

Unemployment Insurance and Cultural Transmission: Theory & Application to European Unemployment¹

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This paper emphasizes the two-way causality between the provision of unemployment insurance and the cultural transmission of work ethic. Values affect the size of the moral-hazard problem and, hence, the policy to be implemented. Conversely, when parents rationally choose how much effort to exert to raise their children to work hard, they form expectations on the policy that will be implemented by the next generation. In this context, we show that the different cultural traits are complementary and that there is some cultural heterogeneity in all steady-state equilibria.

The model could generate a lag between the introduction of unemployment insurance and a deterioration of the work ethic. Relying on a calibration, we argue that it can account for a substantial fraction of the history of European unemployment since World War II. As our explanation is compatible with the co-existence of generous unemployment insurance and low unemployment in the 1950s and 1960s, it could be seen as an alternative to the dominant story that relies on the occurrence of large shocks since the 1970s. Supportive empirical evidence is provided.

Keywords: cultural transmission, European unemployment, unemployment insurance, work ethic

JEL Classifications: E24, H31, J65, Z10

I/ Introduction

The adverse effect of public policies on incentives to work is at the heart of economic analysis. However, in the political debate, we sometimes hear some deeper concerns that, over the long-run, an overly protective welfare state might also have negative consequences

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for the transmission of values. Indeed, if working hard is not properly rewarded, not only will people work less, they will also invest less in transmitting a high work ethic to their children. Younger generations will, in turn, be less receptive to these values. In other words, the concern is that generous welfare policies will gradually make the population lazy.

Conversely, the values held by individuals in a society have an impact on the policies that could be implemented. If people are naturally reluctant to work, then the adverse incentive effect of social policies are likely to be large. This would make them so expensive to implement that voters, as taxpayers, would be unlikely to support them.

This leads us to propose a model which is suitable for a joint determination of values and policies. More specifically, we shall focus on the interactions between the provision of unemployment insurance and cultural transmission, where work ethic is the cultural trait of interest. Those having a low work ethic are characterised by a substantial disutility cost of working, or equivalently by a low productivity, and by a willingness to live off unemployment benefits, without searching for a job, for as long as possible. By contrast, those having a high work ethic enjoy working and would feel guilty if unduly relying on government-provided benefits.

The policy is determined by majority voting. On the one hand, risk-averse workers would like to have some insurance against the unemployment risk; while, on the other hand, if the average work ethic across the population is too low, the severity of the moral-hazard problem makes generous unemployment insurance prohibitively expensive to adopt. This results in a trade-off which determines the impact of values on the policy to be implemented.

To identify the reverse causation, we rely on an extended version of the Bisin Verdier (2001) framework² which captures the fact that, rather than being something spontaneous, cultural transmission results from an optimizing behaviour of parents. When deciding on the level of effort to exert to raise their children to work hard, altruistic parents take into account the policy that will be implemented in the future. Clearly, the prospect of having a high work ethic is less attractive if children, once they have grown up, will be able to live off generous unemployment benefits for extended periods of time. This is the channel by which policies affect culture.

In this setup, the two cultural traits present in the population are complementary. Indeed, if most people have a high work ethic and desire to have a good level of insurance against the risk of becoming unemployed, then the returns to having a low work ethic and to live off the generous benefits are substantial. Conversely, if most people have low values, then the moral-hazard problem is so large that voters favour a replacement ratio that is sufficiently small to induce everyone to work, which makes it preferable to enjoy working.

² The Bisin Verdier (2001) framework, which is both powerful and flexible, has been successfully applied to a number of different contexts, ranging from the links between marriage and the transmission of religious beliefs, Bisin, Verdier (2000) and Bisin, Topa, Verdier (2004), to the analysis of ethnic identity and integration, Bisin, Patacchini, Verdier, Zenou (2006).

Thus, as we shall formally prove, any stable equilibrium of the model is characterised by a culturally heterogeneous population. This result should be contrasted with that of Bisin and Verdier (2004) who find, in the context of redistribution rather than unemployment insurance, that the system converges towards a homogenisation of preferences. The intuition is that, in the case of redistribution, the policy that is implemented is favourable to the majority; while, with unemployment insurance, it is preferable to be part of the minority, especially for those having a low work ethic. In other words, here the government budget constraint is more important than the political constraint; whereas the reverse is true for redistributive policies.

In the second part of this paper, we argue that our model can account for a substantial fraction of the history of European unemployment since World War II. We perform a calibration which suggests that the introduction, or wide expansion, of unemployment insurance programs just after WWII caused, a generation later, an increase in the number of low work ethic individuals registered as unemployed. In this respect, the key feature of the model is the existence of a long lag between the introduction of a policy and the behavioural response of agents. The strength of this explanation is that it is compatible with the co-existence³ of generous unemployment insurance and low unemployment in the 1950s and 1960s. This could therefore be seen as an alternative to the dominant story, defended by Blanchard Wolfers (2000) and Ljungqvist Sargent (1998), which relies on the interaction between shocks and institutional rigidities. The model suggests two or three possible scenarios for the future evolution of European unemployment. Using data from the *World Values Surveys*, we also present some empirical evidence that values did decline over the second half of the twentieth century.

This paper is related to a recent literature on the interplay between social norms and economic incentives in the context of the welfare state. Lindbeck, Nyberg and Weibull (1999) assume that “to live off one’s own work” is a social norm. Furthermore, the larger the number of people adhering to this norm, the stronger it is felt by individuals. Agents have to choose whether to work or to live off the public transfers, the size of which is determined by majority voting. Despite some important similarities, it should be emphasized that their approach substantially differs from ours in a number of ways. First, we assume that there is a true motive for unemployment insurance and, as a result, those who are involuntary unemployed do not have any feeling of guilt when receiving unemployment benefits. Also, we suppose that agents differ in their work ethic, rather than in their wages, which allows us to have an explicit model of cultural evolution. Finally, by assuming a feeling of guilt that is a decreasing function of the population share living on transfers, they obtain that agents adapt their individual ethic to the policy that is implemented. On the contrary, in our model, cultural transmission from one generation to the next is the only source of adaptation of the work ethic to the chosen policy. An important consequence of this difference is that their model cannot generate any lag between the introduction of a policy and the evolution of the work ethic.

³ This co-existence is sometimes referred to as the “European unemployment puzzle”. The relevant literature is briefly surveyed in the second section of this paper.

In order to generate such a lag, Lindbeck and Nyberg (2006) propose an explicit model of norm transmission from parents to children. As in the paper discussed in the previous paragraph, norms are tied to outcome, e.g. being welfare dependant, rather than to effort, e.g. not trying to look for a job. Also, this norm is felt more intensively as more people adhere to it. It should be emphasized that the assumed cultural transmission process is hardly comparable to the one used in this paper. Indeed, the only motivation of parents for raising children to work hard is to avoid having them rely on their altruism in the future. Hence, if parents could credibly commit not to donate more than a certain amount to their children in the future, then norm transmission would never occur.

Some work has also recently been done on the impact of cultural values on labour market institutions and outcomes. Algan and Cahuc (2008) argue that countries characterised by stronger civic virtues are more prone to provide insurance through unemployment insurance, thanks to a lower moral-hazard problem, rather than through job protection. This is closely related to the political economy aspect of our work. In another paper, Algan and Cahuc (2006) emphasize the Catholics' male breadwinner conception as one of the main cause of the high level of labour market rigidities, favouring insiders, encountered in Mediterranean countries. Also, Algan and Cahuc (2005) argue that the strength of family ties in Continental Europe explains a rate of employment lower in these countries than in the US, especially among women, the young and the old. It should be emphasized that all these analyses take culture as given, while, as we argue throughout this paper, we might expect it to evolve as labour market institutions change. This has led Aghion, Algan and Cahuc (2008) to investigate the effect of the minimum wage on the quality of labour relations. They argue that state regulation prevents workers from negotiating, which would foster cooperation. The channel by which policy affects culture is very different from the one which we propose as it relies on the evolution of beliefs on the cooperative nature of the economy.

Interestingly, Fernandez (2007) attributes a major structural change in the labour market, constituted by the rise in female labour force participation, to an evolution of culture. More specifically, the cultural change was driven by a process of intergenerational learning about the payoffs from working in the market rather than at home. A calibration of her model replicates the S-shaped increase in female labour force participation that occurred throughout the twentieth century.

Finally, we should mention the work of Tabellini (2008a) which provides evidence that distant political institutions have an impact on culture as measured by trust and respect, democracy being favourable to these values. Conversely, countries where morality is more widespread have better governance indicators and tend to be more developed. Tabellini (2008b) proposes an explanation for the interaction between cooperation and legal enforcement which relies on an extended version of the Bisin-Verdier (2001) framework.

This paper is organised as follows. The theoretical model is presented in the first part. We begin by a description of the functioning of the economy at a point in time, we then turn to the cultural transmission process and to the resolution of the model. In the second part, we

argue that the model offers an explanation for the history of European unemployment since World War II. After a brief review of the literature on the topic, we perform a calibration of the model and then present some supportive empirical evidence. The paper ends with a conclusion.

II/ The Theoretical Model

A/ The Economy

Let's consider an overlapping generation economy such that each generation is populated by a continuum of agents of mass 1. Each individual lives for two periods corresponding to childhood and adulthood. The young acquire preferences while the old work and try to transmit a high work ethic to the younger generation.

As workers face the risk of being unemployed with probability p , the government provides some unemployment benefits b that are financed by a tax t on wages. Adults have the choice between working full time, which might entail some unemployment spells, and not working at all. Those who decide not to work also benefit from the unemployment insurance system. The population is divided between agents who have a high work ethic, type H, and those who a low work ethic, type L. The work ethic of type H is characterized by a feeling of guilt when receiving unemployment benefits without searching for a job. Also, working is more costly, in utility terms, for type L than for type H.

More specifically, let $U_i(W)$ denote the utility of an agent of type $i \in \{H, L\}$ who chooses to work. We thus have:

$$U_H(W) = (1 - p)v(w - t) + pv(b) + \phi, \quad (1)$$

$$U_L(W) = (1 - p)v(w - t) + pv(b), \quad (2)$$

where v stands for the increasing and strictly concave utility of consumption and w the before-tax wage. This could be seen as the *ex-ante* utility, before the worker knows whether he will be able to find a job. Alternatively, we could consider that a worker spends a proportion p of his working life in unemployment. The parameter $\phi > 0$ captures the fact that working is relatively less painful for those having high work ethic. This could reflect a higher productivity or a stronger taste for work.

Similarly, $U_i(NW)$ stands for the utility of non working agents of type i , i.e. the utility of those who are not even searching for a job. It is given by:

$$U_H(NW) = v(b), \quad (3)$$

$$U_L(NW) = v(b) + \gamma. \quad (4)$$

where $\gamma > 0$ denotes the leisure that low work ethic individual enjoy while not working. Individuals of type H feel so guilty from relying on benefits to which they are not entitled that they cannot enjoy any leisure while inactive.

