

Social Status and the Overworked Consumer

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ABSTRACT. – A policy restricting working hours may be justified if agents care about their social status, as the race for status induces them to work too much. We show that this intuition is questionable if the commitment capacity of the government is limited: status seeking does press people to supply excessive labor relative to the social optimum, yet the time consistent policy of a government controlling working hours implies a shortage of hours.

Statut social et surmenage

RÉSUMÉ. – Une réduction du temps de travail peut être justifiée si les agents cherchent à maximiser leur statut social, car la concurrence pour le statut les incite à travailler trop. Nous montrons que cette intuition est discutable si le gouvernement a une capacité d'engagement limitée : la recherche de statut pousse en effet les agents à travailler trop relativement à l'optimum social, cependant la politique temporellement cohérente d'un gouvernement contrôlant les heures de travail s'avère trop restrictive.

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1 Introduction

Do people work too much? The answer to this deceptively simple question lies at the heart of widening social discussions. In France a bill imposing tighter legal constraints on working hours has just been passed. Similar policies are under consideration in Italy and the UK. In the U.S., recent contributions by FRANK [1985] and SCHOR [1992, 1998] have brought this same issue into public debate.

For most economists, it is difficult to imagine that agents could work “too much”. If they were, then they would obviously reduce their working hours thereby eliminating this inefficiency through individual choice.

Thus any deep consideration of the proposition that agents may work too much requires the specification of an economic environment in which agents all act optimally but, in equilibrium, hours are inefficiently excessive. Among many others, HART [1987], LAYARD, NICKELL and JACKMAN [1991], BOOTH and RAVAILLON [1993] and CAHUC and GRANIER [1997] discuss a variety of such models. Most of the discussions are focused on the choice of hours on imperfect competitive labor markets, where wages, and sometimes hours, are set either by employers or by collective bargaining between employers and Trade Unions. In such a context, individual and collective decisions of supply of hours are generally inefficient and can entail, in certain circumstances, unemployment.

Viewing working time as a policy instrument to fight unemployment is not the sole basis for recommending hours cuts. It has also been repeatedly emphasized in the literature that the quest for social status urges people to work more. This paper contributes to this ongoing discussion by investigating the implications of the fact that individual welfare depends partly on the social esteem they enjoy for the allocation of hours. This approach, although not yet fully standard in economics, seems to gain the interest of a rapidly increasing number of economists. Many empirical studies on happiness and economic performance (EASTERLIN, [1995], OSWALD, [1997]), suggest that the level of individual satisfaction is strongly influenced by relative income. The recent “reviews” by AKERLOF [1997], POSTLEWAITE [1997] and FERSHTMAN and WEISS [1996] point out the role of social status in explaining that influence.

In fact, FRANK [1995] and SCHOR [1992, 1998] among others, argue that the motivation to create social status leads to excessive hours and thus constitutes a basis for collective action to restrict hours. While no formal model is presented, the argument seems intuitive. Agents acting individually choose their labor supply taking as given the choices of others. Since their welfare is postulated to depend on their social status measured, for example, by their income or consumption relative to average, agents have an incentive to work more in order to “get ahead of the others”. Of course, since this is true for all, it leads to a socially excessive equilibrium amount of hours. As FRANK [1995] claims (p. 37): “People who work until 9 p.m. each day can produce and consume more than those who work only until 5 p.m. But the former group has much less time to spend with family and friends. Because many of the individual payoffs to having more goods are positional, the collective payoff to working longer hours is smaller than it appears to each individual. It is thus easy to see why people might prefer institutional arrangements that induce people to quit at 5 p.m.”.

Frank's claim could obviously be corroborated in a formal representation such as a standard static consumer model where social status is measured by relative consumption or income. In such a context, constraining hours can correct the distortion implied by the quest for status. But the issue is much more complex when the dynamic dimension of individual and government behaviors are taken into account. Indeed, two problems arise.

First, it appears that considering only relative consumption or income as the relevant source of social status is very peculiar. One can think of many other measures of status as quite plausible. In fact, the analysis of COLE, MAILATH and POSTLEWAITE [1992, 1997] suggests that relative wealth is a derived symbol of status in a model in which agents care about the quality of their offspring's mate. Indeed, in a dynamic environment, it seems appropriate to assume that social status fundamentally stems from relative capital, both human and physical. One can easily find many illustrations of this idea in the literature. For Smith [1982] capital yields power to purchase the labor of others. According to WEBER's [1958] understanding of the Lutheran ethic, the aim of life is to accumulate as much capital as possible in order to reach a good position in paradise, where there seems to be a harsh competition. VEBLEN [1934, p. 31], argued that "the end sought by accumulation is to rank high in comparison with the rest of the community in point of pecuniary strength". One can also find many insights on this idea in the contributions of BOURDIEU [1984] and his co-authors (see also LAYARD, [1980], ZOU, [1994], and the survey by FERSHTMAN and WEISS, [1997], for the field of economics). Therefore, it is commonly considered that in a dynamic framework, social status not only influences labor supply but also distorts savings decisions. It is also worth noting that in this perspective, conspicuous consumption could arise as a signal of individuals' capital when the latter variable is imperfectly observable. This is the assumption adopted, for instance, by IRELAND [1994], COLE, MAILATH and POSTLEWAITE [1995] and CORNEO and JEANNE [1995].

