature is that Prescott's result that high tax rates determines Europe's allocation of time to work – i.e., that the tax rates are binding – implies that laws that restrict labor supply should not affect it. With binding high taxes, individuals would have selected their optimal supply of labor under the existing tax policy and would have no reason to reduce it following an increase in the minimum vacation time. They could simply work more at other times by increasing overtime work. However, Hunt (1998, 1999) found that the reductions in standard work time did not raise overtime work in France, Germany and other countries. In other words, increases in minimum vacation time led to similarly large reductions in overall work time. Lagarde (1996) obtained similar results.⁴ Thus, it appears that restrictions on labor supply rather than high tax rates have been the binding constraint and explain most of the work time difference between the US and Europe.^{5 6}

Section 2.2 looks at the role of other factors, some of which have, to my knowledge, not been accounted for in this literature.

³ Gordon (2010) also provides a detailed examination of Europe's low work hours and its possible causes. He argues that, even assuming Europe's shift from labor to leisure is voluntary, its value is low because it equals the net wage rate, which is low due to high income taxes. This only holds if changes are small and leisure's private and social values are identical. However, the net wage rate is lower than leisure's true value because i) Europe's changes in work hours have been large (OECD 2013) and leisure's average value over that range is above its marginal value, and ii) the social value of work is lower than its private value so that reducing work hours generates a positive externality.

⁴ She shows an average decline in work hours in France of over 20% from 1950 to 1995, with the largest ones occurring when vacation time was raised – e.g., in 1982 when it increased from four to five weeks.

⁵ Substitution between regular and overtime work may not be perfect. In that case, Prescott's argument also implies that overtime work would increase, though by less than the increase in minimum vacation time. However, Hunt (1998, 1999) found that overtime work did not increase, so that labor supply restrictions are likely to be the binding constraint.

⁶ Alesina et al. (2006) find that Europe's laws on minimum vacation time account for 80% of the difference in employed labor's weeks worked

2.2. Historical Perspective

Per capita income in 1913 was higher in the US than in Continental (Western) Europe by 67 percent, and by close to 50 percent when excluding Southern Europe (Maddison 2007), which may be why Americans worked less than Europeans at that time. Since then, however, Europe's work hours have declined relative to the US. Interestingly, much of the literature has examined the evolution of work hours in the two regions over the last forty to fifty years,⁷ even though Belgium, France and Germany passed their first law on paid vacations and maximum work hours decades earlier: 1936 for Belgium and France and 1938 for Germany.

France's 1936 reform established a two-week minimum paid vacation time and reduced the standard workweek from forty eight to forty hours. The minimum vacation time was raised to three weeks in 1956, four weeks in 1969, and five weeks in 1982. Thus, most of the increase in vacation time (from zero to four weeks) was enacted before the 1970s, and the reduction in weekly work hours was enacted over three decades before it.⁸ Germany's 1938 law reduced the workweek to forty-eight hours, with work time continuing to decline over time. By 2012, Germans were working 82 hours less than the French (OECD 2013), partly because of their six-week vacation time.

Average vacation time in the US is two weeks, and the number of holidays is also significantly smaller than in Europe. A major difference between the two regions is that Europe passed laws restricting work time while no such laws exist in the US. Government intervention in many areas of individuals' existence has been part and parcel of life throughout Europe's history, with royalty and aristocracy having (close to) absolute power over the people, who were serfs and subjects long before they became citizens. The impact of this historical experience on people's psyche cannot be overemphasized and explains why Europeans accept much more government intervention and control over their life than Americans do.⁹

This historical experience did not result from the influence of labor unions – which only appeared in Continental Europe in the nineteenth century (e.g., 1848 in Germany and 1866 in France) – or the left in general, but rather from the power of the historical “elite”. Unions were important for passing labor market reforms but the general environment under which they operated was the outcome of the control that the elite had historically exercised over all aspects of society. Unions were able to have these laws passed because history had given European governments and parliaments the widely accepted authority to impose them. In the absence of such historical experience, passing such laws might not have been possible.