We clearly have $U_H(W) > U_L(W)$ and $U_L(NW) > U_H(NW)$. This implies that if type H agents choose not to work, then so do the Ls:

$$[U_H(NW) \geq U_H(W)] \Rightarrow [U_L(NW) > U_L(W)]. \quad (5)$$

Conversely, if the Ls choose to work, then so do the Hs:

$$[U_L(W) \geq U_L(NW)] \Rightarrow [U_H(W) > U_H(NW)]. \quad (6)$$

The policy implemented by the government consists of a level of taxes, t , and unemployment benefits, b . Denoting by q_t the proportion of agents of type H in period t , the government budget constraint that must be satisfied at time t if only the Hs work is:

$$q_t[(1-p)t - pb] - (1-q_t)b = 0. \quad (7)$$

We can see from this constraint that the existence of L, who take unfair advantage of the system, increases the cost of providing unemployment insurance. This will prevent the provision of full insurance that would be ideal for H.

The policy to be implemented is determined by an electoral process. We therefore need to distinguish two cases depending on which type holds the majority. We assume that $\lim_{c \rightarrow 0} v(c) = -\infty$ so that a policy that does not induce anybody to work is never adopted. This implies, by (5), that, for all policies resulting from the voting process, agents having a high work ethic choose to work.

Whoever holds the majority, there are two policies that could be implemented. Under the first one only type H agents work, whereas the second induces everyone into activity. There is a trade-off between the desirability of the two policies. On the one hand, as could be seen from the government budget constraint, (7), the inactivity of type L agents increases the cost of providing unemployment insurance as they do benefit from the policy without ever contributing to its funding. On the other hand, in order to induce them to work, it is necessary to decrease the level of unemployment benefits, which is costly in terms of worker's forgone insurance.

Let's first consider the case where type H agents hold the majority, $q_t \geq 1/2$. The first policy is such that only the Hs choose to work. Intuitively this should be implemented if the number of agents of type L is not too large and if inducing them to work is excessively costly in terms of forgone insurance. The optimisation problem corresponding to this first policy is given by:

$$\max_{\{t,b\}} U_H(W) \quad (8)$$

$$\text{such that: } U_H(W) \geq U_H(NW)$$

$$q_t(1-p)t - (1-(1-p)q_t)b = 0.$$

The second policy is such that all adults choose to work. Noting, by (6), that if the Ls work then the Hs also work, the corresponding optimisation problem is:

$$\max_{\{t,b\}} U_H(W), \quad (9)$$

$$\text{such that: } U_L(W) \geq U_L(NW) \\ (1-p)t - pb = 0.$$

The policy chosen by voters of type H is the one associated with the highest maximand⁴.

Let's now turn to the case where type L agents are in majority, $q_t < 1/2$. Again, voters have the choice between two different policies, one where only the Hs work and another such that everyone chooses to work. The corresponding optimisation problems are:

$$\max_{\{t,b\}} U_L(NW) \quad (10)$$

$$\text{such that: } U_H(W) \geq U_H(NW) \\ q_t(1-p)t - (1-(1-p)q_t)b = 0,$$

and:

$$\max_{\{t,b\}} U_L(W) \quad (11)$$

$$\text{such that: } U_L(W) \geq U_L(NW) \\ (1-p)t - pb = 0.$$

Note that, as $U_H(W)$ and $U_L(W)$ only differ by a scalar, i.e. ϕ , the second policy is not affected by who holds the majority, i.e. (9) and (11) yield the same values for t and for b .

After simplification, the incentive compatibility constraint for H, $U_H(W) \geq U_H(NW)$, could be written as:

$$(1-p)[v(w-t) - v(b)] \geq -\phi. \quad (12)$$

Thus, type H agents only stop working when the level of unemployment benefits exceeds the net wage by a sufficient amount. Note that, when the Hs are in majority, if the first policy is adopted, (8), the limit on the level of insurance that the government can provide is due to the budget constraint rather than the incentive compatibility constraint. In fact, full insurance would only be provided if all agents were of type H. As a consequence, the incentive compatibility constraint for H is never binding when the Hs are in power⁵. The corresponding incentive compatibility constraint for L reduces to:

$$(1-p)[v(w-t) - v(b)] \geq \gamma. \quad (13)$$

Clearly, inducing type L to work is costly in terms of insurance provided to workers.

To solve the model, let's consider the policy that is adopted when the Hs are in power. The following lemma is proved in appendix 1.

⁴ Note that, given the specification of the optimisation problem, one might wonder about the possibility that agents of type L work even if the first policy is adopted. In fact, this case cannot arise. Indeed, given the budget constraint specification in problem (8), if in equilibrium the Ls choose to work, then the second policy must be preferred to the first one.

⁵ This could be checked more formally from the Kuhn-Tucker conditions.

Lemma 1: If type H agents choose the policy to be implemented, then there exists a threshold $\tilde{q} \in (0,1)$ such that if $q_t > \tilde{q}$ then the first policy is adopted, i.e. (8) preferred to (9), and if $q_t < \tilde{q}$ then the second policy is adopted, i.e. (9) preferred to (8).

Note that if $\tilde{q} < 1/2$, then the first policy is always adopted whenever the Hs actually are in power.

Let's now turn to the case where the Ls are in charge. The following lemma is proved in appendix 2.

Lemma 2: If type L agents choose the policy to be implemented, then there exists a threshold $\hat{q} \in (0,1)$ such that if $q_t > \hat{q}$ then the first policy is adopted, i.e. (10) preferred to (11), and if $q_t < \hat{q}$ then the second policy is adopted, i.e. (11) preferred to (10).

Note that if $\hat{q} > 1/2$, then the second policy is always adopted whenever the Ls actually are in power.

We might wonder about the relative values of the threshold for H, \tilde{q} , and for L, \hat{q} . The following lemma is proved in appendix 3.

Lemma 3: $\tilde{q} > \hat{q}$.

Thus, if type H agents choose the second policy, then so do the Ls. Also, if the Ls choose the first policy, then so do the Hs. It can be checked that many equilibria are inefficient in this model. Indeed, when the Ls hold the majority, at \hat{q} type L agents are indifferent between the two policies whereas the Hs strictly prefer the second one. Also, more fundamentally, whenever the second policy is implemented, the resulting equilibrium is dominated by an allocation such that everybody works and where full insurance is provided. In this case, the source of the inefficiency is the incentive compatibility constraint for L. If possible, the government should try to promote a high work ethic, through the educational system for instance, in order to alleviate the moral hazard problem associated with the provision of unemployment insurance.

B/ Cultural Transmission

As should be clear from the previous section, by “culture” or “values” we denote a preference profile, i.e. type H or type L. Following the seminal work of Cavalli-Sforza and Feldman (1981), it is common to distinguish three modes of cultural transmission between individuals: vertical, oblique and horizontal. The former denotes the transmission of values from parent to children. Oblique cultural transmission occurs when a child is influenced by individuals of the

parental generation other than his own parents. Finally, horizontal transmission results from the interaction between different individuals of the same generation⁶. As we are specifically interested in the *dynamics* of cultural transmission, we abstract from this third channel.

We rely on the model of Saez-Marti and Sjorgen (2008) which is a refinement of Bisin Verdier (2001) that is particularly appropriate when work ethic is the cultural characteristic to be transmitted. For simplicity, we assume that each adult only has one child and that each child only has a single parent. All parents try to instil a high work ethic into their children. Such vertical cultural transmission has a probability τ_t^i of success in period t for a parent of type i , where, as we shall soon see, the type of the parent matters to the extent that transmitting a high work ethic is harder for parents having low values. In case, this process is unsuccessful, i.e. with probability $1 - \tau_t^i$, then oblique cultural transmission operates and the child adopts the preference type of a randomly selected adult who thus becomes his role model. The main extension of the Bisin-Verdier framework proposed by Saez-Marti Sjorgen (2008) is to allow this process of oblique transmission to be biased. Thus, a rebellious child, i.e. a child that failed to be influenced by his parent, chooses a role model who has a high work ethic with probability $f(q_t)$ when a proportion q_t of adults has a high work ethic in period t . In this paper, we assume that the bias is towards role models having a low work ethic; or, more formally, a negative bias⁷ characterised by:

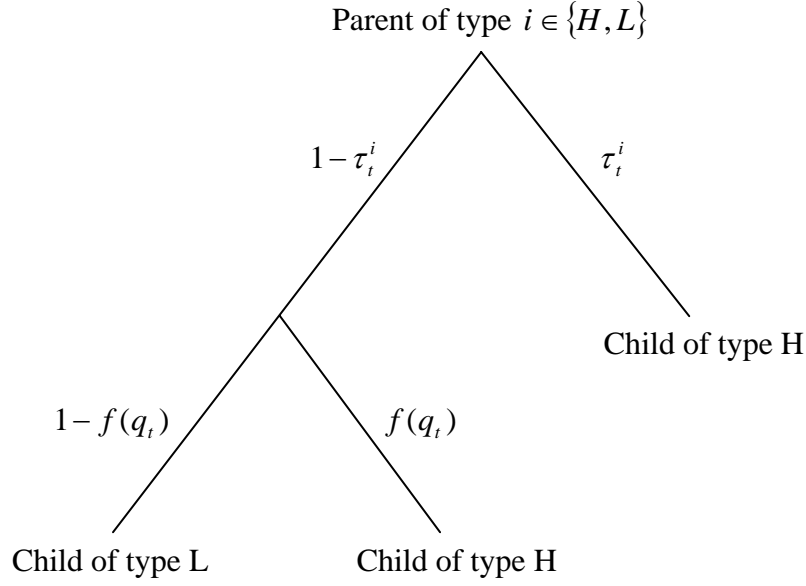
$$f(q) < q, \tag{14}$$

for $q \in (0,1)$. We must logically have $f(0) = 0$ and $f(1) = 1$ since, when all possible role models are of one type, the child will necessarily adopt this type if vertical cultural transmission fails. Figure 1 summarizes the cultural transmission process.

⁶ See Ellis (2007, section 2) for a careful discussion on culture, values and norms.

⁷ Note that, in the context of this paper, given that all parents try to raise their children to work hard, the bias needs to be strictly negative; otherwise the work ethic would never decline.

Figure 1: The Cultural transmission process



Let P_t^{ij} denote the probability at time t that the child of a parent of type i adopts preference type j . Thus, the assumed cultural transmission process implies that:

$$\begin{cases} P_t^{HH} = \tau_t^H + (1 - \tau_t^H)f(q_t) \\ P_t^{HL} = (1 - \tau_t^H)(1 - f(q_t)) \\ P_t^{LH} = \tau_t^L + (1 - \tau_t^L)f(q_t) \\ P_t^{LL} = (1 - \tau_t^L)(1 - f(q_t)) \end{cases} \quad (15)$$

For instance, the probability that a parent of type H has a child of the same type, P_t^{HH} , is equal to the probability of vertical preference transmission, τ_t^H , plus the probability of having a rebellious child that randomly meets a mentor of type H, $(1 - \tau_t^H)f(q_t)$. The dynamic of preferences is given by:

$$\begin{aligned} q_{t+1} &= q_t P_t^{HH} + (1 - q_t) P_t^{LH} \\ &= f(q_t) + (1 - f(q_t)) [q_t \tau_t^H + (1 - q_t) \tau_t^L] \end{aligned} \quad (16)$$

Each adult cares about the preference type of his child. This leads him to choose a costly socialization effort which determines the probability of vertical preference transmission, τ_t^i . The cost function, $C_i(\tau_t^i)$, is assumed to be strictly increasing, strictly convex and satisfies $C_i(0) = C_i'(0) = 0$ as well as $C_i''(0) > 0$. It is type dependent as transmitting a high work ethic is easier for parents who have a high work ethic themselves. More specifically, we assume that:

$$C'_L(\tau) \geq C'_H(\tau), \quad (17)$$

for any $\tau \in (0,1)$.