Second, it is well known that, in a dynamic framework, the efficiency of government policy may hinge on its pre-commitment capability (KYDLAND and PRESCOTT, [1977], CALVO, [1978]). In a world where individual savings decisions are distorted by the need to create social status, government policy can influence these decisions in such a way to restore efficiency. Different policy instruments are available to restore efficiency. If welfare depends on relative wealth or capital, Pigouvian taxation on capital is arguably more natural than a restriction on working hours as a candidate policy to correct the distortions induced by the quest for social status. However, the specific problems raised by capital taxation – mainly, the cost of collecting taxes and time consistency problems (CHAMLEY, [1986]) – have led economists like FRANK and SCHOR to argue that restricting working hours is in fact a policy worth considering when individuals are motivated by social status, even though it is arguably works through more "indirect" mechanisms than capital taxation. This line of ideas, which was followed in France by GORZ and others (ADRET, [1977]), have contributed to inspire the first compulsory reduction in working hours in France in the beginning of the 1980s.

Our paper shows that the link between hours of work and individual savings decisions also poses a time consistency problem: The government has an incentive to announce future restrictions on hours in order to influence current saving decisions, which cease to be optimal once these decisions have irreversibly been made and implemented. We will show that this time consistency problem calls into question the simple intuition that social status urges people to work too much when

a government with a limited pre-commitment ability controls hours. Actually, it appears that the time consistent policy implies a shortage of hours compared to the first-best, which means that the quest for social status might entail too low an amount of labor when government intervention is taken into account. From this point of view, the idea that people motivated by social status work too much is questionable once the interactions with the government, whose commitment ability is limited, is taken into account: mandated cuts in working hours can lead people to work too little.

The paper is organized as follows. Section 2 considers a version of the standard representative agent growth model with labor supply and a measure of social status that reflects relative capital holdings. This specification extends that of ZOU [1994] and CORNEO and JEANNE [1997] by adding labor supply and taking into account relative capital holdings as a source of social status. Here we find that relative to the social optimum hours are always too high.

The behavior of a benevolent government controlling working hours is studied in section 3. More precisely, two different situations are considered. First, if the government is given the possibility to pre-commit its actions for the entire future, then we show that it will indeed cut hours below the equilibrium labor supply spontaneously chosen by private agents. However, the policy thus derived turns out to be time inconsistent: The set of actions announced by the government at some initial date ceases to be optimal just after that date. The second approach we take is see what happens when the government has no (or limited) pre-commitment ability and is thus bound to implement a time-consistent policy. We show in that case that, even though it is indeed desirable to cut hours relative to the equilibrium outcome, the government forces agents to supply an excessively small amount of labor.

2 The Effects of Social Status on Labor Supply in the Neoclassical Growth Model

In this section we consider a standard growth model augmented by the introduction of social status measured by relative capital in the objective function of the representative agent. Other papers, such as ZOU [1994], CORNEO and JEANNE [1997], and FERSHTMAN, MURPHY and WEISS [1996] have introduced status into the standard growth model without a labor supply decision. Thus part of our contribution is to explore the workings of the model with endogenous labor and status. More importantly though, we use this setup to explore the effects of hours restrictions on welfare.

2.1 Balanced Growth

Consider an economy with a continuum of identical consumers, the mass of which is normalized to one. The instantaneous utility of an individual is assumed to be of the form $u(c, \ell, k/\bar{k})$, where c denotes consumption, ℓ hours, k the stock

of capital, and \bar{k} the average stock of capital. $u(\cdot)$ is the felicity function defined as follows:

$$(1) \quad u(c, \ell, k/\bar{k}) = \begin{cases} \frac{c^{1-\sigma} \cdot \exp\left\{ (1-\sigma) \left[S(k/\bar{k}) - v(\ell) \right] \right\} - 1}{1-\sigma} & \text{for } \sigma > 0, \sigma \neq 1 \\ \ln(c) + S\left(\frac{k}{\bar{k}}\right) - v(\ell) & \text{for } \sigma = 1 \end{cases}$$

with the disutility of labor meeting some traditional regularity requirements: $v' > 0$, $v'' > 0$, $\lim_{\ell \rightarrow 0} v'(\ell) = 0$, and S being an increasing function, which we so normalize, w.l.o.g., that $S(1) = 0$ and $S'(1) = s > 0$. The formulation concerning the choice between consumption and leisure borrows from BARRO and SALA-I-MARTIN ([1995], Chapter 9) and is designed to obtain a decreasing labor supply along the convergence path and constant hours in a steady state. Moreover, the multiplicative separability with respect to social status is required to get an intertemporal elasticity of substitution with respect to consumption that is constant and independent of social status, two assumptions that will hold throughout the paper.

Denoting the discount rate by $\rho > 0$, the consumer programme writes down as:

$$(2) \quad \max_{\{c_t, \ell_t, k_t\}} U = \int_0^{+\infty} u(c_t, \ell_t, k_t/\bar{k}_t) \cdot e^{-\rho t} dt$$

subject to $\dot{k}_t = w_t \cdot \ell_t + r_t \cdot k_t - c_t$, where w_t and r_t respectively denote the wage and the interest rate.

Solving that programme leads to (see appendix A):

$$(3) \quad \frac{\dot{c}_t}{c_t} = \frac{1}{\sigma} \cdot \left[r_t - \rho + s \frac{c_t}{k_t} - (1-\sigma) \dot{\ell}_t \cdot v'(\ell_t) \right]$$

$$(4) \quad c_t \cdot v'(\ell_t) = w_t.$$

These optimality conditions show that social status influences individual behavior through the choice between current and future consumption. Equation (4) shows that the concern for relative capital does not modify the marginal rate of substitution between consumption and leisure, meaning that there is no “direct” influence of status seeking on labor supply. However, in a dynamic context, social status influences the saving behavior. Equation (3) shows that an increase in the quest for status resting on relative capital has the same effect as a decrease in the discount rate: It encourages savings.

The technology is given by $y_t = k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha}$, where A_t is a parameter growing at a constant rate $g > 0$. There is no depreciation of capital. Profit maximization of competitive firms yields the following demand functions for labor and capital:

$$(5) \quad w_t \cdot \ell_t = (1-\alpha) A_t \ell_t \cdot \hat{k}_t^\alpha, \quad \text{and} \quad r_t = \alpha \hat{k}_t^{\alpha-1},$$

where $\hat{k}_t = k_t / (A_t \ell_t)$.