The history of the US is dramatically different. First, early immigrants came to the US to escape oppressive circumstances and were highly suspicious of authority. Second, the US federal system, with its strong states rights, makes national policy in this area very difficult.¹⁰ Third, laws imposing work time restrictions on the private sector would never be countenanced in the US, whether at the state or federal level.

⁷ For instance, analysis by Alesina et al. (2006) focuses on 1960-1995, Blanchard (2004) on the 1970s to early 2000s, and Prescott (2004) on the 1970s and 1990s.

⁸ The Aubry laws (1998, 2000), whose objective was to raise employment, reduced work time to 35 hours a week (beyond which overtime pay applied), though all subsequent governments passed laws – in 2002, 2004, 2005, 2007 and 2008 – aimed at dismantling the impact of the Aubry laws, which was essentially achieved with the 2008 law (Hanser 2013). Thus, a self-correcting mechanism seems to exist when work time reductions are deemed to be excessive. Moreover, French labor force surveys show unchanged total hours of work in the first years after the introduction of the 35-hours work week, with only a slight decline in usual hours of work.

⁹ The difference in the concept of government's role is illustrated by, for instance, the fact that a word is part of the American English language if a lot of people use it, while a word only becomes officially part of the French (Spanish) language if approved by the Académie Française (Real Academia Española).

¹⁰ Many of the founding fathers wanted strong states and a weak federal government because, given the size of the new country, they feared the despotism of the British might be replicated in the US.

2.3. Why is the US Stuck in a Prisoner's Dilemma?

If Americans were offered, say, an additional week of vacation time against, say, a two percent reduction in income, most might decide not to take it, though they might take it if everyone else did. The reasons are that someone who takes additional vacation time:

- i) Experiences a *relative* decline in income and thus a utility loss (see below);
- ii) Is faced with peer pressure;¹¹
- iii) Faces the possibility that management might view it as a lack of commitment to the job, with potential long-term career implications; and
- iv) Has few if any people with whom to enjoy it since they are working.

Given that none of these negative effects are present when everyone obtains more vacation time, a majority of people might want more vacation time if everyone else did. If so, the US would find itself in a prisoner's dilemma situation or Nash equilibrium in the absence of a mechanism to move the economy to the social optimum.¹² The opposite holds in Europe where governments set minimum vacation time and maximum workweek. The Nash equilibrium in this paper is associated with relative income preferences, i.e., with reason (i) above, a point emphasized by Keynes (1930) who claimed the desire for higher *relative* income was insatiable.¹³ Cohen (2012) describes recent studies showing the importance of the income of people in a person's reference group for individual wellbeing, a finding confirmed by McBride (2001) and others who show that well-being declines as earnings of others rises.

As discussed in Cohen (2012), US students were asked to rank two situations according to their preference: i) they earn \$50,000 and the others earn \$25,000; and ii) they earn \$100,000 and the others earn \$200,000. The majority preferred the former. And McBride's (2001) experiment shows that satisfaction with individual earnings declines as those of others increases, while Park (2010) finds that husbands' relative income is an important determinant in married women's work decisions.¹⁴ Clark et al. (2008) provide an overview of the literature on relative income, happiness and utility.

Interestingly, comparative wellbeing does not seem to extend to less visible aspects of life in terms of status, wealth and success in the eyes of society, or to what some have termed "intrinsic" as opposed to "extrinsic" goods (e.g., Frey 1997; Deci et al. 1998), where the former consist of aspects such as a sense of purpose, relatedness, love, available quality time, etc., i.e., aspects that seem more important for individual wellbeing (Brooks 2012).¹⁵ For instance, the students mentioned above chose four weeks vacation when others obtained eight weeks, rather than two weeks when others obtained one week. In this case, having less than others did not matter (or not as much). Solnick and Hemenway (1998) obtained similar results. They used survey data to examine the importance for individuals of absolute and relative levels of education, attractiveness, intelligence, income, vacation time, approval by a supervisor, and more, and found that concern with relative position was weakest for vacation time.

