

Work Ethic and Redistribution: A cultural Transmission Model of the Welfare State. *

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1 Introduction

Redistributive policies vary a great deal across countries. In particular European governments redistribute income by means of progressive fiscal policies, labor market and general social policies much more than the U.S. government. For instance, transfers and other social benefits accounted in 1999 for 18.1 percent of GDP on average in the European Union and only for 11 percent in the U.S.; similarly, government subsidies were 1.5 percent of GDP in Europe and .2 in the U.S. (see Alesina-Glaeser-Sacerdote (2001), Table 1, for details).

Recent attempts at explaining such differences in redistributive policies have focused on the self-fulfilling role of agents' preferences, beliefs, and their induced norms of behavior. In Alesina-Angeletos (2002) it is a common preference for social justice which can support either high redistribution and a belief that poverty is mostly driven by exogenous random events, or low redistribution and a belief that the poverty is mostly driven by laziness. In Benabou-Tirole (2002) it is instead a form of cognitive dissonance which makes agents believe in a just world and which can be supported or not depending on the redistribution policy of the country. Such a stress on the role of beliefs and norms in understanding the welfare state is in part motivated by the evidence in Alesina-Glaeser-Sacerdote (2001); they conduct an exhaustive empirical analysis of the determinants of welfare state policies to conclude that the rich set of economic, political and behavioral explanations examined can only minimally explain the observed differences between the United States and Europe. Moreover, survey data on beliefs points in the same direction: according to the *World Value Survey* less than 40 percent of Americans believe that luck determines income, while this percentage is close to 60 for Italians, Spanish, Germans and French.

In this paper we also concentrate on the interaction between redistribution policies and ethical beliefs, values and norms of behavior, and in particular on the set of such beliefs and norms which we usually refer to as the 'work ethic.' Differently from the literature we just discussed, though, we aim at studying the evolution of the beliefs and values which are associated and support redistributive policies. While most economic analysis consider preferences, norms and habits exogenously determined, important aspects of the economic feasibility and future of the Welfare State are related to its effect

on beliefs and values, and in particular on the work ethic.¹ Norms regarding the work ethic, through their effect on the labor supply and its composition, affect the sustainability of different redistribution mechanisms, from pension systems to subsidies for workers of state-owned firms.

[Some evidence on the evolution of work ethic: (Inglehart, 1990, and 1997)]

We envision the Welfare State through its redistributive function and consider that in each period such redistribution mechanisms are chosen by majority voting.² A fundamental aspect of the analysis is that each agent's acceptance of the norms regarding the work ethic (his preference for leisure, that is) is not publicly observable. Because the agents' preferences for leisure are private information, the potential for income distribution facing the Welfare State is limited, as any redistributive mechanism has to be incentive compatible.

We consider the evolution of the beliefs and values concerning the work ethic as determined by a socialization process at the family as well as at the societal level.³ We simply identify the values concerning the work ethic with preferences for leisure in the model: some individuals have developed a work ethic and hence value leisure less than the other individuals at the margin.

The evolution of preferences for leisure in the population and the redistribution of income implemented in the Welfare State are jointly determined. On one hand, in any generation, the parents' gains of socializing their children to their own preferences depend on their expectation regarding the income redistribution mechanisms which the children will face as a result of voting. On the other hand, the outcome of voting on taxation and redistribution in any period depends on the present distribution of preferences in

¹It is Lindbeck, (1995a, 1995b) which first points the attention of the literature on the fact that changes in preferences, norms, tastes or habits have implications on individual and collective behaviors and therefore may change the conditions of the functioning of the Welfare State; and that this pattern of change is indeed not exogenous but actually the result of the structure of incentives and the resulting allocation of resources induced by the Welfare State itself.

²In a companion paper, Bisin and Verdier, (1999b), we analyze in detail the case of public good provision or public provision of private goods.

³Our analysis of the dynamics of the work ethic exploits an economic model of socialization and cultural transmission we have studied in different contexts (see e.g., Bisin-Verdier (2000)).

the population, this in turn being determined by past parents' socialization.

We turn now to a brief description of the main results of our analysis. The gains from socialization increase with the population share of one's own trait. As a consequence preference homogeneity results when the initial distribution of preferences in the population is significantly concentrated on one single preference trait. When the work ethic represents a relatively common trait of the preferences of the population, for instance, such preferences are more likely to be represented in the future by the political process. This reduces the socialization gains of individuals with relatively accentuated preferences for leisure, thereby inhibiting the transmission of their preferences, and results in a society where the work ethic is predominant.

For a relatively balanced initial distributions of preferences, instead, the dynamics display multiple equilibrium paths generated by self-fulfilling expectations. In this case in fact the dominant preference group is only weakly majoritarian. In that case, it is conceivable for the individuals in the minority to reach a shift in political power in the future if enough socialization affects the distribution of preferences of the next generation. Coordination of expectations of different types of future political outcomes, e.g., through shared ideologies, allows the sustainability of multiple self-fulfilling preferences paths with very different long run consequences in terms of the redistribution of income implemented in the economy.

[Sustainability of the Welfare State]

This paper is related to a recent literature on endogenous norms and the Welfare State. Notably, Lindbeck (1995a), and (1995b), and Lindbeck, Nyberg and Weibull (1999), analyze the interaction between Welfare State disincentives and the evolution of norms regarding the work ethic. In this class of models, individuals have interdependent preferences for leisure: not working while receiving a welfare transfer generates a stigma; such effect being larger the smaller the number of people on welfare. While these papers address the question of the interactions between the dynamics of the welfare state and the evolution of the norms regarding the work ethic, they do not propose an explicit model of cultural evolution of the work ethic. Also they are not concerned with the interaction between incentive compatible redistributive mechanisms and work ethic intergenerational transmission.