Using equations (3) through (5) and the definition of consumption in a steady state, $c_t = k_t \cdot (\hat{k}^{\alpha-1} - g)$, one gets the decentralized equilibrium:

$$(6) \quad \hat{k}^{\alpha-1} = \frac{g(\sigma + s) + \rho}{\alpha + s}$$

$$(7) \quad \ell^{\text{eq}} \cdot v'(\ell^{\text{eq}}) = (1 - \alpha) \cdot \frac{\rho + g(\sigma + s)}{\rho + g(\sigma - \alpha)}$$

Equation (7) implies that social status entails excessive hours of work compared to the first-best outcome. The impact of the concern for relative capital holdings on labor supply is somewhat indirect, though. The marginal rate of substitution between consumption and leisure is not influenced by that concern (see equation (4)). But, by increasing savings and the capital stock, it raises the wage and works as an incentive to supply more hours. Thus, one obtains the same qualitative result as in a world where social status stems from relative consumption or income:

PROPOSITION 1: *The concern for relative capital urges people to work too much relative to the social optimum along the balanced growth path.*

As was suggested by intuition, whatever its source, social status increases the amount of time devoted to labor. Moreover, an economy with social status always has a larger steady state output (equal to $A\ell\hat{k}^\alpha$) than the optimal one, because both \hat{k} and ℓ are bigger.¹ Therefore, it seems that there really is an excess of activity when people care about their relative capital holdings.

This result is valid in the steady state where labor supply remains stationary. However, it is both a stylized fact and a result of well-behaved growth models with endogenous labor supply that working hours have a downward trend as economies develop – or, in more ‘theoretical’ terms, converge to their BGP’s – (see e.g. BARRO and SALA-I-MARTIN, [1995], Chapter 9). The next question we wish to address here, before we look at the effects of cuts in hours, is that of the influence of social status on the dynamics of labor supply.

2.2 Transition Dynamics

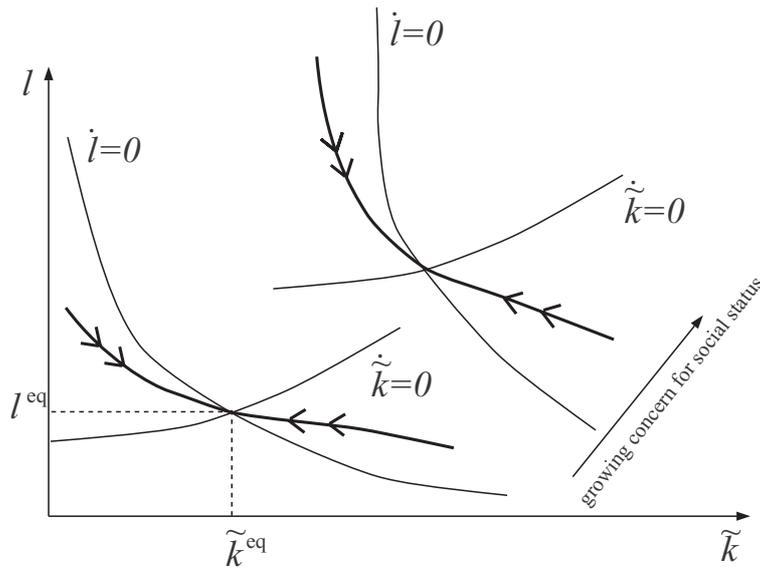
The dynamic properties of the growth model with endogenous labor supply and social status are essentially the same as those of the model without social status: The BGP is unique, and it exhibits global saddle-point stability, provided that the intertemporal elasticity of substitution ($1/\sigma$) is not too large (see e.g. BARRO and SALA-I-MARTIN, [1995], chapter 9). We do not give the details of the mathematics that show these properties.² The phase diagram (see figure 1) shows that hours are declining as the economy develops when there is social status. What we have shown so far is that hours eventually reach a higher level when there is more concern for social status. But what is the impact of social status along the transition path?

1. It can easily be checked that \hat{k} increases with s if the transversality condition (16), which amounts to $\rho > g(1 - \sigma)$, is satisfied.

2. Those details are available on request. See also appendix A.

PROPOSITION 2: *Along the transition path, for any given stock of capital, more concern for relative capital urges people to work more, and the concern for social status entails an excess of working hours relative to the social optimum.*

FIGURE 1
The Phase Diagram



3 Cutting Hours

From the results of the previous paragraph, it seems obvious that a constraint on working hours can be thought of as a suitable policy instrument, if not to recover the first-best outcome, at least to get the economy closer to it. We now study this issue.

3.1 The Case of an Infinite Pre-Commitment Ability

We begin with the following approach of our problem: We assume that a benevolent planner or government controls working hours, and plays as the leader in a STACKELBERG game where private agents are the followers and decide upon their consumption levels taking as given the amount of labor they are allowed to supply. We make the additional assumption that the government is able to pre-commit its actions for the entire future: It chooses the entire path $\{\ell_t\}_{t \geq 0}$ once and for all at the initial date $t = 0$.³

3. This assumption is here to avoid time consistency problems (see next paragraph for more on this point).

Under this set of assumptions, the planner's programme writes down as:

$$(8) \quad \max_{\{\ell_t, t \geq 0\}} V = \int_0^{+\infty} u(c_t, \ell_t, 1) \cdot e^{-\rho t} dt$$

subject to the economy resource constraint $\dot{k}_t = k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha} - c_t$, and the private agents' consuming behavior. From appendix A, we know that this behavior is summarized by the ensuing optimality conditions, taken from the programme (2):

$$(9) \quad c_t^{-\sigma} e^{-(1-\sigma)v(\ell_t)} = \lambda_t$$

$$(10) \quad \dot{\lambda}_t = (\rho - r_t) \cdot \lambda_t - s \cdot \frac{c_t^{1-\sigma} e^{-(1-\sigma)v(\ell_t)}}{k_t},$$

where λ_t is the costate variable associated with capital in the consumers' programme. This costate variable is in turn taken as a state variable by the government, which maximizes V subject to the dynamic constraint (10).