¹¹ Reasons (i) and (ii) are discussed in Levine et al. (2013).

¹² A possible mechanism might be a higher marginal income tax, though – as mentioned earlier – its impact is doubtful, as Levine et al. (2013) and Lundqvist and Sargent (2007) only find weak support for increased taxes to align the private and socially optimal outcomes; moreover, its political feasibility is most doubtful.

¹³ Alesina et al. (2006), on the other hand, examine the case of a Nash equilibrium that is based on reason (iv) above, i.e., on the fact that the utility of leisure increases with the number of people who consume it. A result available upon request is that the two assumptions generate similar results on work time.

¹⁴ Empirical analysis discussed in Cohen (2012) shows that a woman is more likely to work if her sister's husband earns more than her own husband.

¹⁵ The impact on job performance and productivity of intrinsic and extrinsic motivation and of their interaction are examined by, e.g. Deci et al. (1998) and Bénabou and Tirole (2003).

In what follows, I assume a utility function that reflects the characteristics of individual preferences described above, i.e., utility declines with other people's average income but is unaffected by other people's leisure time.

3. Model

Americans have been working more than Europeans for fifty years (OECD 2012) and the explanation for this difference must recognize its persistence. The interest is in long-term behavior and not in cyclical or medium-term behavior; thus, a static model is used.

Assume an economy with homogeneous labor as the only factor of production (this assumption is relaxed in Section 4.3). The representative individual's income (or consumption) is

$$Y = AL, A > 0, \quad (1)$$

where L is labor supply or work hours. The productivity parameter, A , depends on human capital and technological and institutional development and need not be the same in Europe and the US for the analysis, though it might, given the convergence between the productivity of the European countries considered in the simulations and the US.

Utility is given by:

$$U = l^\alpha Y^{1-\alpha} y^{-\beta} = A^{1-\alpha} l^\alpha L^{1-\alpha} y^{-\beta}, \beta \in (0, 1 - \alpha), \quad (2)$$

where $l = 1 - L$ is the share of time an individual spends on leisure, and y is average income of other individuals.¹⁶

The private optimum (where y is taken as given) is:

$$l^P = \alpha, L^P = 1 - \alpha, Y^P = (1 - \alpha)A, U^P = \alpha^\alpha [A(1 - \alpha)]^{1-\alpha-\beta}. \quad (3)$$

As argued in the Introduction and found in various studies, income taxes have little if any impact on the supply of labor, i.e., its elasticity is not significantly different from zero, i.e., income and substitution effects are not significantly different in absolute value.

The social optimum is given by:

$$l^S = \frac{\alpha}{1-\beta} > l^P; L^S = \frac{1-\alpha-\beta}{1-\beta} < L^P; U^S = \left(\frac{\alpha}{1-\beta}\right)^\alpha \left[A \left(\frac{1-\alpha-\beta}{1-\beta}\right)\right]^{1-\alpha-\beta}, \quad (4)$$

and the ratio of social to private optimal leisure time is $\frac{l^S}{l^P} = \frac{1}{1-\beta}$. The ratio of social to private utility, V , is

¹⁶ It is possible that $l + L < 1$ because of other uses of time, particularly home production. Using time-diary data for Germany, Italy, Australia and the US, Burda and Hamermesh (2010) find substitution between market and household production over the business cycle, and Aguiar et al. (2013) find that home production absorbed 30% of the reduction in market work hours during the Great Recession. However, as mentioned before, the phenomenon examined here is a long-term one, and Burda and Hamermesh (2010) find that substitution between market work and home production is at best negligible over longer periods of time, and that almost none of the lower level of market work is offset by home production in areas of high long-term unemployment. Consequently, home production is excluded from the model.