2 Intergenerational Transmission of Work Ethic and Income Redistribution

Consider an overlapping generation structure. In each generation there is a continuum of agents. An individual lives for two periods, as a child and as an adult. Moreover he has one offspring. (Hence population is stationary and normalized to 1). We are concerned with the evolution of preferences for work ethic in a context in which income redistribution is obtained through simple majority voting; see Mulligan (1999) for empirical support for the fact that work ethic is determined by cultural transmission and cultural parental background.

Agents' preferences over consumption, C , and hours worked, l , are represented for simplicity by the following utility function:

$$u_i(C_i, l_i) = C_i + \theta_i V(1 - l_i) \quad \text{with } \theta_i > 0$$

where $V(\cdot)$ is a strictly concave, increasing function with $V'(0) = \infty$ and $V'(1) = 0$.

Agents differ in terms of their preferences for leisure; θ^i , for $i \in \{a, b\}$, parametrizes the marginal rate of substitution of leisure in term of consumption. Agents of type a are characterized by lower preferences for leisure at the margin, $\theta_a < \theta_b$. We say that agents of type a have developed a 'work ethic', that agents of type b have not. Agents' preferences are private information: the work ethic is not observable (except at the level of the family).

Agents do not only care about their consumption and leisure, but are also altruistic towards their children. Parents are paternalistic and therefore the component of his preferences deriving from altruism, for a parent of trait i has the form: $P^{ii}V^{ii} + P^{ij}V^{ij}$ where P^{ii} and P^{ij} are the probabilities that the child's trait is, respectively, i or j ; and V^{ii} , V^{ij} denote instead the utility derived if the child has, respectively, trait i or j as perceived by the parent. The socialization mechanism and the consequent determination of P^{ii} , P^{ij} , V^{ii} , V^{ij} is studied in Section 2.1.

In the beginning of their mature life, all individuals have an identical productivity ω . The before tax income of an individual of type i is then given by ωl_i . Their after tax income, which equals consumption in our simple economy, is denoted R_i and is determined through majority voting on taxation and redistribution policy. The voting problem and the determination of after tax income and labor supply for the agents of each preference group, R^i , l_i ,

is studied in Section 2.2.

2.1 Cultural transmission and Socialization

Our approach to the transmission and diffusion of preferences and cultural traits follows Bisin-Verdier (1999), to which we refer for details. The transmission of cultural traits and preferences as occurring through social learning. Children are born ‘naive’, i.e. with not-well-defined preferences and cultural traits. They acquire preferences through observation, imitation and adoption of cultural models with which they are matched. In particular children are first matched with their family, and then with the population at large, e.g. teachers, role models etc. We also identify socialization as an economic choice (mostly of parents). In other words, parents purposefully attempt at socializing their children to a particular trait.

The motivation for a parent to socialize his child (even though socialization is costly) comes from the fact that each parent is altruistic. But, we assume, parents can perceive the welfare of their children only through the filter of their own (the parents’) preferences. This particular form of myopia (which we call ‘imperfect empathy’) is quite crucial in the analysis. In the set-up of this paper it has the important implication that parents always want to socialize their children to their own preferences and cultural traits (because children with preferences and cultural traits different than their parents’ would choose actions that do maximize their own and not their parents’ preferences).

The socialization of a naive individual occurs in two steps. First the naive child is exposed to the parent model (type a or b) and adopts his parents’ preferences with a certain probability $\tau^i, i \in \{a, b\}$. With probability $1 - \tau^i$ the child is matched randomly with an individual of the old generation and adopts then the preferences of that individual.

More precisely, denote q_t the fraction at tie t of individuals of the old generation which are of type a . Transition probabilities P_t^{ij} that a parent of type i has a child adopting a preference of type j are then given by:

$$P_t^{aa} = \tau^a + (1 - \tau^a)q_t \quad P_t^{ab} = (1 - \tau^a)(1 - q_t) \quad (1)$$

$$P_t^{bb} = \tau^b + (1 - \tau^b)(1 - q_t) \quad P_t^{ba} = (1 - \tau^b)q_t \quad (2)$$

Given the transition probabilities P_t^{ij} , the fraction q_{t+1} of adult individuals

of type a in period $t + 1$ is easily calculated to be:

$$q_{t+1} = q_t + q_t(1 - q_t)[\tau^a - \tau^b] \quad (3)$$

There are many dimensions along which it is costly for parents to socialize their children to a certain preference pattern. Here we simply denote with $H(\tau^i)$ the cost of socialization effort τ^i . We assume it is twice continuously differentiable, strictly increasing and strictly convex⁴. We assume also that $H(0) = 0$ and $\frac{d}{d\tau^i}H(0) = 0$.

Formally, given a choice of work effort l_i and a certain after tax income R_i , each parent with preferences of type $i \in \{a, b\}$ at time t chooses τ^i to maximize

$$R_i - H(\tau^i) + \theta_i V(1 - l_i) + [P_t^{ii}V^{ii}(q_{t+1}^e) + P_t^{ij}V^{ij}(q_{t+1}^e)] \quad (4)$$

where P_t^{ii} and P_t^{ij} are the transition probabilities of the parent's cultural trait to the child (which, as defined above in equations 1-2), depend on τ^i and q_t ; $V^{ii}(q_{t+1}^e)$ (resp. $V^{ij}(q_{t+1}^e)$) denotes the utility from the economic action of a child of type i (resp. j) as perceived by a parent of type i when he expects a future political equilibrium and redistributive outcome associated with a state of the population q_{t+1}^e . They can be written as:

$$\begin{aligned} V^{ii}(q_{t+1}^e) &= R_i^*(q_{t+1}^e) + \theta_i V(1 - l_i^*(q_{t+1}^e)) \\ V^{ij}(q_{t+1}^e) &= R_j^*(q_{t+1}^e) + \theta_i V(1 - l_j^*(q_{t+1}^e)) \end{aligned}$$

where we denote by $R_i^*(q_{t+1}^e)$, $l_i^*(q_{t+1}^e)$ the after tax income and induced work effort of an individual of type i following the optimal redistributive scheme voted in period $t + 1$ and which depends therefore naturally on q_{t+1}^e .