The problem (8) is analyzed in appendix B. We show the following:

PROPOSITION 3: *The steady-state amount of labor chosen by a benevolent government playing as the leader of a STACKELBERG game with pre-commitment ability is equal to the first-best steady-state labor supply ℓ^* , which is given by*

$$\ell^* \cdot v'(\ell^*) = (1-\alpha) \cdot \frac{\rho + \sigma g}{\rho + g(\sigma - \alpha)}.$$

It is thus strictly less than the equilibrium steady-state labor supply ℓ^{eq} .

To begin with, we give some intuition on why such a policy can indeed improve welfare. For a given aggregate stock of capital, reducing labor supply lowers the interest rate and pushes up the wage. The higher wage partially compensates agents for the loss in labor income they incur from the hours restriction. More importantly, the lower interest rate tends to counteract the inefficient oversaving tendency that agents have from their quest for social status, when status is borne by relative capital holdings. Therefore, even though such an hours restriction reduces labor income and per period consumption during the transition, its effects on welfare are positive, for it also reduces the disutility of labor and the (excessive) willingness to save.

The problem with this kind of "open loop" solution where the government determines its policy for the entire future once and for all at date zero is that it is generally time-inconsistent. And indeed, one can see that the policy chosen by a planner solving (8) under the constraints (9) and (10) is not time consistent whenever relative capital counts in the measure of status (*i.e.* whenever $s > 0$). This time inconsistency can be explained intuitively.⁴ The primary objective of the government

4. And formally, as well. The point is that one of programme (8)'s state variables, namely λ_t , is not pre-determined. As a consequence, optimality requires that its shadow price (designated by v_t in appendix B) be worth zero at the initial date 0: $v_0 = 0$. Moreover, if the planner were free to re-optimize at some date $T > 0$, it would obviously choose a new solution satisfying $v_T = 0$. As can readily be seen from the law of motion of v_t and μ_t (eqns. (21) and (20) in appendix B), this new solution is incompatible with $v_0 = 0$ whenever $s > 0$.

being to prevent inefficient oversaving, it has to promise that a relatively large quantity of labor is to be available tomorrow so that agents are induced to save less today (because they forecast high interest rates in the future). But when tomorrow comes, today's savings decisions are made and it becomes optimal for the government to put a more stringent constraint on labor supply. In other words, the policy chosen by the government at any given date ceases to be optimal after that date. Hence time inconsistency, and the fact that the policy talked about in this paragraph cannot be implemented by a government that is not able to pre-commit. Therefore it is interesting to study a time consistent policy, a task that we carry out in the next paragraph.

3.2 Time Consistent Policies

A convenient technique for calculating time consistent policies was worked out by COHEN and MICHEL [1988]. Basically, what such a policy is required to do is both maximize the criterion (8) taking the private agents' behavior into account and obey the BELLMAN dynamic programming principle.

From the private agents' programme exposed in appendix A, we know that optimal consumption is given at any date by a function of ℓ_t and the costate variable λ_t : $c_t = \lambda_t^{-1/\sigma} \cdot e^{-(1-1/\sigma)v(\ell_t)}$. This expression can be substituted into the economy resource constraint and the private agents' Euler equation (10). Define an admissible government policy as a function $\mathcal{L}(\tau, k)$ such that the resulting system

$$(11) \quad \begin{cases} \dot{k}_t = k_t^\alpha \cdot [A_t \mathcal{L}(t, k)]^{1-\alpha} - \lambda_t^{-1/\sigma} \cdot e^{-(1-1/\sigma)v[\mathcal{L}(t, k)]} \\ \dot{\lambda}_t = (\rho - \alpha \cdot [A_t \mathcal{L}(t, k) / k_t]^{1-\alpha}) \lambda_t - s \lambda_t^{-1/\sigma} \cdot e^{-(1-1/\sigma)v[\mathcal{L}(t, k)]} \end{cases}$$

has a unique solution for $t \geq \tau$ and $k_\tau = k$. For any admissible policy, the private agents' best response function can be defined unambiguously as a function $\mathcal{C}(\tau, k; \mathcal{L})$.

A time consistent policy solves the following optimal control problem:⁵

$$(12) \quad \max_{\{\ell_t, t \geq 0\}} V(0, k_0; \mathcal{L}) = \int_0^{+\infty} u[\mathcal{C}(t, k_t; \mathcal{L}), \ell_t, 1] \cdot e^{-\rho t} dt$$

subject to the aggregate resource constraint $\dot{k}_t = k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha} - \mathcal{C}(t, k_t; \mathcal{L})$. The solution to this problem is given in appendix C. It leads to the following conclusions:

5. Note that this control problem is equivalent to solving a dynamic programming problem characterized by the following BELLMAN equation: \max

$$-\frac{\partial V}{\partial t}(t, k_t; \mathcal{L}) = \max_{\ell_t} \left\{ u[\mathcal{C}(t, k_t; \mathcal{L}), \ell_t, 1] + \frac{\partial V}{\partial k_t}(t, k_t; \mathcal{L}) \cdot \left[k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha} - \mathcal{C}(t, k_t; \mathcal{L}) \right] \right\}.$$

Its solution therefore obviously obeys the BELLMAN optimization principle.