$$V \equiv \frac{U^S}{U^P} = \left(\frac{1}{1-\beta}\right)^{1-\beta} \left(\frac{1-\alpha-\beta}{1-\alpha}\right)^{1-\alpha-\beta}. \quad (5)$$

From (5), $\frac{\partial \log V}{\partial \beta} = \log(1-\alpha) + \log(1-\beta) - \log(1-\alpha-\beta) \geq 0 \Leftrightarrow \beta \geq 0$. Since $V = 1$ for $\beta = 0$, and $\frac{\partial V}{\partial \beta} > 0$ for $\beta > 0$, it follows that $V > 1$ for $\beta > 0$, i.e., $U^S > U^P$ for $\beta > 0$. Moreover, $\frac{\partial^2 V}{\partial \beta^2} > 0$, i.e., V increases with β at an increasing rate.

4. Simulations

Section 4.1 uses data on work hours to derive the value of the model's parameters and solve for the potential US welfare gain, $V - 1$. Section 4.2 examines whether the parameter values obtained are consistent with the experiment described in Section 1, and Section 4.3 looks at the conditions under which excessive restrictions on labor supply raise welfare.

4.1. Potential US Welfare Gain

Following Olovsson et al. (2003), Prescott (2004), Burda et al. (2008) and Olovsson (2009), preferences defined over income and leisure are assumed to be identical for Europeans and Americans. Given Americans' view about the role of government, a law requiring employers to provide a minimum amount of vacation time to their employees would never be countenanced, i.e., the US has no politically acceptable mechanism for internalizing the negative externalities associated with other people's income.¹⁷ Europeans, on the other hand, tend to accept government involvement in more areas of their life, enabling it to internalize these externalities. Hence, Europe's labor-leisure allocation is assumed to correspond to the social optimum, though the assumption that Europe's work restriction may in fact be excessive is examined in Section 4.4.

The OECD publishes information on the amount of time devoted to work. US work time is compared to that of four Western European countries. The poorest ones are excluded for the sake of comparability. The four-country group includes the two largest economies (Germany and France), a mid-size one (the Netherlands) and a small one (Norway), and comprises over 50 percent of the population of continental EU-15. Based on OECD (2013) data, the weighted average leisure time in 2012 was 188.3 days (with a .026 coefficient of variation), i.e., $l^E = 0.517$, or 33.45 percent more than US leisure time, $\alpha = l^{US} = 0.388$ (141.4 days).¹⁸

Since $\frac{l^E}{l^{US}} = \frac{1}{1-\beta} = 1.3345$, we have $\beta = .251$, and from equation (5), $V = 1.036$. Thus, internalizing the negative externalities would have raised US welfare by 3.6 percent.¹⁹ The US annual real interest rate, r , since 1980 has averaged around 3.3% (World Bank 2013) and annual productivity

¹⁷ As stated earlier, a tax increase on labor income has been found to be ineffective (Alesina et al. 2006, Lundqvist and Sargent 2007, Levine et al. 2013).

¹⁸ Leisure time in the UK, $l^{UK} = .43$, is between those of the US and the four continental European countries selected.

¹⁹ Work hours and wellbeing were also examined by Hamermesh et al. (2014) who found an increase in wellbeing for Japanese and Koreans affected by a law that reduced the number of work hours where overtime pay takes effect to 40 hours, leading to a decline in work hours. This result is not directly comparable to ours as the law raised the wage of those working over 40 hours, i.e., their wellbeing changed because of both fewer work hours and higher wages. Moreover, as the authors state, the law's welfare impact on the rest of the economy, and thus on the economy as a whole, was not examined.

growth has averaged around 1% (BLS 2013). With A increasing at 1% per year, equations (3) and (4) imply that the annual welfare increase, g , is .361% per year ($1 - \alpha - \beta = .361$), with $r - g = 2.94\%$. Hence, the present value of the 3.6 percent welfare increase is about 120 percent of annual welfare.²⁰