Importantly, assuming that socialization cost enter separately into preferences, allows us to separate the socialization problem of the agents from their economic problem, the determination of labor supply and after tax income.

2.2 Optimal taxation and redistribution

Before tax income is redistributed each period. Redistribution decisions are taken by majority voting of the mature generation under the constraint that the work ethic parameter θ_i is private information of individual agents (see

⁴Note that $H(\tau^i)$ must be convex enough so that the solution of the socialization problem is $\tau^i < 1$.

Mirlees, 1973, for the pioneering analysis of redistribution in economies with adverse selection).

If the fraction q_t of individuals of type a is less than $1/2$, then clearly, individuals of type b are into power and vote for an income redistributive scheme which maximizes their representative utility and is incentive compatible with the work behavior of private agents. Such redistributive scheme consists of labor supply and after tax income, for each agent type, $(l_i, R_i)_{i \in \{a,b\}}$, which solves the following problem:

$$\begin{aligned} \max_{R_i, l_i} \quad & R_b + \theta_b V(1 - l_b) + W^b(q_{t+1}^e) \\ & \text{subject to} \\ & R_a + \theta_a V(1 - l_a) + W^a(q_{t+1}^e) \geq R_b + \theta_b V(1 - l_b) + W^a(q_{t+1}^e) \quad (\text{i}) \\ & R_b + \theta_b V(1 - l_b) + W^b(q_{t+1}^e) \geq R_a + \theta_a V(1 - l_a) + W^b(q_{t+1}^e) \quad (\text{ii}) \\ & q_t R_a + (1 - q_t) R_b \leq \omega [q_t l_a + (1 - q_t) l_b] \quad (\text{iii}) \end{aligned}$$

where $W^i(q_{t+1}^e) = \text{Max}_{\tau_i} (\beta [P_t^{ii} V^{ii}(q_{t+1}^e) + P_t^{ij} V^{ij}(q_{t+1}^e)] - H(\tau_i))$. Constraints (i) and (ii) represent the incentive compatibility constraints each type θ_i ; while (iii) is the resource constraint that guarantees that the aggregate after-tax income does not exceed the aggregate pre-tax income.

Since the socialization problem of each agent depends only on the expectation of future redistributive schemes, we can separate the dynamic optimization problem into a sequence of static ones of the form:

$$\begin{aligned} & \text{Max}_{R_i, l_i} R_b + \theta_b V(1 - l_b) \quad (5) \\ R_a + \theta_a V(1 - l_a) & \geq R_b + \theta_b V(1 - l_b) \quad (\text{i}) \\ R_b + \theta_b V(1 - l_b) & \geq R_a + \theta_a V(1 - l_a) \quad (\text{ii}) \\ q_t R_a + (1 - q_t) R_b & \leq \omega [q_t l_a + (1 - q_t) l_b] \quad (\text{iii}) \end{aligned}$$

It is easy to see that constraint (i) and (iii) are binding while constraint (ii) is not. The solution $\{R_a^*(q_t), l_a^*(q_t), R_b^*(q_t), l_b^*(q_t)\}$ then satisfies:

$$R_a^* + \theta_a V(1 - l_a^*) = R_b^* + \theta_b V(1 - l_b^*) \quad (6)$$

$$q_t R_a^* + (1 - q_t) R_b^* = \omega [q_t l_a^* + (1 - q_t) l_b^*] \quad (7)$$

$$\theta_a V'(1 - l_a^*) = \omega \quad (8)$$

$$\theta_b V'(1 - l_b^*) = \frac{(1 - q_t)\theta_b}{\theta_b - q_t\theta_a} \omega \quad (9)$$

The solution of the redistribution problem, in the case in which $q_t < \frac{1}{2}$, i.e., the agents with high preferences for leisure are the majority, has the following properties, for $0 < q_t < 1$.

The labour supply of agents of type a is ‘undistorted’ (is as in the “first best”):

$$\omega = \theta_a V'(1 - l_a^*);$$

while the labour supply of agents of type b is lower than at the “first best”:

$$\omega = \theta_b V'(1 - l_b^*) + \frac{q_t}{1 - q_t} (\theta_b - \theta_a) \theta_b V'(1 - l_b^*) < \theta_b V'(1 - l_b^*)$$

The after-tax income of the agents of type a is higher than that of the agents of type b (who work less), $R_a^* > R_b^*$, but the redistribution is in favor of the agent of type b ,

$$R_b^* - \omega l_b^* > 0, \quad R_a^* - \omega l_a^* < 0$$

The optimal redistribution scheme that is implemented by a majority of individuals of type a (by a society with a majority of individuals who have developed a work ethic, with $q_t > \frac{1}{2}$) is symmetric. The redistribution problem is in this case written as follows:

$$\max_{R_i, l_i} R_a + \theta_a V(1 - l_a) \quad (10)$$

$$\text{subject to} \quad (11)$$

$$R_a + \theta_a V(1 - l_a) \geq R_b + \theta_a V(1 - l_b) \quad (\text{i})$$

$$R_b + \theta_b V(1 - l_b) \geq R_a + \theta_b V(1 - l_a) \quad (\text{ii})$$

$$q_t R_a + (1 - q_t) R_b \leq \omega [q_t l_a + (1 - q_t) l_b] \quad (\text{iii})$$

The labour supply of agents of type b is ‘undistorted’ (is as in the first best):

$$\omega = \theta_b V'(1 - l_b^*);$$

while the labour supply of agents of type a is higher than at the first best:

$$\omega = \theta_a V'(1 - l_a^*) + \frac{1 - q_t}{q_t} (\theta_a - \theta_b) \theta_a V'(1 - l_a^*) > \theta_a V'(1 - l_a^*)$$

The after-tax income of the agents of type a is higher than that of the agents of type b (who work less), $R_a^* > R_b^*$, but the redistribution is in favor of the agent of type a ,

$$R_a^* - \omega l_a^* > 0, \quad R_b^* - \omega l_b^* < 0$$

3 Dynamics of Preferences

We consider the implications of optimal taxation and redistribution on the evolution of preferences for leisure.