PROPOSITION 4: *The steady-state amount of labor chosen by a benevolent government with no pre-commitment ability is equal to a value ℓ^{tc0} given by*

$$\ell^{tc0} \cdot v'(\ell^{tc0}) = \frac{1-\alpha}{1+s} \cdot \frac{\rho + g(\sigma + s)}{\rho + g(\sigma - \alpha)} = \frac{\ell^{eq} \cdot v'(\ell^{eq})}{1+s}.$$

Steady-state comparisons of the equilibrium, time inconsistent, and time consistent outcomes yield the following ranking (whenever $s > 0$):

$$\ell^{eq} > \ell^* > \ell^{tc0}.$$

This result is of particular interest. It shows that, even if a cut in hours is desirable since the quest for social status entails excessive labor supply in equilibrium, what a government with no pre-commitment capability spontaneously does is *go too far* in that direction.

Being deprived of its pre-commitment ability, the government cannot use its promise of higher interest rates in the future to persuade the private agents not to save too much in the current period. Therefore, it has to impose a more stringent constraint on labor supply to restrain current savings by lowering the current interest rate.

The time-consistent policy above was derived assuming that the government had no pre-commitment capability at all. The alternative assumption of a partial “one-period” pre-commitment is often considered more relevant for issues of economic policy (see the discussion in COHEN and MICHEL, [1988]). Under this assumption, the government is again the leader of a STACKELBERG game, since it is now able at each date t to announce truthfully its policy decision for t before the private agents make their consumption decisions for that date. The government is thus endowed with an “instantaneous” pre-commitment capability.

The optimal policy with partial pre-commitment ability is studied extensively in appendix C.⁶ We merely report the final result in a proposition:

PROPOSITION 5: *The steady-state amount of labor chosen by a benevolent government with an instantaneous pre-commitment ability is equal to a value ℓ^{tc1} given by*

$$\ell^{tc1} \cdot v'(\ell^{tc1}) = \frac{1-\alpha}{1+s/\sigma} \cdot \frac{\rho + g(\sigma + s)}{\rho + g(\sigma - \alpha)} = \frac{\ell^{eq} \cdot v'(\ell^{eq})}{1+s/\sigma}.$$

Steady-state comparisons of the equilibrium, time inconsistent, and time consistent with instantaneous pre-commitment outcomes yield the following ranking (whenever $s > 0$):

$$\ell^{eq} > \ell^* > \ell^{tc1}.$$

6. This kind of policy with a one-period pre-commitment capability is referred to as the TC_1 policy, as opposed to the TC_0 policy that is implemented in the absence of any kind of pre-commitment (hence the labels on ℓ in the two propositions of this subsection).

Again, the government reduces working hours too much relative to the optimal, time-inconsistent policy, in spite of its partial pre-commitment ability. What this means is that the government really needs a *complete* pre-commitment ability to avoid excessive hours cuts.

We close our analysis of the effects of an hours restriction with some comments on the welfare effects of the government's actions. As we stressed, even though an hours cut is desirable when agents wish to create status, what a government without a complete pre-commitment ability spontaneously does is choose a constraint that is too stringent. Therefore, even though agents would undoubtedly be better off, were the government able to implement the optimal, time-inconsistent policy, the welfare effect of the sub-optimal, time-consistent policies are not straightforward.

TABLE 1
Welfare Effects of an Hours Restriction

Value of s	Equilibrium welfare V under the policy...			Ranking
	TC_1	TC_0	<i>Laissez-faire</i>	
$s = 0$	-14.99	-14.99	-14.99	$TC_0 \approx TC_1 \approx LF$
$s = 0.05$	-14.99	-14.96	-14.95	$TC_0 \prec TC_1 \prec LF$
$s = 0.15$	-15.26	-15.36	-15.30	$TC_0 \prec LF \prec TC_1$
$s = 0.3$	-16.22	-16.48	-16.54	$LF \prec TC_0 \prec TC_1$

Results from numerical simulations of the equilibrium and constrained economies are reported in table 1 for various values of s , the weight of social status in the felicity function.⁷ The reported numbers are the equilibrium values of the representative consumer's lifetime utility V in an economy starting off with a lower-than-steady-state detrended capital stock⁸ under three alternative policies: Time-consistent with no pre-commitment at all (TC_0), time-consistent with instantaneous pre-commitment (TC_1), and *laissez-faire* (LF).⁹ It turns out from those simulations that implementing a either time-consistent policy (TC_0 or TC_1) is actually welfare deteriorating at low, positive value of s – that is, when agents put a positive but relatively small weight on status in their utility. In other words, the want for social status (as measured by s) has to be sufficiently strong for at least one of the two time-consistent policies to be welfare improving relative to a *laissez-faire* situation. (Obviously, for $s = 0$, individuals do not have any concern for their status, there is no externality affecting the economy, and the three situations are equivalent.)

7. The model was simulated by means of the *time elimination method* (see e.g. MULLIGAN and SALA-I-MARTIN, [1993], for an extensive exposition). The function v was taken iso elastic: $v(\ell) = \ell^{1+\varepsilon} / (1 + \varepsilon)$, and the various parameters were given "standard" values: $\alpha = .3$, $\sigma = 1.5$, $\varepsilon = .2$, $\rho = .05$, $g = .02$. The only significant influence of a reasonable change in any of those values is that the ranking between the TC_0 and TC_1 policies is reversed if one takes $\sigma < 1$. Both policies are equivalent for $\sigma = 1$.

8. In all cases we let the economy start with the same low value of detrended capital $\hat{k}_0 = 1$ (to be compared to steady-state values of \hat{k} ranging from 10 to 40, depending on the value of s and the policy regime). Where we start from doesn't matter in terms of the ranking of our three policy regimes.