Parents are assumed to be altruistic. Hence, when choosing their transmission effort, they weigh their child's expected utility when old against the cost of giving them a desirable

education. Thus, the utility that a parent of type i derives from cultural transmission is given by:

$$W^i(q_{t+1}^e) = -C_i(\tau_t^i) + \beta[P_t^{ii}V^i(q_{t+1}^e) + P_t^{ij}V^j(q_{t+1}^e)], \quad (18)$$

where β is a parameter capturing the intensity of altruism, q_{t+1}^e denotes the expected value of q_{t+1} and $V^i(q_{t+1}^e)$ corresponds to the utility that a child of type i would get next period if the share of type H agents is equal to q_{t+1}^e . Here, as in Bisin Verdier (2004), the future welfare of a child depends on the policy that will be implemented next period and, hence, parents need to form rational expectations on the evolution of values from one generation to the next. It should nevertheless be emphasized that expectations are assumed to be rational in order to enhance the internal consistency of the model, however most insights from this analysis could also be derived under backward looking expectations.

The total utility of an adult of type i , \tilde{U}^i , is composed of the direct gratification he derives from his labour market activity and of the altruistic utility associated with cultural transmission. Thus:

$$\tilde{U}^i = V^i(q_t) + W^i(q_{t+1}^e). \quad (19)$$

Note that the two terms can be treated separately in the optimisation process as they do not interact directly.

We use the following notations:

$$\Delta V(q_{t+1}^e) = V^H(q_{t+1}^e) - V^L(q_{t+1}^e), \quad (20)$$

where $\Delta V(q_{t+1}^e)$ denotes the extent to which parents prefer their child to have a high rather than a low work ethic. The optimal socialization effort for each type, τ_t^i , is derived by maximizing $W^i(q_{t+1}^e)$, given by equation (18), with respect to τ_t^i ; which gives:

$$C'_i(\tau_t^i) = \beta(1 - f(q_t))\Delta V(q_{t+1}^e). \quad (21)$$

This first order condition says that the optimal level of effort is such that the corresponding marginal cost is equal to the marginal benefit, where the latter is composed of the intensity of altruism, β , of the probability that a rebellious child adopts a low work ethic, which is to be avoided, $1 - f(q_t)$, and of the extent to which type H is preferable to L, $\Delta V(q_{t+1}^e)$. As cultural transmission is more costly to the Ls than to the Hs, c.f. equation (17), and, as the cost function is convex, we must have:

$$\tau_t^H \geq \tau_t^L, \quad (22)$$

for any time period t .

C/ Equilibrium

When solving the model, three possible cases could be considered: $1/2 \leq \hat{q} < \tilde{q}$, $\hat{q} < \tilde{q} \leq 1/2$ and $\hat{q} < 1/2 < \tilde{q}$. For simplicity, we shall focus on the first case which seems quite realistic. It

should nevertheless be noted that the two other possibilities could also be analysed and would indeed yield very similar insights.

Assuming $1/2 \leq \hat{q} < \tilde{q}$, there are three different political outcome that can arise. If $q_t \in (\tilde{q}, 1]$, then type H agents choose to implement the first policy, (8); if $q_t \in (1/2, \tilde{q})$, then the Hs choose the second policy, (9); and, if $q_t \in [0, 1/2)$, the Ls choose the second policy, (11). Note that the last two outcomes are in fact equivalent. Type H agents always choose to work, which implies that:

$$V^H(q_{t+1}^e) = U_H(W; q_{t+1}^e). \quad (23)$$

Type L agents only choose to work if $q_t < \tilde{q}$, implying:

$$V^L(q_{t+1}^e) = \begin{cases} U_L(W; q_{t+1}^e) & \text{if } q_{t+1}^e < \tilde{q} \\ U_L(NW; q_{t+1}^e) & \text{if } q_{t+1}^e > \tilde{q} \end{cases}. \quad (24)$$

From equations (20), (23) and (24), it is straightforward to check that:

$$\Delta V(q_{t+1}^e) = \begin{cases} U_H(W; q_{t+1}^e) - U_L(W; q_{t+1}^e) & \text{if } q_{t+1}^e < \tilde{q} \\ U_H(W; q_{t+1}^e) - U_L(NW; q_{t+1}^e) & \text{if } q_{t+1}^e > \tilde{q} \end{cases}. \quad (25)$$

Using the specification of the utility functions given by equations (1) to (4), we have:

$$\Delta V(q_{t+1}^e) = \begin{cases} \phi & \text{if } q_{t+1}^e < \tilde{q} \\ (1-p)[v(w-t) - v(b)] + \phi - \gamma & \text{if } q_{t+1}^e > \tilde{q} \end{cases}. \quad (26)$$

When all agents have a high work ethic, $q = 1$, perfect insurance is provided and, hence, $\Delta V(1) = \phi - \gamma$. If $\gamma > \phi$, then ΔV as given by (26) is negative for q sufficiently close to 1. By the first order condition for τ_t^i , (21), this should entail a negative level of cultural transmission effort, or, more precisely, this should induce parents to make an effort to transmit a low work ethic. Although the model could rigorously allow for this possibility, we shall assume for simplicity that ΔV is exogenously bounded below by 0 as if parents are unable to raise their children to be of type L. This assumption only affects the speed with which work ethic declines when q is close to 1, but has no consequences for our subsequent results.

It is easy to prove that:

$$\lim_{\substack{q \rightarrow \tilde{q} \\ q > \tilde{q}}} \Delta V(q) < \phi, \quad (27)$$

implying a discontinuity of ΔV at \tilde{q} . Indeed, if (27) does not hold, then the incentive compatibility constraint for low work ethic agents, (13), is automatically satisfied at \tilde{q} , under the first policy, (8). But, then, type H agents strictly prefer the second policy, (9) to the first, (8), as it is associated to a lower level of taxes for a given level of insurance. But, this is a contradiction⁸, as, by definition, type H voters should be indifferent between the two possible

⁸ Note that this proof follows the argument given in footnote 4.

policies at \tilde{q} . By the same token, it must be that $\Delta V(q) < \phi$ whenever the first policy is implemented, i.e. for all $q \in (\tilde{q}, 1)$.

For some of the results that will subsequently be derived, we need ΔV to be a non-increasing function of q . Although, practically, this condition will always be satisfied, there is a theoretical probability that, as q increases, providing unemployment insurance becomes so much cheaper that the level of taxes declines and hence the level of insurance, i.e. the closeness between $w-t$ and b , also declines. We shall therefore assume that the utility function v is such that ΔV is non-increasing⁹ for $q \in (\tilde{q}, 1)$.

It could easily be seen by combining (16) and (21) and by noting that in a rational expectation equilibrium agents correctly forecast the evolution of the economy, i.e. $q_{t+1}^e = q_{t+1}$, that the dynamic of preferences is determined by:

$$q_{t+1} = f(q_t) + (1 - f(q_t)) [q_t C_H'^{-1}(\beta(1 - f(q_t))\Delta V(q_{t+1})) + (1 - q_t) C_L'^{-1}(\beta(1 - f(q_t))\Delta V(q_{t+1}))], (28)$$

with ΔV given by (26) and, if needed, bounded below by 0. The following lemma, which is proved in appendix 4, shows that q_{t+1} is a well defined function of q_t .

Lemma 4: For a given value of q_t , there could be at most one corresponding value of q_{t+1} .

Hence, equation (28) implicitly determines $q_{t+1}(q_t)$. Note that the proof combines equation (28) with the fact that ΔV is non-increasing in q .

Let's now investigate this function in greater details. First, it is straightforward to check that when, initially, all agents have a high work ethic, values do not decline as children do not have any "bad" role model to follow:

$$q_{t+1}(1) = 1. \quad (29)$$

If, on the contrary, the economy starts with a population that exclusively has a low work ethic, then, next generation, this will no longer be the case as some parents would have successfully raised their children to work hard; so:

$$q_{t+1}(0) > 0. \quad (30)$$

When, initially, the share of type H agents is arbitrary close to 1, but strictly smaller than 1, then the average work ethic is lower in the following generation. This is stated more formally in the following lemma which is proved in appendix 5.

⁹ It could be shown that a sufficient, but far from necessary, condition for this to be satisfied is that $v''(x)/(v'(x))^2$ is a non-increasing function of x . In the case of a CRRA utility function, this is equivalent to assuming that the coefficient of relative risk aversion is greater or equal to 1.

Lemma 5: $\frac{dq_{t+1}(1)}{dq_t} > 1$.

The proof essentially relies on an implicit differentiation of equation (28).

It is clear from equation (26) and (27) that ΔV is discontinuous at \tilde{q} . What impact does this have on the function $q_{t+1}(q_t)$? First, note that, if parents always expect the first policy, (8), to be implemented, then the discontinuity never plays any role as $q_t > \tilde{q}$ for all t . We shall therefore turn to the case where $q_{t+1}(q_t) < \tilde{q}$ for some values of q_t . A sufficient condition for the existence of such q_t is $q_{t+1}(0) < \tilde{q}$. Let's now consider a value of q that is initially high and which declines until the second policy, (9), is about to be implemented. More precisely, let q_+ denote the smallest value of q_t such that the first policy, (8), will still be implemented next period; thus q_+ is formally defined by:

$$\lim_{\substack{q_t \rightarrow q_+ \\ q_t > q_+}} q_{t+1}(q_t) = \tilde{q}. \quad (31)$$

Similarly, q_- denotes the largest value of q_t such that the second policy will be implemented next period; or more formally:

$$\lim_{\substack{q_t \rightarrow q_- \\ q_t < q_-}} q_{t+1}(q_t) = \tilde{q}. \quad (32)$$

Clearly, if there was no discontinuity in ΔV , we would have $q_+ = q_-$. As stated in the next lemma, which is proved in appendix 6, for range of values of q_t there does not exist any corresponding value of q_{t+1} .

Lemma 6: $q_+ > q_-$ and, hence, $q_{t+1}(q_t)$ is not defined for $q_t \in (q_-, q_+)$.

This lemma states that for a range of values of q_t , there does not exist any rational expectation equilibrium. In fact, this result has a simple intuitive interpretation. If parents expect the first policy, (8), to be implanted next period, then it is not necessary to make a large cultural transmission effort as, for a child, having a high work ethic is not so much better than having a low one, i.e. ΔV is quite low under the first policy. But this leads to a deterioration of values which results in the adoption of the second policy, (9), next period. If, on the contrary, parents expect the second policy, (9), to be in force, they make such a large transmission effort, as ΔV is high, that the first policy, (8), will be chosen by voters next period. There is therefore no rational expectation equilibrium¹⁰.