We can compute $V^{ii}(q_t) = R_i^*(q_t) + \theta_i V(1 - l_i^*(q_t))$ and $V^{ij}(q_t) = R_j^*(q_t) + \theta_j V(1 - l_j^*(q_t))$ and hence determine the incentives $\Delta V^i(q_t) = V^{ii}(q_t) - V^{ij}(q_t)$ for individuals of group i to transmit its own work ethic trait.

Lemma 1 For $q_t < 1/2$,

$$\Delta V^a(q_t) = 0 \text{ and } \Delta V^b(q_t) = (\theta_b - \theta_a)[V(1 - l_b^*) - V(1 - l_a^*)] \quad (12)$$

Moreover $\Delta V^b(q_t)$ is increasing in q_t . Also for all $q_t < 1/2$, $\Delta V^b(q_t) > 0$

The incentive for individuals of type b , with high leisure preferences, to socialize their offspring to their own preference is increasing in the fraction of individuals of type a in the society, as long as this fraction remains lower than $1/2$. The maximal degree of redistribution from type a to type b which is feasible and incentive compatible is in fact increasing in the fraction of agents of type a . As a consequence, parents of type b care also more about having their children not developing a work ethic (sharing their preferences for leisure). Similarly for individuals of type a , with a strong work ethic,

Lemma 2 For $q_t > 1/2$,

$$\Delta V^b(q_t) = 0 \text{ and } \Delta V^a(q_t) = (\theta_b - \theta_a)[V(1 - l_b^*) - V(1 - l_a^*)] \quad (13)$$

Moreover $\Delta V^a(q_t)$ is decreasing in q_t . Also for all $q_t > 1/2$, $\Delta V^a(q_t) > 0$

From Lemma 1 and 2,

$$\Delta V^a(q_{t+1}^e) = 0 \text{ and } \Delta V^b(q_{t+1}^e) = (\theta_b - \theta_a) \left[\Phi \left(\frac{(1 - q_{t+1}^e) \omega}{\theta_b - q_{t+1}^e \theta_a} \right) - \Phi \left(\frac{\omega}{\theta_a} \right) \right] > 0$$

for all $q_{t+1}^e \leq 1/2$; and

$$\Delta V^a(q_{t+1}^e) = (\theta_b - \theta_a) \left[\Phi\left(\frac{\omega}{\theta_b}\right) - \Phi\left(\frac{q_{t+1}^e}{\theta_a - (1 - q_{t+1}^e)\theta_b} \omega\right) \right] > 0 \text{ and } \Delta V^b(q_{t+1}^e) = 0$$

for all $q_{t+1}^e \geq 1/2$.⁵

Let $\tau^i(q_t, q_{t+1}^e)$ denote the solution of the socialization problem respectively for agents of type i :

$$W^i(q_{t+1}^e) = \text{Max}_{\tau_i} \left(\beta [P_t^{ii} V^{ii}(q_{t+1}^e) + P_t^{ij} V^{ij}(q_{t+1}^e)] - H(\tau_i) \right)$$

Then $\tau^a(q_t, q_{t+1}^e)$ and $\tau^b(q_t, q_{t+1}^e)$ are respectively given by:

$$\begin{cases} H'(\tau^a) = \beta(1 - q_t) \Delta V^a(q_{t+1}^e) & \text{if } q_{t+1}^e \geq 1/2 \\ \tau^a = 0 & \text{otherwise} \end{cases}$$

and

$$\begin{cases} H'(\tau^b) = \beta q_t \Delta V^b(q_{t+1}^e) & \text{if } q_{t+1}^e < 1/2 \\ \tau^b = 0 & \text{otherwise} \end{cases}$$

Note that $\tau^a(q_t, q_{t+1}^e)$, whenever positive, is decreasing in q_{t+1}^e as parents' socialization gains are decreasing in q_{t+1}^e . On the other hand, $\tau^b(q_t, q_{t+1}^e)$ when positive, is increasing in q_{t+1}^e as in this case, parents' socialization gains are increasing in q_{t+1}^e . At the same time, $\tau^a(q_t, q_{t+1}^e)$ is decreasing in q_t while $\tau^b(q_t, q_{t+1}^e)$ is increasing in q_t . This reflects the substitutability in socialization between family models and external models. An individual of group a , for example, has less incentives to socialize directly his child to his own trait when the fraction of that group increases because he realizes that, if not socialized by the family, the child is more likely to be socialized by an external model with trait a .

The reason why $\tau^i = 0$, when parents of type θ_i expect their cultural group to remain in a minority group in the future is intimately related to the non linear structure of the optimal taxation scheme. In such a situation, they expect individuals of type θ_j to be the majority and to choose their preferred taxation and redistribution scheme under incentive compatibility

⁵Majority voting, and hence the optimal redistribution decision, is of course indeterminate if $q_t = 1/2$. The dynamics of preferences do not depend in any substantial way on which assumption we make on the outcome of majority voting in this case. We assume for convenience that both groups assume to be choosing the redistribution policy if $q_t = 1/2$.

constraints. Because of this, in the optimal redistributive scheme, the incentive compatibility constraint of an individual of type θ_i to reveal his type truthfully will be binding. But this means also exactly that parents of type θ_i are valuing in the same way with their "imperfect empathy perception" (ie. their own parameter θ_i) a child of type θ_i with after tax income R_i^* and work effort l_i^* and a child of type θ_j with after tax income R_j^* and work effort l_j^* . Thus in such a case they have no incentives to spend resources to socialize their kid to their own work ethic. On the contrary, when they expect their cultural group to be in the majority in the future, then they understand that according to the optimal redistribution scheme chosen by individuals of type θ_i , the incentive compatibility truth-telling constraint of agents of type θ_i is not binding and that by the same token, there is a net perceived gain to have a child of type θ_i with after tax income R_i^* and work effort l_i^* rather than a child of type θ_j with after tax income R_j^* and work effort l_j^* . This feature of the socialization process has important implications for the evolution of preferences, hence of the work ethic, in the society.