9. It is questionable to compare *laissez-faire*, which needs full pre-commitment to be implemented, with time-consistent policies. Here we interpret *laissez-faire* as a case with no government to be able to evaluate the effect of government's actions on welfare.

4 Concluding remarks

This paper has explored some of the macroeconomic consequences of the quest for social status in the standard Neoclassical growth model with endogenous labor supply. Its main message can be summarized in the following three points:

1. The quest for social status induces private agents to supply an excessive amount of labor in the decentralized equilibrium.
2. It is desirable to impose a constraint on hours, and a benevolent planner that is allowed to follow an optimal time inconsistent policy is willing to do so.
3. Spontaneously, a government with no pre-commitment ability which is bound to implement a time consistent policy tends to reduce hours excessively.

These results were obtained in a very simple framework, which could be enriched to provide a better understanding of the consequences of reductions in hours. In particular, two extensions could yield interesting insights. First, it may be interesting to endogenize the growth rate. For instance, in the standard ROMER [1986] *AK* model, people do not work and save enough in the decentralized equilibrium, compared to the first-best, because there are positive externalities associated with savings and labor supply decisions. Then, as shown by CORNEO and JEANNE [1997], the concern for social status urges individuals to work and save more, and may improve their welfare. In this context, reducing hours could have systematic adverse consequences on welfare.

Second, as we mentioned in the introduction, one can introduce the idea that social status stems from both capital and conspicuous consumption by assuming that the capital of an individual is observed by the others with a frequency φ . Accordingly, with a frequency $1-\varphi$, it is his level of relative consumption that gives him social status, acting as a signal for his wealth. As it has been stressed by VEBLEN ([1934], Chapter 4), the relative weight of the concern for capital in social status may be less important when individuals are more mobile. Hence, for instance, the relative concern for capital may be more important in rural than in urban areas.

A third field to be explored is the potential effects of hours restrictions on the dynamics of income distribution and social welfare in the presence of a concern for relative wealth. When agents are distinguished only by their initial stocks of physical capital, standard growth models predict that this type of inequalities should persist in the long-run, at least partially. Things may well be different if people care about their social status. If status is measured in terms of relative capital, then we saw that agents have an extra incentive to accumulate. If in turn the utility accruing from status has a certain degree of concavity, then that extra incentive may be stronger for poorer people than for richer people, thus pushing towards a convergence of individual capital stocks. In such a context, putting a constraint on hours worked is likely to affect the evolution of inequalities. ■

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APPENDIX

A. The Consumers' Programme

This appendix provides the first-order conditions of the consumer maximization programme and analyses the dynamics of capital and hours. Let us denote by λ_t the current-value shadow price of capital. The current-value Hamiltonian writes:

$$H = u(c_t, \ell_t, k_t / \bar{k}_t) + \lambda_t \cdot (w_t \ell_t + r_t k_t - c_t).$$

The first-order conditions yield

$$(13) \quad \frac{\partial H}{\partial c_t} = u_1(c_t, \ell_t, k_t / \bar{k}_t) - \lambda_t = 0$$

$$(14) \quad \frac{\partial H}{\partial \ell_t} = u_2(c_t, \ell_t, k_t / \bar{k}_t) + \lambda_t \cdot w_t = 0$$

$$(15) \quad \dot{\lambda}_t = \rho \lambda_t - \frac{\partial H}{\partial k_t} = (\rho - r_t) \cdot \lambda_t - \left(\frac{1}{\bar{k}_t} \right) \cdot u_3(c_t, \ell_t, k_t / \bar{k}_t),$$

where u_i denote the partial derivative of u w.r.t. its i^{th} argument. The transversality condition is

$$(16) \quad \lim_{t \rightarrow +\infty} \lambda_t \cdot k_t \cdot e^{-\rho t} = 0.$$

With a felicity function taking the form given by eqn.(1), straightforward manipulations of the first-order conditions and the law of motion of capital $\dot{k}_t = w_t \cdot \ell_t + r_t \cdot k_t - c_t$ lead to a dynamic system in the variables $\tilde{k}_t = k_t / A_t$ and ℓ_t :

$$(17) \quad \frac{\dot{\ell}_t}{\ell_t} = \Phi(\ell_t, \tilde{k}_t)$$

$$(18) \quad \frac{\dot{\tilde{k}}_t}{\tilde{k}_t} = \Gamma(\ell_t, \tilde{k}_t)$$

where the functions Φ and Γ are given by the following expressions:

$$\Phi(\ell_t, \tilde{k}_t) = \frac{g\sigma(1-\alpha) + \rho - \left(\frac{\tilde{k}_t}{\ell_t}\right)^{\alpha-1} \cdot \left\{ \alpha(1-\sigma) + \frac{(1-\alpha) \cdot (\alpha\sigma + s)}{\ell_t v'(\ell_t)} \right\}}{(\sigma-1)\ell_t v'(\ell_t) + \sigma(\alpha + \varepsilon)},$$

$$\Gamma(\ell_t, \tilde{k}_t) = \left(\frac{\tilde{k}_t}{\ell_t}\right)^{\alpha-1} \cdot \left(1 - \frac{1-\alpha}{\ell_t v'(\ell_t)}\right) - g,$$

where $\varepsilon = \ell_t v''(\ell_t) / v'(\ell_t)$.

It can easily be verified from the above equations that a sufficient condition for the steady-state equilibrium to be saddle-point stable is $\sigma \geq 1$. Therefore, under the restriction that the intertemporal elasticity of substitution $1/\sigma$ is below or “not too far” above unity, the phase diagram looks like figure ss fig1. Note that the requirement that $1/\sigma$ be not too much larger than 1 is both frequent in growth models with endogenous labor supply and usually considered empirically relevant.