¹⁰ One might wonder about the possibility of having a mixed strategy equilibrium. In fact, this cannot occur as, with an infinity of voters, even if each voter votes randomly, by the law of large number, it is either the first or the second policy that is implemented for sure or each policy might win with equal probability. But, even in this

Even though we have established a number of properties satisfied by the dynamic of cultural transmission, $q_{t+1}(q_t)$, a large number of possibilities remain, including the existence of multiple equilibria, i.e. several solutions to $q_{t+1}(q^*) = q^*$. We can establish additional properties of the dynamic of preferences by imposing restrictions to the cost functions. The following lemma offers a useful example.

Lemma 7: For C_H and C_L sufficiently convex, $\frac{dq_{t+1}}{dq_t} > 0$.

This proposition¹¹ follows immediately from the implicit differentiation of equation (28), which was used to prove Lemma 5 and which could be found in Appendix 5. Following this route, we could still add further restrictions to the cost functions in order to reduce the number of possible equilibria. For instance, it could be proved, by implicitly differentiating (28) twice, that, for C_i sufficiently convex and $C_i''(\tau) > 0$, q_{t+1} is a convex function of q_t .

Instead of adding all these extra assumptions in order to reduce the number of possible equilibria, we characterize, qualitatively, the equilibrium towards which the economy converges when it starts with an initial population that has a very high work ethic, i.e. q_0 close to 1. Indeed, as we shall subsequently argue, this is the relevant case when applying the model to European unemployment. From equation (29), Lemma 5, 6 and 7, we have the following proposition.

Proposition 1: For C_H and C_L sufficiently convex and for q_0 sufficiently close to 1, q either monotonically converges to an equilibrium $q^ < q_0$ or it initially decreases until it reaches a point where no rational expectation equilibrium exists.*

Note, that Lemma 7, which insures monotonous convergence, is stronger than what is needed for convergence to q^* ; in fact, it would be sufficient to have $dq_{t+1}/dq_t > -1$. The three possibilities resulting from equation (29), Lemma 5, 6 and 7 and which led to Proposition 1 are depicted in the figure 2, 3 and 4.

last case, the equal probabilities will, generically, not induce a cultural transmission effort leading to $q_{t+1} = \tilde{q}$ next period.

¹¹ Obviously, this proposition only applies when q_{t+1} is defined.

Figure 2: Starting from a share of type H close to 1, the economy converges to a stable equilibrium

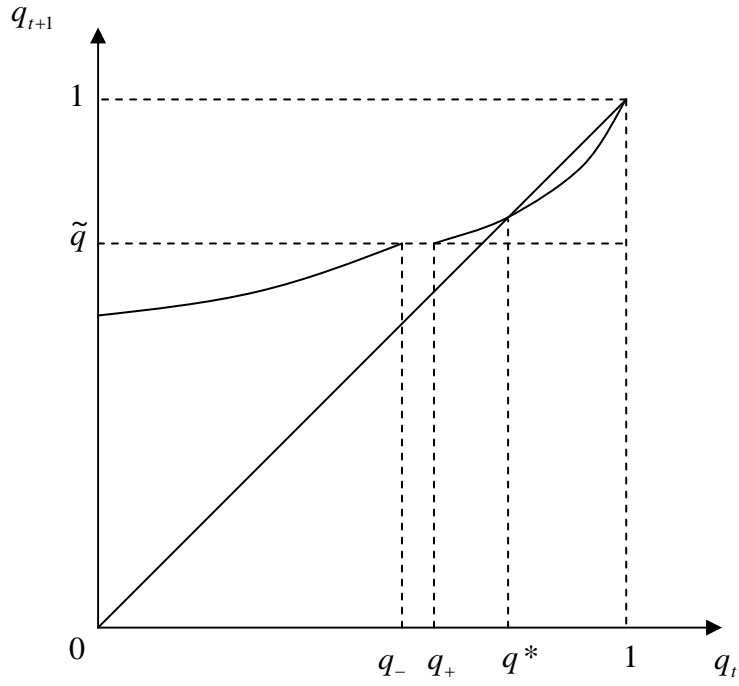


Figure 3: Starting from a share of type H close to 1, the economy eventually reaches a no-rational-expectation-equilibrium point

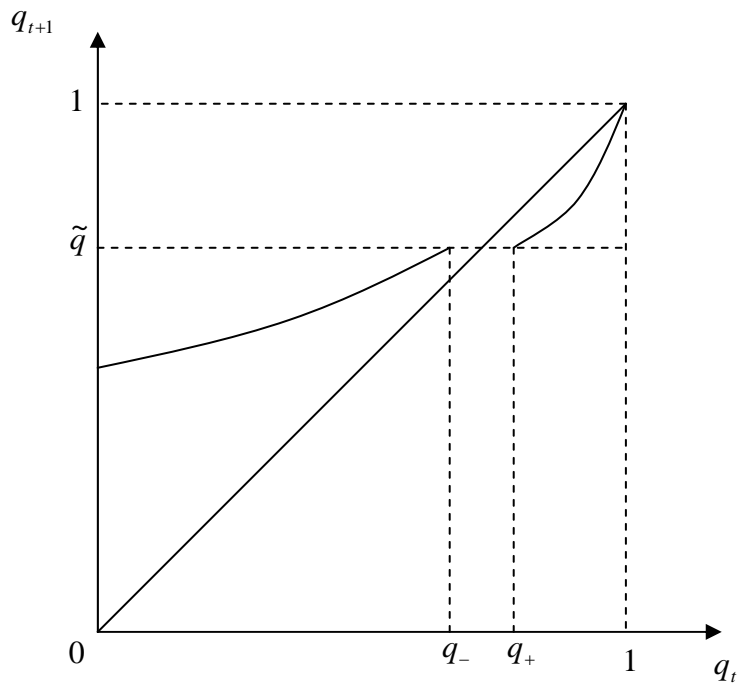
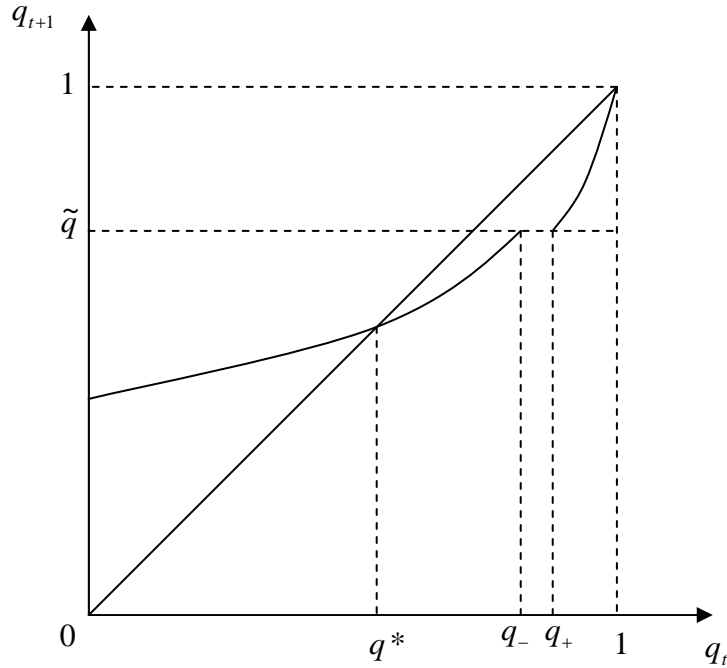


Figure 4: Starting from a share of type H close to 1, the economy either converges to a stable equilibrium or reaches a no-rational-expectation-equilibrium point



It should be emphasized that, starting from q_0 close to 1, the graphs are generic until either the stable equilibrium q^* or a no-rational-expectation-equilibrium point is reached. There could, however, be additional equilibria further to the left, i.e. for smaller values of q_t ; but these are not relevant for q_0 close to 1 and most of them could be ruled out by imposing additional restrictions on the cost functions¹².

In figure 2, if the economy is initially characterised by a very high share of type H agents, i.e. $q_0 > q^*$, then values deteriorate until equilibrium q^* is reached for sure. In figure 3, with $q_0 > q_+$, values start eroding until a no-rational-expectation-equilibrium point is reached for sure. Finally, in figure 4, starting from $q_0 > q_+$, values converge towards q^* unless the recursion gets trapped into a no-rational-expectation-equilibrium point, i.e. it generates some $q_t \in (q_-, q_+)$. In this case, the outcome critically depends on the initial distribution of values given by q_0 .

The results of Proposition 1 contrast sharply with those obtained by Bisin Verdier (2004) in the case of redistributive politics where the economy converges towards a

¹² For instance, multiple equilibria could be ruled out in configurations corresponding to figure 2 and 4 by assuming that C_i is sufficiently convex, $C_i''' > 0$ and $C_H = C_L$. The first two requirements imply that $dq_{t+1}^2 / d^2 q_t > 0$ and the first and last one, together, are sufficient to ensure that $dq_{t+1}(q_-) / dq_t < dq_{t+1}(q_+) / dq_t$.

homogenization of preferences¹³. Their result is driven by the voting process. Indeed, if a majority of agents have a high work ethic, then low redistribution is implemented which encourages the transmission of a high work ethic. Conversely, when most agents are of type L, redistribution is high and hence being of type L is more attractive. Here, on the contrary, agents have an incentive to be part of the minority. Indeed, when most people are of type H, unemployment benefits are generous, which does not encourage the transmission of a high work ethic. This is fundamentally explained by the fact that, in the context of this paper, the budget constraint is more important than the political constraint. For type L agents, having enough type H workers to contribute to the funding of the unemployment benefit system is more important than holding the majority. Conversely, if the number of low work ethic individuals is so large that generous unemployment insurance cannot be provided, everyone has to work and, hence, it is preferable to enjoy working and, therefore, to be of type H.

The findings of Algan and Cahuc (2008) could be seen as providing some preliminary empirical support for our model. They show that, on average, a US citizen tends to have the same work ethic as someone living in his country of origin. This could be interpreted as a consequence of the cultural heterogeneity that is expected to be found in each country. Moreover, our model predicts that the Americans with a low work ethic are likely to be those whose parents had a low work ethic themselves.

III/ Application to European Unemployment

A/ The European Unemployment Puzzle

Observation of cross-country rates of unemployment suggests a positive correlation between institutional rigidity (high minimum wage, stringent employment protection legislation, generous unemployment benefits...) and unemployment. It is therefore tempting to assert that labour market rigidities are the main cause of the high rates of unemployment that characterised the recent economic history of Europe. The problem with this interpretation is that most of these institutions pre-existed the soar in European unemployment. It is therefore necessary to find an explanation that is compatible with the coexistence of stringent institutions and low unemployment in the 1950s and 1960s.

This has led Blanchard and Wolfers (2000) to argue that high unemployment resulted from the combination of labour market rigidities and of the occurrence of adverse shocks affecting the economy. According to this scenario, all major economies became unstable since the 1970s, and only those having a flexible labour market could prevent a rise in their rate of unemployment. Although they find some empirical evidence that the impact of institutions

¹³ It should be emphasized that the cultural transmission process assumed in this paper is slightly different from that used in Bisin Verdier (2004). In particular, they do not allow for biased oblique cultural transmission and they assume imperfect empathy, i.e. a parent assesses his child's action using his own preference profile. Nevertheless, Proposition 1 could also be established under this alternative framework. Our results are therefore robust to substantial changes in the assumptions made about the cultural transmission process.

has changed over time, they have difficulties identifying the shocks that would have triggered the dramatic rise in the number of unemployed.