4.2. Student Experiment

In the experiment described in Section 1, students were presented with two offers, which consisted of i) a personal income (in USD thousands) $Y_1 = 50$ and others' average income $y_1 = 25$ or $(Y_1, y_1) = (50, 25)$, and ii) $(Y_2, y_2) = (100, 200)$, and preferred the first one, implying – from equation (2) – that $100^{1-\alpha}200^{-\beta} < 50^{1-\alpha}25^{-\beta}$ or $2^{1-\alpha}8^{-\beta} < 1$. With $\beta = .251$ and $\alpha = .388$, we have $2^{.612}8^{-.251} = .906 < 1$. Thus, our analysis is consistent with the students' preference ordering.

4.3. Excessive Reduction in Work Time

Denote the true value of β by β^* , its policy-determined value by β^G , and the utility associated with β^G by U^G . So far, we have assumed that $\beta^G = \beta^* = .244$. Assume now that $\beta^G \neq \beta^*$. The policy is unambiguously beneficial for $\beta^G < \beta^*$, with $U^G > U^P$. On the other hand, $U^G \geq U^P$ for $\beta^G > \beta^*$, i.e., the policy's welfare impact is ambiguous. The question is: under what conditions is $U^G > U^P$ when $\beta^G > \beta^*$?

We know from work time data that $\beta^G = .251$. The labor supply, l^G , under the government policy is such that $\frac{l^G}{l^P} = \frac{1}{1-\beta^G}$, with $\Delta l^G \equiv \frac{l^G}{l^P} - 1 = \frac{\beta^G}{1-\beta^G}$. Since $\beta^G = .251$, it follows that $\Delta l^G = .3345$. From equation (5), when $\beta^G = .251$, $U^G > U^P \Leftrightarrow \beta^* > .14$, i.e., a policy that selects an excessively large $\beta^G = .251$ is beneficial if β^* is greater than .14, with $\Delta l^S \equiv \frac{l^S}{l^P} - 1 = \frac{\beta^*}{1-\beta^*} > .163$. Since $.3345/.163 = 2.05$, it follows that a necessary and sufficient condition for the policy to be beneficial is that the increase in leisure time under the policy, Δl^G , be less than 2.05 times or about twice its optimal increase, Δl^S .²¹

²⁰ The welfare gain was also obtained in an alternative model that includes capital. Using actual labor and capital income shares, the present value of the welfare gain amounts to about 90% of annual welfare.

²¹ I tried several alternative values for β^G and β^* , and obtained that $U^G > U^P$ if $\Delta l^G/\Delta l^S < X$, where $2.0 \leq X < 2.25$. For instance, assume $\beta^* = .251$. Then, $\Delta l^S = .3345$, and $U^G > U^P \Leftrightarrow \beta^G < .401$. This implies $\Delta l^G < .699$, or $\Delta l^G/\Delta l^S < 2$.

5. Conclusion

This paper has argued that, due to an inability to internalize the negative externality people associate with other people's income, US work time reflects a Nash equilibrium. Thus, Americans are likely to be stuck in an "overworking trap," with too little time allocated to leisure and too much time allocated to work relative to their optimal level. This is not the case in Europe where people's historical experience has made it possible to enact laws about minimum vacation time and maximum hours. A simple model together with data on work hours were used in order to derive the model's parameter values and obtain an estimate of the US welfare gain of reducing work hours to Europe's level. Under an optimal number of work hours in Europe, the US welfare gain's present value is about 120 percent of its annual welfare.

The results are consistent with those of an experiment about the benefit of own income relative to (the cost of) other peoples' income. In the case where the reduction in work time is excessive, a sufficient condition for the policy to remain beneficial is for the reduction in work time to be less than twice the optimal increase.

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