We can now achieve the proof of proposition 2, which states that there are more hours along the stable arm when there is more concern for social status (*i.e.* s is increased), and that social status entails an excessive supply of hours relative to the social optimum along the transition path. We know from equation (7) that more concern for social status implies more hours in the steady state. Therefore, a sufficient condition to obtain more hours when the concern for social status is raised is that the absolute value of the slope (which is negative) of the stable arm increases (resp: decreases) with respect to s for any (\tilde{k}_t, ℓ_t) if $\tilde{k}_t > \tilde{k}^{\text{eq}}$ (resp: $\tilde{k}_t < \tilde{k}^{\text{eq}}$), because in that case, the stable arm with more concern for social status is above that with less social status, and cannot intersect it.

The slope of the stable arm is given by $\ell_t \Phi(\ell_t, \tilde{k}_t) / \tilde{k}_t \Gamma(\ell_t, \tilde{k}_t)$, and it can easily be checked that this sufficient condition is satisfied, since $\partial \left[\ell_t \Phi(\ell_t, \tilde{k}_t) / \tilde{k}_t \Gamma(\ell_t, \tilde{k}_t) \right] / \partial s < 0$ (resp > 0) if $\tilde{k}_t < \tilde{k}^{\text{eq}}$ (resp $\tilde{k}_t > \tilde{k}^{\text{eq}}$). Moreover, as the social optimum corresponds to the case where $s = 0$, there are always excessive hours on the transition path with social status.

B. The Government's Programme

This appendix is devoted to the analysis of the government's problem (8). The current-value Hamiltonian for that problem is

$$H_g = u(c_t, \ell_t, 1) + \mu_t \cdot \left[k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha} - c_t \right] + v_t \cdot \left[\left(\rho - \alpha \left(\frac{k_t}{A_t \ell_t} \right)^{\alpha-1} \right) \cdot \lambda_t - s \cdot \frac{c_t^{1-\sigma} e^{-(1-\sigma)v(\ell_t)}}{k_t} \right],$$

where μ_t and v_t are the costate variables associated respectively with the capital stock k_t and the private agents' own costate variable λ_t . The private consumers' first-order condition (9) allows to express c_t as a function of ℓ_t , k_t , and λ_t .

Substituting the resulting expression for c_t in the above Hamiltonian, and writing the optimality conditions leads to:

$$(19) \quad \frac{\partial H_g}{\partial \ell_t} = 0 \Leftrightarrow \ell_t \cdot v'(\ell_t) = \frac{\sigma(1-\alpha) \cdot \frac{k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha}}{c_t} \cdot \left(1 - \alpha \frac{v_t \lambda_t}{\mu_t k_t}\right)}{\frac{\lambda_t}{\mu_t} + (\sigma-1) \cdot \left(s \frac{v_t \lambda_t}{\mu_t k_t} + 1\right)},$$

$$(20) \quad \frac{\dot{\mu}_t}{\mu_t} = \rho - \frac{1}{\mu_t} \cdot \frac{\partial H_g}{\partial k_t} = \rho - \alpha \left(\frac{k_t}{A_t \ell_t}\right)^{\alpha-1} \cdot \left[1 + (1-\alpha) \frac{v_t \lambda_t}{\mu_t k_t}\right] - s \frac{v_t \lambda_t}{\mu_t k_t} \cdot \frac{c_t}{k_t},$$

$$(21) \quad \frac{\dot{v}_t}{v_t} = \rho - \frac{1}{v_t} \cdot \frac{\partial H_g}{\partial \lambda_t} = \alpha \left(\frac{k_t}{A_t \ell_t}\right)^{\alpha-1} + \frac{1}{\sigma} \cdot \frac{c_t}{k_t} \cdot \left[\frac{k_t}{v_t} - \frac{\mu_t k_t}{v_t \lambda_t} + s(\sigma-1)\right].$$

Along a BGP with constant labor supply, the growth rates of the various variables have to be the following: $\dot{k}_t/k_t = \dot{c}_t/c_t = \dot{v}_t/v_t = g$, and $\dot{\mu}_t/\mu_t = \dot{\lambda}_t/\lambda_t = -\sigma g$. Substituting these values into (10), (20), (21), and the aggregate resource constraint give (after a lot of boring calculations) the steady-state values taken by the ratios $v_t \lambda_t / (\mu_t k_t)$, λ_t / μ_t , c_t / k_t , and $[k_t / (A_t \ell_t)]^{\alpha-1}$. Replacing those values into (19) finally shows that:

$$\ell \cdot v'(\ell) = \frac{(1-\alpha) \cdot (\sigma g + \rho)}{g(\sigma - \alpha) + \rho} = \ell^* \cdot v'(\ell^*).$$

C. The Government's Programme II: The Time Consistent Policies

In this appendix, we derive the steady-state outcome of two different time-consistent policies. The first one is the policy without any pre-commitment ability on the government's part, and the second one is implemented by the government when it has an "instantaneous" pre-commitment ability.

C.1 No pre-commitment

The current-value Hamiltonian at date t for problem (12) is

$$H_g^{tc0} = u[C(t, k_t; \mathcal{L}), \ell_t, 1] + \mu_t \cdot \left[k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha} - C(t, k_t; \mathcal{L}) \right]$$

The corresponding optimality conditions yield:

$$(22) \quad \frac{\partial H_g^{tc0}}{\partial \ell_t} = 0 \Leftrightarrow \ell_t \cdot v'(\ell_t) = \mu_t \cdot \frac{(1-\alpha) k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha}}{C(t, k_t; \mathcal{L})^{1-\sigma} \cdot e^{-(1-\sigma)v(\ell_t)}},$$

$$(23) \quad \frac{\dot{\mu}_t}{\mu_t} = \rho - \frac{1}{\mu_t} \cdot \frac{\partial H_g^{\text{tc0}}}{\partial k_t} = \rho - \alpha k_t^{\alpha-1} \cdot (A_t \ell_t)^{1-\alpha} \\ + \frac{\partial \mathcal{C}}{\partial k_t}(t, k_t; \mathcal{L}) \cdot \left[1 - \frac{\mathcal{C}(t, k_t; \mathcal{L})^{-\sigma} \cdot e^{-(1-\sigma)v(\ell_t)}}{\mu_t} \right].$$