On the theoretical side, a similar hypothesis was defended by Ljungqvist and Sargent (1998) who focused more specifically on the effects of unemployment insurance. They argued that, in a turbulent economy, when a worker loses his job, he loses a lot of job specific human capital with it, and he is therefore unlikely to find another position paid at a similar level. Generous unemployment benefits, indexed on the last income level, induce the unemployed to have a high reservation wage which discourages them from searching for another job. On the contrary, in a *laissez-faire* economy, they are searching actively as they are willing to accept lower paid jobs. According to Hörner, Ngai and Olivetti (2007), the adverse effects of turbulence could have been magnified, until the early 1990s, by the then pervasive state control of some industries within Europe.

Nickell, Nunziata and Ochel (2005) challenged these views. They note that European labour market institutions did not remain constant over the later-half of the twentieth century, but that they have become more stringent. They then provide evidence that the rise in unemployment could be attributed to changes in institutions. However, although this explanation could explain some part of the story, it is hard to believe that quantitatively small changes in labour market policies could have had such dramatic effects on European unemployment. More fundamentally, from a political economy perspective, it is not clear that these changes in institutions were exogenous. Indeed, they have arguably been the political response to the rise in the number of jobless.

The literature also offers other explanations based on the impact of growth and technological progress on unemployment. On the one hand, Pissarides and Vallanti (2007) and Pissarides (2007) attribute the very low rates of European unemployment in the 1950s and 1960s to the high rate of growth associated with the technological catch-up of the Old Continent. On the other hand, Hornstein, Krusell and Violante (2007) argue that half the rise in European unemployment since the 1970s could be attributed to the combination of an increase in the rate of growth by creative destruction with the pre-existing rigid labour market institutions. Indeed, growth by creative destruction leads to the destruction of old job-worker matches which forces workers to return to unemployment before they could find another position. However, as suggested by Michau (2007), this last explanation is unlikely to hold when allowing for on-the-job search.

In this section, we argue that the evolution of European unemployment over the second half of the twentieth century could be explained by the dynamic response of culture to institutional rigidities. As in Ljungqvist Sargent (1998), unemployment insurance is the institutional factor that we focus on. We shall assume that when unemployment insurance programs were initially put in place across European countries, in the 1930s and 1940s, most agents had a high work ethic. Under the proposed scenario, because of the cultural transmission process, one generation later many more agents had a low work ethic, which increased the number of non-working people who unfairly took advantage of unemployment

benefits¹⁴. These agents were registered as unemployed and contributed to the rise in European unemployment¹⁵. It should be emphasized that the story we propose, like the one involving shocks, is consistent with the coexistence of institutional rigidities and low unemployment in the 1950s and 1960s. In other words, because of changing preferences, similar policies could have different consequences at different points in time. Clearly, the key feature of the model at work here is the existence of a long lag, equal to one generation, between the introduction of a policy and the behavioural response of agents.

B/ Calibration

Let's now illustrate this scenario with a simple calibration of the model of the previous section. We therefore need to specify the relevant functional forms. Assuming a constant relative risk aversion utility function, we have:

$$v(c) = \frac{c^{1-\theta} - 1}{1-\theta}, \quad (33)$$

where θ is the CRRA coefficient. The cost, to a parent of type i , of successfully transmitting a high work ethic with probability τ^i is assumed to be quadratic; thus:

$$C_H(\tau^H) = \frac{(\tau^H)^2}{2} \text{ and } C_L(\tau^L) = \alpha \frac{(\tau^L)^2}{2}, \quad (34)$$

where $\alpha \geq 1$ reflects the extent to which cultural transmission is more costly for parents whose work ethic is low. From the first order condition for τ^i , given by equation (21), it follows from our specification of the cost functions that $\tau^H = \alpha \tau^L$.

We finally need to specify the function f , which determines the magnitude of the negative bias in oblique cultural transmission. More precisely, recall that $f(q)$ is the probability that a rebellious child, i.e. a child for whom vertical cultural transmission failed, adopts a high work ethic when a proportion q of adults are of type H. Saez-Marti and Sjogren (2008), who introduced this function into models of cultural transmission, propose a microfoundation for f , which, in the context of this paper, reduces to:

$$f(q) = \frac{qm_H}{qm_H + (1-q)m_L}, \quad (35)$$

where m_H and m_L stand for the merit of being of type H and L, respectively, as perceived by a rebellious child. The idea is that $f(q)$ corresponds to the probability of randomly meeting

¹⁴ In our model, those who have a low work ethic, i.e. type L agents, live off unemployment benefits forever. However, this could be seen as a reduced form which should not be interpreted too narrowly. The idea is that agents work as little as possible, but just sufficiently to qualify for the benefits. Also, the unemployment income could be thought of as a minimum income guarantee which does not decrease over time. Finally, note that Ljungqvist Sargent (1998) and Algan Cahuc (2008) also assume a permanent stream of unemployment benefits.

¹⁵ This is broadly consistent with the empirical findings of Laroque and Salanié (2000) who estimate that nearly 50% of French unemployment is voluntary; unemployment being defined as voluntary whenever the productivity of an agent is below his reservation wage.

an adult of type H , weighted by the relative merit of having type H . The negative bias is due to the fact that rebellious children perceive type L as being superior to H ; hence we must have:

$$m_L > m_H. \quad (36)$$

It reflects the fact that, if parents fail to transmit a high work ethic, children are relatively more likely to end up with a low one.

As we are focusing on the history of European unemployment over the second half of the twentieth century, we choose 1950 as our initial period and consider that 25 years separate two generations. For our explanation to work, we need to assume that, initially, the work ethic was very high, i.e. q_{1950} close to 1. One justification for this is historical. Indeed, it is unlikely that those who survived World War II, many of whom would have been willing to risk their life for the nation, would be inclined to take unfair advantage of government-provided benefits. Another justification, which is more in line with our model, is that the deterioration of the work ethic was due to the creation, or wide expansion in coverage, of generous unemployment insurance after World War II¹⁶.

This last explanation could easily be built into the model by assuming that the merit of having a low, rather than high, work ethic is increasing in the generosity of unemployment benefits. Thus, we assume:

$$m_L = \left(1 + k \frac{b(q_t)}{w - t(q_t)} \right) m_H, \quad (37)$$

where $k > 0$ is a fixed parameter. Before the creation of unemployment insurance, the replacement ratio was close to zero, and, hence, oblique cultural transmission was unbiased, i.e. $f(q) = q$, implying that the work ethic could not deteriorate from one generation to the next. The fall in values was then triggered by the provision of generous unemployment insurance.

It should be emphasized that equation (37) is an extension¹⁷ to the model of the previous section as it adds a discontinuity in f at \tilde{q} . From equation (28), this generates a discontinuity in $q_{t+1}(q_t)$ at \tilde{q} that we previously did not have. However, we shall not focus on the new possibilities that this could generate. The intuition for this discontinuity is that, if

¹⁶ In many European countries, unemployment insurance was created in the 1930s and widely extended just after World War II. Furthermore, as the baby boom generation was born in the late 1940s and early 1950s, for the purpose of cultural transmission, it is reasonable to consider that the system was created in 1950. In France, it was created in 1946.

¹⁷ It could be objected that the specification of the relative merit of type L and H given by equation (37) should influence the voting behaviour of adults. To solve the problem, it could be assumed that in the total utility of parents, given by equation (19), the first term, corresponding to direct gratification from market activities, weigh much more than the second term, corresponding to cultural transmission. Alternatively, we could assume that rebellious children are forward looking and only care about the replacement ratio that will be prevailing next period, i.e. in (37) $b(q_t)$ and $t(q_t)$ should be replaced by $b(q_{t+1}^e)$ and $t(q_{t+1}^e)$, and that the creation of unemployment insurance came as a surprise in 1950. However, we keep the specification of equation (37), which seems to be the most sensible, and assume that this does not influence voting behaviour, which also seems quite realistic.

the first policy, (8), is implemented, i.e. $q_t > \tilde{q}$, then the level of benefits is very high which make rebellious children keen to adopt type L. But this might lead to a drop in work ethic next period, inducing the implementation of the second policy, (9), associated to a lower replacement ratio, which should decrease the attractiveness of having type L. This results in a fluctuation of the economy between $q_t > \tilde{q}$ and $q_t < \tilde{q}$, i.e. between the implementation of the first and second policy. Note that this discontinuity in f , unlike the one in ΔV , does not lead to the non-existence of a rational expectation equilibrium as q_{t+1} is defined for all values of q_t in the neighbourhood of \tilde{q} .

For the calibration, we use the parameter values of table 1.

Table 1: Exogenous parameter values

w	p	θ	ϕ	γ	β	α	k	q_{1950}
					200			
10	0.02	4	0.006	0.006	400	2	2	0.98
					2000			

Although reasonable, these values are somewhat arbitrary. The calibration of ϕ and γ , which is hard to interpret but nevertheless key to the cultural transmission process, deserves an explanation. Given the magnitude of the other parameters, the chosen value of γ implies that, in order to induce the low work ethic agents to work, the replacement ratio of unemployment insurance cannot exceed 37.5%, which sounds sensible. Similarly, the value of ϕ implies that for any net income from work above 37.9% of productivity¹⁸, here normalised to 10, type H agents would never choose to permanently live off unemployment insurance, regardless of the level of benefits. This is in line with the behaviour that is expected from high work ethic agents.

We will present three calibrations corresponding to the three types of equilibria depicted in figure 2, 3 and 4. For this, we just take three different values for β , which in the model denotes the intensity of parental altruism, but which could also be seen as a parameter of the cost function, C_H and C_L , as is clear from equation (21). So a high value of β either corresponds to strong altruism or to a low cost of cultural transmission. This is associated to a high value of q^* , when it exists.

Under the chosen calibration, the political equilibrium is characterised by $\tilde{q} = 0.887$. We also get $\hat{q} = 0.354$. Although, in the previous section, we focused on the case where

¹⁸ If this number seems too low, a much lower value of ϕ could be chosen. This would make the occurrence of the scenario associated to figure 4, rather than 2, much more likely; but would hardly change the calibrated rate of unemployment reported in figure 7.

$\hat{q} \geq 1/2$, this does not make any difference here as in the reported calibrations q never falls below a half. We can therefore restrict our attention to $q_t > 1/2$.

Whenever $q_t > \tilde{q} \geq 1/2$, type H agents choose to implement the first policy, (8), implying that only the Hs choose to work. Thus, unemployment is composed of type H agents who cannot find a job, which occurs with probability p , and of all type L agents who do not work and have no intention to do so. When $\tilde{q} > q_t > 1/2$, the second policy, (9), is implemented and everybody prefers to work, reducing the fraction of jobless to p . Hence, the observed rate of unemployment at time t is given by:

$$u_t = \begin{cases} q_t p + (1 - q_t) & \text{if } q_t > \tilde{q} \\ p & \text{if } \tilde{q} > q_t > 1/2 \end{cases} \quad (38)$$

The three calibrated time paths of unemployment are displayed in figure 5, 6 and 7 and correspond to β equal 2000, 400 and 200, respectively.