The dynamics of preferences satisfy:

$$q_{t+1} - q_t = \begin{cases} q_t(1 - q_t)H'^{-1}[(1 - q_t)\beta\Delta V^a(q_{t+1}^e)] & \text{if } q_{t+1}^e \geq 1/2 \\ -q_t(1 - q_t)H'^{-1}[q_t\beta\Delta V^b(q_{t+1}^e)] & \text{otherwise } q_{t+1}^e \leq 1/2 \end{cases}$$

We can then characterize the perfect foresight path $\{q_t\}_t$ of preferences in this system (i.e., the path such that $q_{t+1}^e = q_{t+1}$) as well as the equilibrium level of redistribution and taxation starting from an initial fraction q_0 of individuals of type a . The phase diagram is represented in Figure 1.

Proposition 3 *If $H(\cdot)$ is sufficiently convex there exists a unique $\hat{q}_b > 1/2$ and a unique $\hat{q}_a < 1/2$ such that:*

if $q_0 < \hat{q}_a$, then q_t converges monotonically to 0;

if $q_0 > \hat{q}_b$, then q_t converges monotonically to 1;

*if $\hat{q}_a \leq q_0 \leq \hat{q}_b$, then, there are multiple (in fact a continuum of) rational expectation paths, some of which converging to 0, some of which converging to 1.*⁶

⁶The reader will notice that complex dynamics are also easily constructed. We do not stress such dynamics in this paper.

When one preference type is strongly majoritarian in society, then the politics of redistribution lead to a homogenization of the preferences for leisure. When on the contrary the initial distribution of preferences for leisure is sufficiently balanced and diversified, then the dynamics of the evolution of preferences may follow various paths depending on the type of expectations individuals are coordinated on⁷

3 Dynamics of redistribution and the sustainability of the Welfare State

Given a path of the evolution of preferences, we consider the dynamics of the main economic variables.

Proposition 4 *Consider a path of the distribution of the population across preference types such that $q_t > 1/2$, and $q_{t+1} > q_t$, for any t (agents of type a , with developed work ethic, are the majority, and population tends to be populated only of such agents in the limit). Then,*

The difference in the equilibrium labour supplies across types, $l_a^ - l_b^*$ decreases over time; and, as $q_t \rightarrow 1$, both agents' labour supplies tend to be undistorted with respect to the first best, $\omega = \theta_i V'(1 - l_i^*)$, for $i \in \{a, b\}$.*

The difference in after-tax income, $R_a^ - R_b^*$, also decreases over time, but remains positive in the limit as $q_t \rightarrow 1$.*

The extent of the redistribution from agents of type b to agents of type a , $R_a^ - \omega l_a^*$, decreases over time, and tends to 0 as $q_t \rightarrow 1$.*

The case in which $q_t < 1/2$, and $q_{t+1} < q_t$, for any t , is symmetric: $l_a^ - l_b^*$ decreases over time, and labor supplies tend to be undistorted as $q_t \rightarrow 0$; $R_a^* - R_b^*$ decreases over time and remain positive in the limit; $R_b^* - \omega l_b^*$ decreases over time, and tends to 0 as $q_t \rightarrow 0$.*

⁷The dynamic indeterminacies of cultural change in the interval $\hat{q}_a \leq q_0 \leq \hat{q}_b$ is similar to Krugman (1991) or Matsuyama (1991) dynamics for which both history and expectations matter.

This proposition shows that as cultural evolution tends towards homogenization of preferences for work (i.e., $q_t \rightarrow 0$ or $q_t \rightarrow 1$), the degree of redistribution in society will also decrease over time. At the same time, though, the inequality in the labor supply, and in after-tax income is also reduced. The reason for this is simply the fact that as society becomes less heterogeneous in terms of its preferences for leisure, marginal tax rates and distortions on labor supply decisions are reduced. In the present framework, a reduction of these tax rates tends to be progressive in income distribution as incentive compatibility constraints are associated with negative (resp. positive) marginal tax rates for the 'high income' (resp. 'low income') brackets.⁸

In our framework, we identify the Welfare State as a situation with redistribution from the rich to the poor (or more exactly from the "hard working" to the "leisure oriented" individuals). Hence it is described as an equilibrium in which the redistribution policies are controlled by agents with high preferences for leisure (agents of type b are the majority, $q_t < 1/2$). We can then study how the dynamics of the preferences and the redistribution policies are such that the economy leaves the Welfare State. It has been argued that macroeconomic shocks have significantly changed the economic conditions of the functioning of the institution of the Welfare State, this in turn having long lasting effects on the pattern of habits, norms and preferences prevailing in the society (Lindbeck 1998).