Along a BGP, it is necessarily the case that $\dot{\mu}_t / \mu_t = -\sigma g$. From the private consumers' Euler equation (3), $-\sigma g$ is also equal to $\rho - r - s \cdot c_t / k_t$ in steady states. Replacing this into the steady-state version of eqn. (23), together with (22) and the steady-state values of \hat{k} which is still given by (6) yields:

$$(24) \quad s \cdot \frac{c_t}{k_t} = \frac{\partial \mathcal{C}}{\partial k} \Big|_{\text{BGP}} \cdot \left[(1-\alpha) \cdot \frac{\rho + g(\sigma + s)}{\rho + g(\sigma - \alpha)} \cdot \frac{1}{\ell^{\text{tc0}} \cdot v'(\ell^{\text{tc0}})} - 1 \right],$$

where ℓ^{tc} denotes the steady state equilibrium quantity of labor, and $\partial \mathcal{C} / \partial k \Big|_{\text{BGP}}$ is the value of the partial derivative of the agents' response function $\mathcal{C}(\cdot)$ w.r.t. the capital stock along a BGP.

The only thing left to determine is $\partial \mathcal{C} / \partial k \Big|_{\text{BGP}}$. Since \mathcal{C} is the unique solution to the dynamic system (11), the slope $\partial \mathcal{C} / \partial k$ is equal to the ratio \dot{c}_t / \dot{k}_t taken after the equations of (11). Since those equations say $\dot{c}_t / c_t = \dot{k}_t / k_t = g$ along BGP's, it becomes clear that $\partial \mathcal{C} / \partial k \Big|_{\text{BGP}} = c_t / k_t$. Replacing this into (24) finally shows:

$$(25) \quad \ell^{\text{tc0}} \cdot v'(\ell^{\text{tc0}}) = \frac{1-\alpha}{1+s} \cdot \frac{\rho + g(\sigma + s)}{\rho + g(\sigma - \alpha)} = \frac{\ell^{\text{eq}} \cdot v'(\ell^{\text{eq}})}{1+s},$$

where the last equality stems immediately from (7).

We finally prove that $\ell^{\text{tc}} < \ell^*$. The first-best value ℓ^* is given by

$$\ell^* \cdot v'(\ell^*) = \frac{1-\alpha}{1+s} \cdot \frac{\rho + g\sigma}{\rho + g(\sigma - \alpha)} = \frac{\rho + g\sigma}{\rho + g(\sigma + s)} \cdot \ell^{\text{eq}} \cdot v'(\ell^{\text{eq}}),$$

and therefore

$$\ell^{\text{tc0}} \cdot v'(\ell^{\text{tc0}}) = \frac{\rho + g(\sigma + s)}{\rho + g\sigma} \cdot \frac{1}{1+s} \cdot \ell^* \cdot v'(\ell^*)$$

Thus, $\ell^{\text{tc0}} < \ell^*$ is equivalent to $\rho + g(\sigma + s) < (1+s)(\rho + g\sigma)$, which holds true *iff*: $\rho + (\sigma - 1)g > 0$, which is exactly the transversality condition associated with the planner's programme.

C.2 Instantaneous pre-commitment

Let $\Lambda(\tau, k; \mathcal{L})$ denote the solution to (11) for $t \geq \tau$ when the admissible policy \mathcal{L} is implemented from time τ onward. The optimality condition (13) of the consumer's programme implies that consumption is given at every date t by:

$$(26) \quad c_t = \Lambda(t, k_t; \mathcal{L})^{-1/\sigma} \cdot e^{-(1-1/\sigma)v(\ell_t)}.$$

At every instant t , if the government can make its policy decision ℓ_t before the consumers choose their consumption level c_t , then it can take the instantaneous impact of ℓ_t on c_t from eqn. (26) into account. Therefore, the derivation of the time consistent policy with instantaneous pre-commitment goes exactly like that of the policy with no pre-commitment at all, except that $\mathcal{C}(\cdot)$ must be replaced by the expression in (26).

Denoting the resulting Hamiltonian by H_g^{tc1} , the first-order condition for ℓ_t now becomes:

$$(27) \quad \frac{\partial H_g^{\text{tc1}}}{\partial \ell_t} = 0 \Leftrightarrow \frac{1}{\sigma} \cdot c_t^{-\sigma} \cdot e^{-(1-1/\sigma)v(\ell_t)} = \mu_t \cdot \left(\frac{(1-\alpha)k_t^\alpha \cdot (A_t \ell_t)^{1-\alpha}}{c_t \cdot \ell_t \cdot v'(\ell_t)} - 1 + \frac{1}{\sigma} \right),$$

and the dynamic condition governing the motion of μ_t remains the same as (23). Writing the whole thing in steady state leads to the thus constrained steady-state labor supply ℓ^{tc1} :

$$\ell^{\text{tc1}} \cdot v'(\ell^{\text{tc1}}) = \frac{1-\alpha}{1+s/\sigma} \cdot \frac{\rho+g(\sigma+s)}{\rho+g(\sigma-\alpha)} = \frac{\ell^{\text{eq}} \cdot v'(\ell^{\text{eq}})}{1+s/\sigma}.$$

Finally, it is immediately verified along the lines drawn in the previous subsection that the condition $\ell^{\text{tc1}} < \ell^*$ backs to $\rho s/\sigma > 0$, which is obviously true.