Figure 5: Convergence to stable equilibrium with high benefits

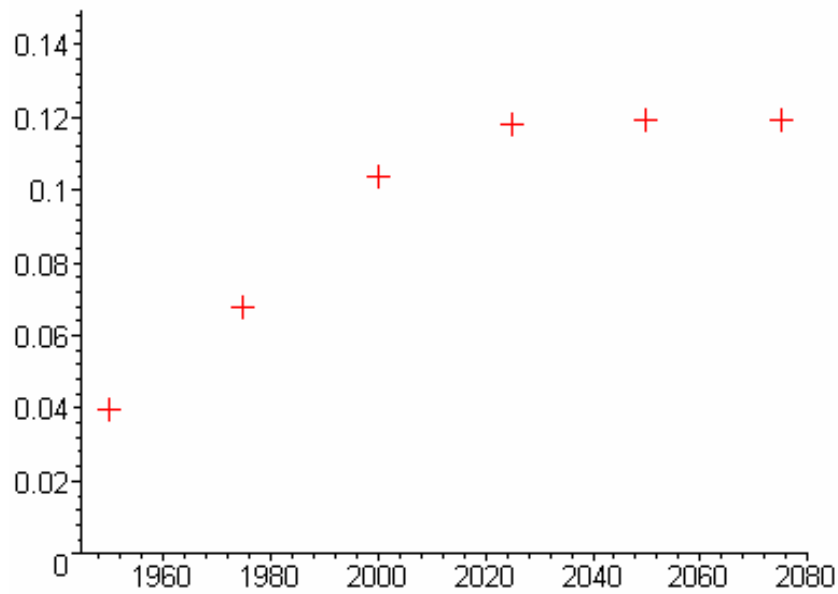


Figure 6: No rational expectation equilibrium in 2025 and beyond

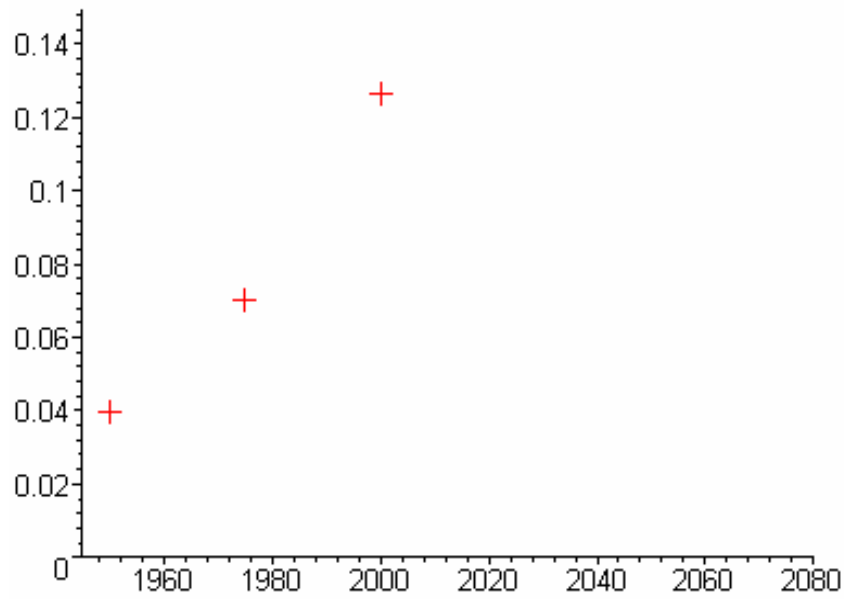
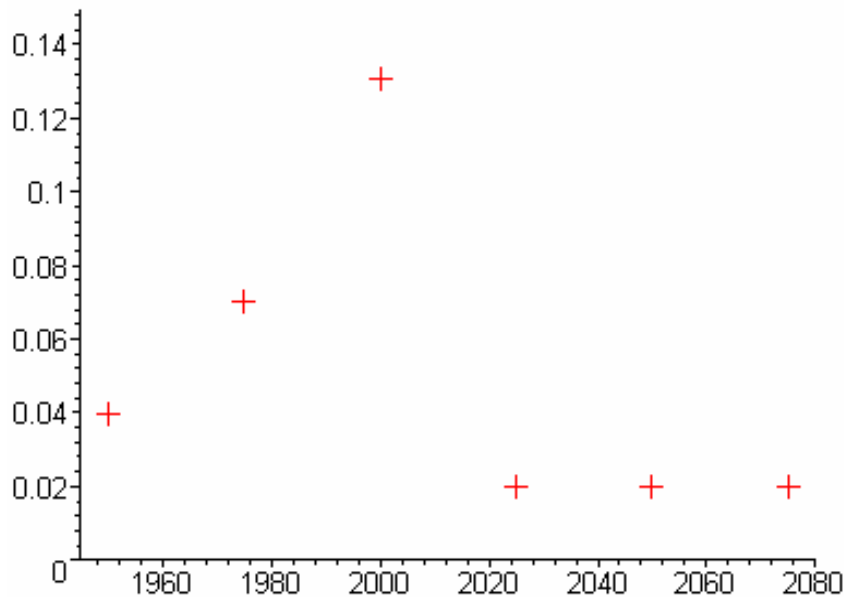


Figure 7: Convergence to a stable equilibrium with low benefits



In figure 5, the economy reaches a stable equilibrium that is above \tilde{q} . It corresponds to the case depicted in figure 2. As β is very high, the intensity of vertical cultural transmission is very strong, which prevents a large deterioration of values. According this scenario, we have almost already reached the long-run equilibrium in 2000 and the rate of unemployment will not change much in the future.

In figure 6, there is initially a fall in values until a no-rational-expectation-equilibrium point is reached in 2025. This case corresponds to figure 3 and it could indeed be checked that the dynamic equation (28) does not have any fixed point. The interpretation is that if parents

expect the system to be sustained, then they make a low investment in cultural transmission and, hence, more people will cease to work next period, thus threatening the sustainability of the policy. If, on the contrary, parents do not expect the system to be sustained, then cultural transmission is intense and, hence, the work ethic will be sufficiently high for the policy to be sustained.

Looking at the current political debate about the future of the welfare state in continental Europe, this story might be insightful. Indeed, on the one hand, many parents hope that their children will be able to benefit from generous welfare policies and from heavily protected public sector jobs, while, on the other hand, they realise that these policies are not sustainable if people continue to behave opportunistically. This situation leads to some confusion about the values that should be transmitted to the young generation. Our model suggests that these evolutions could be related to an absence of rational expectation equilibrium.

Finally, in figure 7, the rate of unemployment increases until it becomes so high that the second policy, (9), inducing everyone to work, is implemented. According to this scenario, corresponding to figure 4, the cost of providing generous unemployment insurance will become so important that European countries will choose to reduce the replacement ratio sufficiently to prevent the free-riding of type L agents. Indeed, in recent years, the level of unemployment insurance across European countries, if anything, has been on the decline, partly through tighter eligibility rules¹⁹. Note that, although unemployment remains low and constant beyond 2025, depending on the precise specification of f , the average work ethic might continue to deteriorate. As predicted in the previous section, the recursion might fall in the no-rational-expectation-equilibrium trap if we choose a slightly different initial value for q . And, indeed, for $q_{1950} = 0.979$, there is no rational expectation equilibrium in 2000 and beyond.

Although our model is able to replicate the main trend in European unemployment, it does not explain why the US experience was so different. In fact, we could also replicate the stagnation of US unemployment over second half of the twentieth century if we are willing to assume that workers are less risk averse in the US than in Europe, as some anecdotal evidence might suggest.

C/ Empirical Evidence

The usual way to test theoretical predictions involving values is to use survey data such as the *World Values Surveys* (WVS). The problem is that these have only been collected since the

¹⁹ The model could offer an alternative explanation for the recent decline in European unemployment. If the cost functions are not sufficiently convex, as required by proposition 1, then the convergence to q^* is non-monotonic, implying that unemployment fluctuates as values fluctuate from one generation to the next. Note that, as discussed in the text, such fluctuations could also be generated by the assumption embodied in equation (37).

1980s. The solution is to work with cohorts. Our prediction is simply that young generations have lower values than older ones.

We use the answer to the following question from the WVS: “*Please tell me whether you think it is always justified, never justified or something in between to claim government benefits to which you are not entitled*”. Respondents were asked to report an integer number between 1 for “*Never Justified*” and 10 for “*Always Justified*”. The WVS consists of three main waves, in 1980, 1990 and 2000, and this question was included in all three.

The model of the previous section assumes two dimensions to work ethic: willingness to work hard and honesty. It could reasonably be objected that the above question only captures the latter but not the former. However, the WVS only contains few questions related to willingness to work and these were only sporadically included in surveys. It could nevertheless be checked that, when available, the answers to these questions have the expected correlation with the propensity to cheat on government-provided benefits. For example, those who think that it is never justified to cheat also are “satisfied with [their] job”, “looking forward for work after weekend” and think that “work should come first even if this means less spare time”; the corresponding correlations being 13.6%, 19.1% and 8.7%, respectively.

In order to check whether work ethic has declined over time, as predicted by the model, we focus on the impact of an individual’s year of birth on his willingness to claim benefits to which he is not entitled. We obviously need to control for some key characteristics of the respondents. Algan and Cahuc (2008) are interested in the cross-country variation in values and therefore regress the answer to the same question on age, age squared, gender, level of education²⁰, political orientation, religion and nationality. We use the same controls, except for age for which we try different specifications, and add year of birth as an explanatory variable. We include all 18 West-European countries which are part of the OECD, i.e. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and Great Britain.

As, in our sample, about 63% of respondents think that it is never justified to claim government benefits to which they are not entitled, we just run a probit where 1 stands for “*Never Justified*” while 0 corresponds to any other answer, i.e. any reported number between 2 and 10. It could be checked that running an ordered probit would give very similar results. The marginal effects corresponding to the probit regression are reported in Table 2.

²⁰ It could be objected that the level of education of an individual is a consequence of his work ethic. It is nevertheless included in order to capture the structural increase in the length of education that occurred throughout the twentieth century. The cohort effect is smaller, but still strongly significant, when education is omitted.

Table 2: Probit estimation

Dependent variable: Never justified to claim government benefits to which you are not entitled			
	(1)	(2)	(3)
Year of Birth	-0.62*** (0.02)	-1.41*** (0.19)	-1.39*** (0.19)
Age		-0.81*** (0.19)	0.18 (0.22)
Age ²			-0.010*** (0.001)
Gender:			
Female	Reference	Reference	Reference
Male	-2.98*** (0.64)	-2.98*** (0.64)	-2.99*** (0.64)
Highest level of education:			
Lower education	Reference	Reference	Reference
Middle education	1.99** (0.78)	2.02*** (0.78)	1.89** (0.78)
Upper education	3.13*** (0.90)	3.08*** (0.90)	2.55*** (0.91)
Political orientation:			
Centre	Reference	Reference	Reference
Left	-3.28*** (0.77)	-3.29*** (0.77)	-3.42*** (0.77)
Right	1.50* (0.82)	1.50* (0.82)	1.61** (0.82)
Religion:			
No religion	Reference	Reference	Reference
Protestant	0.40 (1.13)	0.62 (1.14)	0.90 (1.14)
Roman catholic	3.21*** (0.96)	3.31*** (0.96)	3.32*** (0.96)
Muslim	-4.92 (5.06)	-4.80 (5.07)	-3.95 (5.06)
Jew	7.61 (6.83)	7.17 (6.88)	7.35 (6.91)
Buddhist	-31.18** (12.06)	-31.06** (12.11)	-30.57** (12.20)
Other Religion	4.25*** (1.59)	3.65** (1.62)	3.95** (1.61)
Country dummies	Included***	Included***	Included***
Pseudo R	0.0748	0.0753	0.0778
Number of observations	24941	24941	24941

Note: Marginal effects in percentage terms for average characteristics with the corresponding standard errors in parentheses. Significance: *** for 1%, ** for 5% and * for 10%.