We identify macroeconomic shocks with shocks to the productivity (or, equivalently, the wage rate), ω , and consider such an argument for the end of the Welfare State in the context of our model. Consider then the effect of a productivity shock on the dynamics of the preferences in the population. The following proposition can be easily derived:

⁸The dynamics of aggregate output, $Y_t = \omega [q_t l_a^*(q_t) + (1 - q_t) l_b^*(q_t)]$, along a given path for the evolution of preferences is on the other hand ambiguous. For instance, whenever $q_t < 1/2$,

$$\frac{dY}{dq_t} = \omega [l_a^*(q_t) - l_b^*(q_t)] + \omega(1 - q_t) \frac{\partial l_b^*}{\partial q_t}$$

The first term in brackets is positive. It reflects the fact that, since $l_a^* > l_b^*$, a larger fraction of agents of type a has a positive direct effect on the aggregate labour supply and hence on aggregate output. The second term on the other hand is negative. When the fraction q_t of individuals of type a increases, the optimal redistribution scheme decided by the majority (of individuals of type b , with high leisure preferences) involves a reduction in the labour supply of individuals of type b , which has a negative effect on aggregate output. The total effect on output of cultural homogenization of preferences for work is therefore ambiguous.

Proposition 5 *Suppose that the function $V(\cdot)$ is such that $2V''(y)^2 - V'(y)V'''(y) > 0$; then $\hat{q}_a(\omega)$ is an increasing function of ω and $\hat{q}_b(\omega)$ is a decreasing function of ω .*

In other words, an increase in the productivity parameter, ω , reduces the set of initial distributions of the population across preference types to which are associated indeterminate dynamics of the distribution of the preferences for leisure. Temporary macroeconomic shocks to ω may then radically change the pattern of the evolution of preferences for leisure, as they change the threshold distributions of the population at which the qualitative dynamics of the distribution of preferences change. An example in which such a temporary shock moves the economy out of the Welfare State, into a path for the evolution of preferences converging to an homogeneous distribution of the population with more individualistic work oriented values (of type a) is presented in Figure 2. At time t just before say a negative productivity shock $-\Delta\omega$, the economy was on a cultural path like (B) converging towards $q = 0$ with $q'_a = \hat{q}_a(\omega - \Delta\omega) < q_t < \hat{q}_a(\omega) = q_a < 1/2$. After the shock, the change in ω is associated with a change in the dynamic path of preferences for leisure. Indeed if, at the moment of the shock, individuals also change their expectations from $t + 1$ on, the economy can easily jump to a path like $(A)'$ such that, in the long run, there is cultural homogenization towards $q = 1$ (ie. with an increasing number of individuals sharing "work oriented" values). Obviously, if ω returns to its pre-shock value at some time t' such that $q_{t'} > \hat{q}_b(\omega) = q_b$ then the economy will remain on a path like (A) still converging towards $q = 1$. A temporary shock may then have long run effects on the profile of work oriented values in the Welfare State, influencing thereby the very sustainability of the welfare system.

4 Conclusions

Welfare State institutions have always been at the nexus of ideological developments. Ideology however is a rather controversial concept in social sciences, for which many definitions have been proposed. As emphasized, however by Higgs (1987), Mullins (1972), and Hinich and Munger (1993), two characteristics appear as common to all definitions: 1) the programmatic function of ideologies (that is a collection of statements on what should be the state of a future society) and 2) the information processing and communication role

of ideologies about politics. Our results on the dynamics of cultural change, politics and redistribution illustrate how these salient features provide a role for ideologies as coordination mechanisms on individuals' expectations in societies. For instance, developing an ideology that associates a stigma to, e.g., 'living off welfare' or to 'working in the public sector' (in fact to preferences for leisure, as for agents of type b) acts as an expectations' coordinating device of the current generation on the idea that in the future, preferences of type a will be satisfied as a political outcome. This stimulates their effort to socialize the next generation to have a preference for work which, in turn makes it possible to have the realization of this outcome.

Our analysis suggests that coordination on beliefs, through ideology, may produce coordination on preferences in the long run. Obviously, the ideology has to be consistent (i.e., self-fulfilling; see d'Aberbach, Putnam and Rockman, (1981); Hinich and Munger (1992) and (1993)). Therefore, such ideological traits can only serve as a coordination mechanism when enough people already have developed a work ethic (i.e., when $q_0 > \hat{q}_b$). When $q_0 \in [\hat{q}_a, \hat{q}_b]$, the alternative ideology that associates a stigma to, e.g., 'individualistic behavior', or to belonging to the 'bourgeoisie' (to preferences of type a) is also self-fulfilling. In that case, the current generation of agents of type a does not socialize children to their own preferences and preferences of type a never become majoritarian in the population. On the contrary preferences for leisure of type b will prevail in the long run.

While the model for the evolution of preferences for leisure and the redistribution of income we developed is quite stylized, its results are quite robust at least in two directions: *i*) the introduction of the endogenous choice of human capital accumulation in the form of skills which affect the productivity of labor, and *ii*) the general equilibrium determination of the wage rate in an economy with a standard neoclassical production function in labor and physical capital.

Clearly however, our analysis considered a quite narrow aspect of the link between cultural change and the functioning of the Welfare State. Other components like unemployment insurance, health care, public goods, education and pension benefits are also important dimensions which may be subject to cultural evolutions helping or impeding the smooth functioning of Welfare State institutions. Again, one may expect that the pattern through which such dimensions become felt by the population as legitimate (or illegitimate) entitlements, is dependent on the incentive structure actually implemented in the economy. Understanding such processes and their implications for the

dynamics of the Welfare State is obviously beyond the scope of the present paper.

Appendix

Lemma 1: The derivation of (12) is straightforward and hence left for the reader.