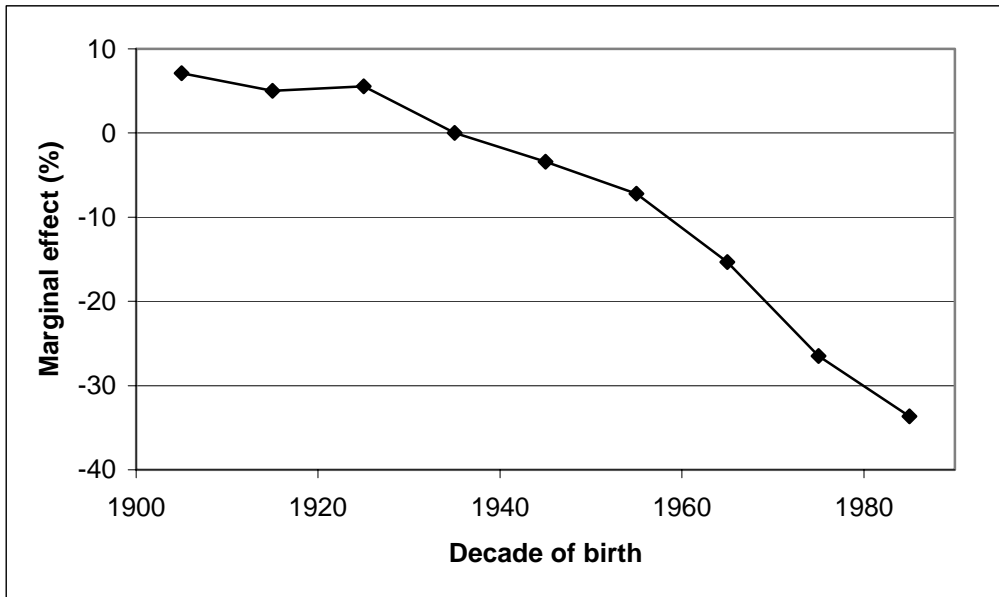
In line with our theoretical predictions, the first regression suggests a strongly significant negative effect of year of birth on work ethic. However, it could be objected that this result might simply be due to the omission of age from the regression. Indeed, it sounds reasonable that people adhere to more conservative values as they get older. As the data were only collected after 1980, those who were born a long time ago were older when surveyed. Hence, the negative coefficient on year of birth might just correspond to an age effect.

Fortunately, the data set contains three waves of surveys and, hence, we can control for both age and year of birth. However, the limits of this exercise should not be underestimated; we are trying to disentangle a cohort from an age effect while each cohort has only been observed for, at most, 20 years. Thus, our empirical specification regarding age is likely to be critical and we therefore try two possibilities: a linear and a quadratic effect of age. The second regression of table 2, corresponding to the linear effect of age, yields strongly significant estimates for both year of birth and age. Surprisingly, the coefficient on age does not have the expected sign, i.e. as people get older they find it more acceptable to claim benefits to which they are not entitled. This translates into an even stronger cohort effect. In the third regression, which allows for a quadratic effect of age, the coefficients implies that work ethic peaks before the age of 9 which does not seem very realistic.

Throughout this paper, we have assumed that values are acquired during childhood and remain unaltered thereafter. On the contrary, Lindbeck, Nyberg, Weibull (1999) and Lindbeck, Nyberg (2006) assume that, the larger the number of people adhering to a norm, the stronger it is felt by individuals. In fact, both effects are likely to play a role. If agents born a long time ago observe that younger generations have lower values, they might adjust their own values downward as they get older. This offers a possible explanation for the negative effect of age on propensity to cheat on publicly provided benefits.

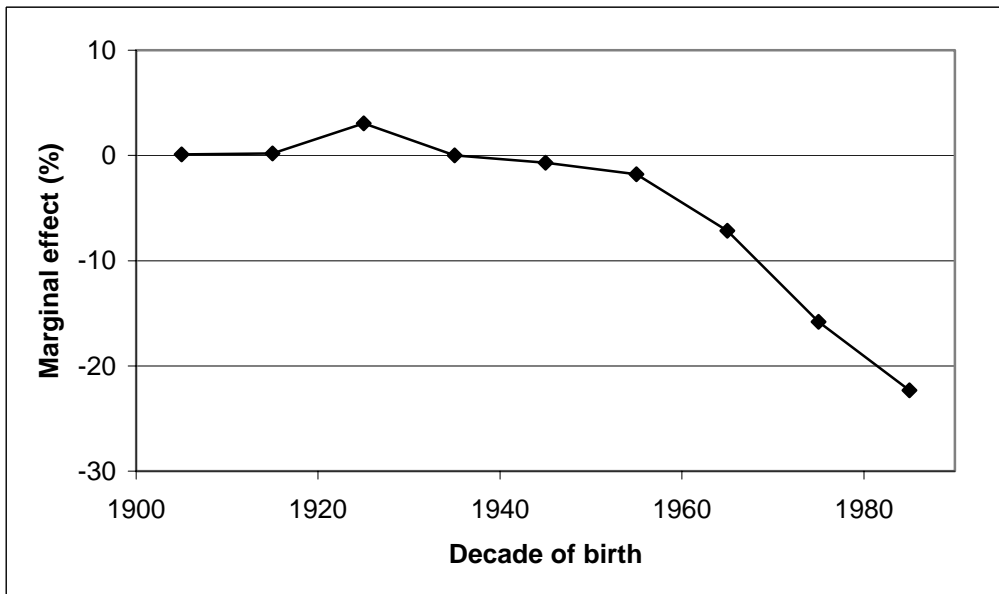
Clearly, one problem with the specifications of table 2, is that it imposes a linear effect of year of birth, whereas we have previously argued that values might have fallen faster at certain time, after World War II for instance. To address this issue, we run the same regression, but, instead of having a single control variable for year of birth, we use a dummy variable for each decade of birth, thereby allowing for non-linear effects. The marginal effects corresponding to each decade are plotted in figure 8, 9 and 10, where age is not included as a control in figure 8, enters linearly in 9 and quadratically in 10. The other parameters of the regression are not reported as they are very close to those given in table 2. The cohort of those born in the 1930s is chosen as the reference.

Figure 8: Effect of decade of birth on work ethic without controlling for age



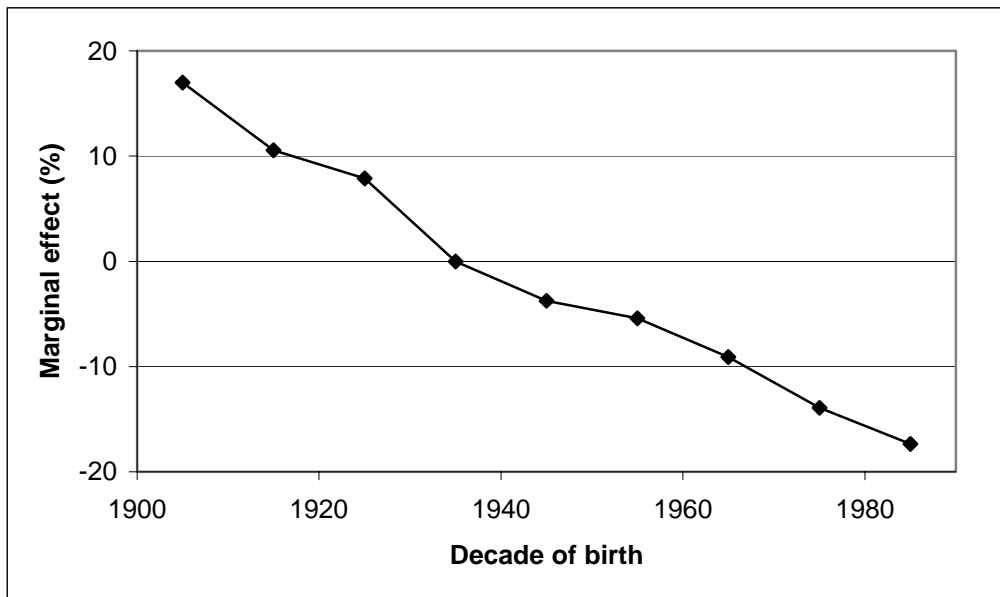
Note : The first point also includes all those born before 1900 (who are not very numerous).

Figure 9: Effect of decade of birth on work ethic allowing for a linear effect of age



Note : The first point also includes all those born before 1900 (who are not very numerous).

Figure 10: Effect of decade of birth on work ethic allowing for a quadratic effect of age



Note : The first point also includes all those born before 1900 (who are not very numerous).

Consistently with the evidence presented in table 2, all three figures show that values have declined over the twentieth century. This fall was large; in figure 9, for example, being born in the 1960s, rather than the 1930s, decreases the probability of answering “Never Justified” by 7.2%. Furthermore, figure 8 and 9 suggest an acceleration in the decline after World War II, consistently with our explanation of European unemployment. In the regression corresponding to figure 9, the coefficient on age is relatively small but of the expected sign, i.e. positive, and strongly significant. The quadratic specification associated to figure 10 yields that work ethic peaks at age 57, which seems reasonable. This suggests that the negative impact of age obtained in table 2 might be due to a misspecification of the year of birth effect. Again, these results related to age should be interpreted with care to the extent that their identification relies on a limited variation of age for a given cohort.

A typical concern with our identification strategy is that the results might be driven by a year effect which cannot be distinguished from the impact of age and year of birth. Note that our findings would only be invalidated by a negative trend, i.e. if people were more likely to answer “never justified” in the context of 2000 than in that of 1980. However, this problem is unlikely to be severe since all the data were collected between 1980 and 2000 and, in most European countries, the economic environment regarding the labour market and the welfare state has not changed dramatically during that period. It is therefore unlikely that a person of a given age and a given year of birth would have answered very differently in the context of 1980 than in that of 2000. Furthermore, given the magnitude of the impact of year of birth that we find, only a very large year effect would be problematic.

Using variables such as the rate of unemployment or output to proxy for a potential year effect would not be compatible with our model. Indeed, our theoretical work suggests that unemployment and output are endogenous and, at least partly, driven by the values held

by individuals. An alternative, which we follow, is to use the phase of the business cycle in which countries were when the surveys were performed, which we measure by the deviation of the annual real GDP growth rate from its average value²¹ from 1974 to 2006. These deviations are substantial, about 1.7% on average, and we might therefore expect answers to differ whether the country is in a boom or in a recession. In fact, when included in the regressions this business cycle effect is very far from significant and does not affect any other coefficients. All this suggests that our results are unlikely to be driven by a year effect.