Using (8) and (9), one gets

$$\Delta V^b(q_t) = (\theta_b - \theta_a) \left[\Phi \left(\frac{(1 - q_t)}{\theta_b - q_t \theta_a} \omega \right) - \Phi \left(\frac{\omega}{\theta_a} \right) \right]$$

with $\Phi(\cdot) = V \circ V'^{-1}(\cdot)$. Because of the concavity of $V(\cdot)$, it is easy to see that $\Phi(\cdot)$ is a decreasing function. Given that $\frac{(1 - q_t)}{\theta_b - q_t \theta_a}$ is decreasing in q_t , one obtains immediately the result. Note finally that $\Delta V^b(0) = (\theta_b - \theta_a) \left[\Phi \left(\frac{1}{\theta_b} \omega \right) - \Phi \left(\frac{\omega}{\theta_a} \right) \right] > 0$. Therefore, for $q_t < 1/2$, one has $\Delta V^b(q_t) > 0$ ■

Lemma 2: Symmetric to the one of lemma 1 and hence left to the reader ■

Proposition 3: The dynamic system can be rewritten as:

$$q_{t+1} = \begin{cases} A(q_t, q_{t+1}) & \text{if } q_{t+1} \geq 1/2 \\ B(q_t, q_{t+1}) & \text{otherwise } q_{t+1} \leq 1/2 \end{cases}$$

with $A(q, q') = q + q(1 - q)H'^{-1}[(1 - q)\beta\Delta V^a(q')]$ and $B(q, q') = q - q(1 - q)H'^{-1}[q\beta\Delta V^b(q')]$.

i) Consider first the function $A(q, q')$. Immediately, $A(q, q') \geq q$ for $q \geq 1/2$ (with = only if $q = 1$). Also

$$A_q(q, q') = 1 + (1 - 2q)H'^{-1}[(1 - q)\beta\Delta V^a(q')] - \frac{q(1 - q)\beta\Delta V^a(q')}{H'' \circ H'^{-1}[(1 - q)\beta\Delta V^a(q)]}$$

When $H(x)$ is convex enough, it is easy to see that $A_q(q, q') > 0$ for $q < 1/2$. Moreover $A(0, 1/2) = 0$, and $A(1/2, 1/2) > 1/2$, thus there exists a unique $\hat{q}_a < 1/2$ such that $A(\hat{q}_a, 1/2) = 1/2$.

Note also that $A(q, 0) > 0$ and $A(q, 1) - 1 = q - 1 + q(1 - q)H'^{-1}[(1 - q)\beta\Delta V^a(1)]$ has the sign of $f(q) = qH'^{-1}[(1 - q)\beta\Delta V^a(1)] - 1$. $f(q)$ is again increasing in q for $H(x)$ convex enough and $f(1) = H'^{-1}[0] - 1 \leq 0$. Hence $A(q, 1) - 1 < 0$ for $q \in]0, 1[$. From this and the fact that, by lemma 2, $A(q, q')$ is decreasing in q' , one conclude that for all $0 < q < 1$, there exists a unique

$q' = q'(q)$ such that $A(q, q') = q'$. In particular $q'(\hat{q}_a) = A(\hat{q}_a, q'(\hat{q}_a))$, hence $q'(\hat{q}_a) = 1/2$. Also as $A_q(q, q') > 0$ for $q < 1/2$ and $A_{q'}(q, q') < 0$, the function $q'(q)$ is increasing in q for $q < 1/2$. From this, one has necessarily for any $q \in [\hat{q}_a, 1/2[$, $q'(q) \geq q'(\hat{q}_a) = 1/2$. This proves that there is a rational expectation path $\{q_t\}$ starting from a point $q_0 > \hat{q}_a$ and such that the dynamics of q_t is implicitly described by $q_{t+1} = A(q_t, q_{t+1})$ which converges towards $q = 1$. This proves the first part of 3).

We can also prove by contradiction part 1) of the proposition Assume that there is a rational expectation path $\{q_t\}$ starting from a point $q_0 < \hat{q}_a$ and such that the dynamics of q_t is implicitly described by $q_{t+1} = A(q_t, q_{t+1})$. This can be the case only if $q_{t+1} \geq 1/2$. In particular $q_1 > 1/2$. As we already know, when $H(x)$ is convex enough, the function $q'(q)$ is increasing in q for $q < 1/2$, implying under these dynamics that $q_{t+1}(q_t)$ is positively related to q_t for $q_t < 1/2$. Hence $q_1(q_0) < q_1(\hat{q}_a) = 1/2$. Hence $q_1(q_0) < 1/2$ proving that by contradiction, the rational expectation path of cultural evolution for the initial condition $q_0 < \hat{q}_a$ should necessarily be of the form $q_{t+1} = B(q_t, q_{t+1}) < q_t$ converging towards $q = 0$.

ii) The second part of 3) and part 2) by investigating in a very symmetric way the properties of the function $B(q, q')$. One sees immediately that $B(q, q') \leq q$ for $q \leq 1/2$ (with $=$ only if $q = 0$). Also:

$$B_q(q, q') = 1 - (1 - 2q)H'^{-1}[q\beta\Delta V^b(q')] - \frac{q(1 - q)\beta\Delta V^b(q')}{H'' \circ H'^{-1}[q\beta\Delta V^b]}$$

When $H(\cdot)$ is convex enough, an argument symmetric to the one of i) proves that there exists a unique $\hat{q}_b > 1/2$ and $B(\hat{q}_b, 1/2) = 1/2$. By the symmetric token, there is a rational expectation path $\{q_t\}$ starting from a point $q_0 < \hat{q}_b$ and such that the dynamics of q_t is implicitly described by $q_{t+1} = B(q_t, q_{t+1})$ which converges towards $q = 0$, proving the second part of 3). Also, in the same way, by contradiction, part 2 of the proposition can be shown. ■

Proposition 4: Proof. The behavior of the solution of the redistribution problem, $(l_i^*, R_i^*)_{i \in \{a, b\}}$, when either $q_t \rightarrow 1$ or $q_t \rightarrow 0$, follows simply from the first order conditions of the problem.

Also, by differentiation of such first order conditions,

$$\frac{\partial l_a^*}{\partial q_t} = 0 \text{ when } q_t < 1/2 \text{ and } \frac{\partial l_a^*}{\partial q_t} < 0 \text{ when } q_t > 1/2$$

$$\frac{\partial l_b^*}{\partial q_t} < 0 \text{ when } q_t < 1/2 \text{ and } \frac{\partial l_b^*}{\partial q_t} = 0 \text{ when } q_t > 1/2$$

Then the difference in labour supplies, $I = (l_a^* - l_b^*)$, satisfies:

$$\frac{\partial I}{\partial q_t} > 0 \text{ when } q_t < 1/2 \text{ and } \frac{\partial I}{\partial q_t} < 0 \text{ when } q_t > 1/2$$

The difference in after tax income is given by $R = R_a^* - R_b^*$. From the first order conditions of the redistribution problem, $R = \theta_a[V(1 - l_b^*) - V(1 - l_a^*)]$ when $q_t < 1/2$ and $R = \theta_b[V(1 - l_b^*) - V(1 - l_a^*)]$ when $q_t > 1/2$. Hence,

$$\frac{\partial R}{\partial q_t} > 0 \text{ when } q_t < 1/2 \text{ and } \frac{\partial R}{\partial q_t} < 0 \text{ when } q_t > 1/2$$

Finally the extent of the redistribution towards agents of type b is given by $R_b - \omega l_b^*$. When $q_t < 1/2$, one has

$$R_b - \omega l_b^* = q_t [[\omega l_a^* + \theta_a V(1 - l_a^*)] - [\omega l_b^* + \theta_a V(1 - l_b^*)]] > 0$$

Differentiation with respect to q_t gives:

$$\begin{aligned} \frac{\partial(R_b - \omega l_b^*)}{\partial q_t} &= [[\omega l_a^* + \theta_a V(1 - l_a^*)] - [\omega l_b^* + \theta_a V(1 - l_b^*)]] \\ &\quad + q_t [\theta_a V'(1 - l_b^*) - \omega] \frac{\partial l_b^*}{\partial q_t} \end{aligned}$$

The first term in brackets is positive and the second, being the product of two negative terms is also positive. Hence the result that for $q_t < 1/2$, $R_b - \omega l_b^*$ is an increasing function of q_t .

For $q_t > 1/2$ one can observe that $R_b - \omega l_b^* = -q_t [[\omega l_b^* + \theta_b V(1 - l_b^*)] - [\omega l_a^* + \theta_b V(1 - l_a^*)]] < 0$. Hence

$$\begin{aligned} \frac{\partial(R_b - \omega l_b^*)}{\partial q_t} &= - [[\omega l_b^* + \theta_b V(1 - l_b^*)] - [\omega l_a^* + \theta_b V(1 - l_a^*)]] \\ &\quad - q_t [\theta_b V'(1 - l_a^*) - \omega] \frac{\partial l_a^*}{\partial q_t} \end{aligned}$$

which, symmetrically, is negative. Hence for $q_t > 1/2$, $R_b - \omega l_b^*$ is a decreasing function of q_t . ■

Proposition 5: Suppose that the function $V(\cdot)$ is such that $2V''(y)^2 - V'(y)V'''(y) > 0$. and consider

$$\Delta V^a(q_{t+1}, \omega) = (\theta_b - \theta_a) \left[\Phi\left(\frac{\omega}{\theta_b}\right) - \Phi\left(\frac{q_{t+1}}{\theta_a - (1 - q_{t+1})\theta_b}\omega\right) \right]$$

where now we make explicit the dependence of the socialization incentives on the labor productivity parameter ω . Recall that $\Phi(\cdot) = V \circ V'^{-1}(\cdot)$. From this it follows that:

$$\Phi'(x) = \frac{x}{V'' \circ V'^{-1}(x)} \text{ and } [x\Phi'(x)]' = \frac{2x[V'' \circ V'^{-1}(x)]^2 - x^2[V''' \circ V'^{-1}(x)]}{[V'' \circ V'^{-1}(x)]^3}$$

after a change of variable $y = V'^{-1}(x)$, it follows that $[x\Phi'(x)]' > 0$ when $2V''(y)^2 - V'(y)V'''(y) > 0$. Hence under this assumption, $x\Phi'(x)$ is increasing in x . Now differentiation of $\Delta V^a(q_{t+1}, \omega)$ with respect to ω gives that

$$\begin{aligned} \text{sign of } \frac{\partial \Delta V^a}{\partial \omega} &= \text{sign of } \left[\frac{1}{\theta_b} \Phi\left(\frac{\omega}{\theta_b}\right) - \frac{q_{t+1}}{\theta_a - (1 - q_{t+1})\theta_b} \Phi\left(\frac{q_{t+1}}{\theta_a - (1 - q_{t+1})\theta_b}\omega\right) \right] \\ &= \text{sign of } [z_1 \Phi(z_1) - z_2 \Phi(z_2)] \end{aligned}$$

with

$$z_1 = \frac{\omega}{\theta_b} \text{ and } z_2 = \frac{q_{t+1}}{\theta_a - (1 - q_{t+1})\theta_b} \omega$$

and $z_2 > z_1$ (as $\theta_a < \theta_b$). Hence

$$\frac{\partial \Delta V^a}{\partial \omega} < 0 \tag{14}$$

Now $\hat{q}_a(\omega)$ is determined by $A(\hat{q}_a, 1/2, \omega) = 1/2$ with $A(q, 1/2, \omega) = q + q(1 - q)H'^{-1}[(1 - q)\beta\Delta V^a(1/2, \omega)]$. From the proof of proposition 3, we know that $A_q(q, 1/2, \omega) > 0$ for $q < 1/2$. From (14), $A_\omega(q, 1/2, \omega) < 0$. Therefore

$$\frac{\partial \hat{q}_a(\omega)}{\partial \omega} = -\frac{A_\omega(q, 1/2, \omega)}{A_q(q, 1/2, \omega)} > 0$$

Hence it follows that $\hat{q}_a(\omega)$ is increasing in ω . By a symmetric argument it can be shown that $\hat{q}_b(\omega)$ is decreasing in ω ■.

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