Although not a full proof of our proposed explanation for the recent history of European unemployment, our empirical findings show that the key driving force that we have emphasized throughout, i.e. the decline in work ethic, was at work during the second half of the twentieth century.

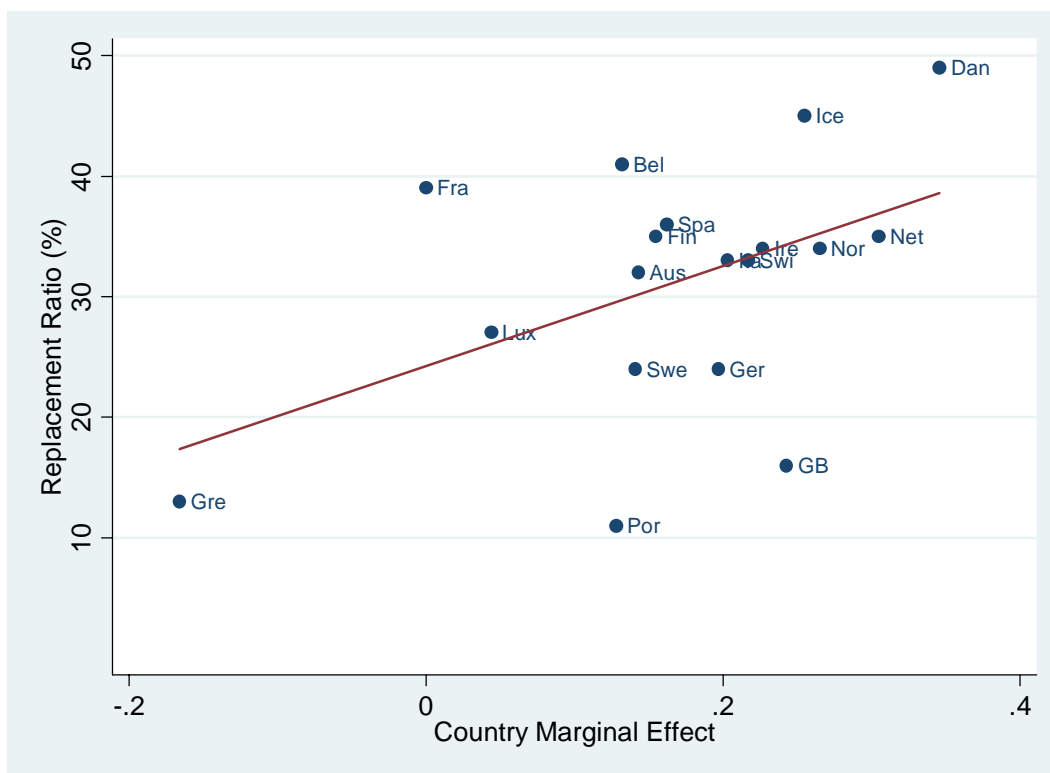
Another prediction of the model is that the average level of values held in a society has a positive impact on the generosity of unemployment insurance. This suggests a positive correlation between the country fixed effects obtained from the previous regressions and the corresponding replacement ratios. It is indeed reasonable to consider that country fixed effects are exogenous from the perspective of our model, which does not pretend to capture all dimensions of culture. This could be rationalised by differences in the deep parameters of the model such as, for instance, those affecting the cost functions or the bias in oblique cultural transmission. We obtain a 47.5% correlation between the country fixed effects²² and the OECD measure of replacement ratio²³ in 2005. This relationship, which is displayed in figure 11, is statistically significant at the 95% confidence level.

²¹ For almost all countries in our sample, we cannot reject at the 95% confidence level the absence of a trend in growth rate.

²² We use the marginal effects of country dummies of the regression corresponding to figure 9, i.e. the regression allowing for decade of birth dummies and a linear effect of age. Note that these are hardly distinguishable from the corresponding coefficients for the other specifications.

²³ A similar exercise was originally performed by Algan and Cahuc (2008) who focused on the ratio of unemployment benefits to employment protection, rather than just the unemployment benefits. They obtained a 70% correlation. This higher number is due to some substitutability between unemployment insurance and employment protection.

Figure 11: Correlation between unemployment insurance generosity and the values held in a country



Note: France taken as reference. (E.g., being British rather than French increases the probability of answering “Never Justifiable” by 24%.)

In an empirical investigation of the relation between culture and unemployment, Brügger, Lalive and Zweimüller (2008) provide some evidence in line with our theoretical predictions. In order to disentangle the effect of culture from that of policies on economic outcomes, they use a regression discontinuity design. The discontinuity is the language border between the German and the Latin, i.e. French and Italian, speaking parts of Switzerland, which does not coincide with the limit of any political jurisdiction. Exploiting the local results from six national referenda on working time regulations, they show that the Latin-speaking Swiss have a stronger taste for leisure. The length of unemployment is also longer on the Latin speaking side of the border. As the economic environment hardly differs between the two sides, it could be concluded that culture has causal impact on voting and working behaviour, consistently with what has been argued throughout this paper.

Finally, some other anecdotal evidence related to our work could be found in the literature. Using Swedish data, Ljunge (2006) documents that, after controlling for a bunch of observable characteristics, the sick leave participation rate of a young generation is 25% higher than that of a cohort born 20 years earlier. This strongly suggests that social norms do change from one generation to the next. Also, Lemieux and MacLeod (2000) report that a large increase in the generosity of unemployment insurance in Canada in 1971 was followed by a steady increase in the level of unemployment over the 20 consecutive years, which they attribute to a time-consuming learning process. Although the timing is a bit quicker than our

model would suggest, an evolution of preferences is likely to have played a role. Indeed, consistently with our model, the young generation, which entered the labour market once the generous benefits were already in place, had a much higher likelihood of benefiting from unemployment insurance than workers from older cohorts.

IV/ Conclusion

In this paper, we have presented a model where unemployment insurance and cultural values are jointly determined. On the one hand, the generosity of welfare benefits is affected by the extent of the moral hazard problem which depends on the average work ethic across the population. On the other hand, when deciding on their cultural transmission effort, parents form expectations about the policy that will be implemented in the future.

We have shown that, in the context of unemployment insurance, the interaction between the welfare state and work ethic sustains cultural heterogeneity over the long-run. On the contrary, Bisin and Verdier (2004) proved that if the welfare state is exclusively involved in redistribution, cultural homogeneity eventually prevails. The obvious question to ask in future research is which effect dominates when the government is involved in both social insurance and redistribution. Although a formal analysis would be required, long-run cultural heterogeneity would presumably prevail. This is explained by the fact that, as emphasized by Bisin Verdier (2004), the redistributive policy only has a vanishing impact on cultural transmission as the population becomes homogenous. Thus, the opposite effect of social insurance would dominate before complete homogenization is realised.

The model can generate a substantial lag between the introduction of a policy and a deterioration of work ethic. It can therefore explain why the consequences of similar policies could be different at different point in time. Hence, it provides a natural solution to the “European unemployment puzzle” due to the co-existence of institutional rigidities and low unemployment in the 1950s and 1960s. Relying on a simple calibration, we have argued that the introduction of unemployment insurance programs in the 1940s was followed, a generation, by a decline in work ethic, which has led to an increase in the number of non-working people registered as unemployed.

We were also able to make predictions about the likely long-term evolution of unemployment. If values do not fall further, unemployment will remain high; while if the work ethic continues to deteriorate, the generosity of unemployment benefits will decline sufficiently to prevent opportunistic behaviour and, hence, unemployment will drop. Finally, we have presented some empirical evidence suggesting that older generations do have higher values than younger ones, even after controlling for age. Thus, although unlikely to be the full story about European unemployment, our work suggests that the observed decline in work ethic is a key underlying trend explaining why the effects of labour market policies are now markedly different from what they were in the 1950s.

Clearly, our very simple and highly stylized model could be extended in a number of ways. Let's just mention a few directions. First, we could consider other labour market institutions. For instance, following Algan Cahuc (2008), we could allow the government to set a layoff tax. This would permit an analysis of the substitutability between unemployment insurance and employment protection legislations in an economy with cultural transmission.

Our calibration was simplistic in that it only consisted of one point every generation, i.e. every 25 years. If we allowed for overlapping dynasties, in order to gain in precision, we would have presumably obtained a steady increase in unemployment from the late 1960s until the 1990s, whereas in reality unemployment soared in the late 1970s and then remained high. These higher frequency movements could probably be reconciled with our model by allowing for the work ethic of adults to be affected by the behaviour of others, i.e. by allowing for horizontal cultural transmission. These effects are, indeed, at the heart of Lindbeck, Nyberg, Weibull (1999) and Lindbeck, Nyberg (2006) which assume that a social norm is felt more intensively as more people adhere to it.

Finally, this paper has shown that the very long-run labour supply elasticities could differ markedly from short ones. This is potentially important as, following Prescott (2004), a substantial amount of work has been done to try to attribute differences in the quantity of hours worked on both sides of the North Atlantic to differences in tax rates. The problem with this explanation is that it necessitates a higher elasticity of labour supply than microeconomic estimates typically suggest. Furthermore, hours of work continued to fall in Europe even after the level of taxes ceased to increase. Cultural transmission could potentially be an important part of the solution to this puzzle.

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Appendix 1: Proof of Lemma 1

If q_t is close to 1, then the first policy yields almost full insurance and is therefore preferred to the second policy which would need to satisfy the incentive compatibility constraint for L, (13). If the first policy is adopted and q_t is low enough, $q_t \leq \tilde{q}$ say, then type L workers would choose to work since the level of unemployment benefit that could be provided would be too low. But this implies that for $q_t \leq \tilde{q}$, type H would prefer the second policy. The proof can be completed by noting that, under the first policy, the welfare of type H is a strictly increasing function of q_t whereas, under the second policy, it is independent of q_t . Note that this proof implies that $\tilde{q} \in (\tilde{q}, 1)$.

Appendix 2: Proof of Lemma 2

If q_t is close to 0, then the second policy is preferred by L to the first one which would imply a very low level of unemployment benefits²⁴.

We need to proceed in three steps to prove that when q_t is close to 1, the first policy is preferred to the second:

1. If q_t is close to 1, then unemployment benefits are higher under the first policy than under the second. This is due to the incentive compatibility constraint, $U_i(W) \geq U_i(NW)$, that is tighter for L than for H. Thus, type L agents prefer to be inactive under the first policy than under the second²⁵.
2. If type L agents are working, under the second policy, then they would like to have full insurance, implying that the incentive compatibility constraint for L is binding. So, under the second policy, type L agents are indifferent between working and not working.
3. Hence, by a revealed preference argument, for q_t close to 1, type L prefer the first policy since not working under this policy is preferred to working under the second policy.

Again, the proof can be completed by noting that, under the first policy, the welfare of type L is a strictly increasing function of q_t whereas, under the second policy, it is independent of q_t .

²⁴ Remember that $\lim_{c \rightarrow 0} v(c) = -\infty$ is assumed.

²⁵ Remember that when L are not working, they just want to maximize the level of unemployment benefit that they receive.

Appendix 3: Proof of Lemma 3

By construction, at \hat{q} type L agents are indifferent between the first and the second policy. As under the second policy the incentive compatibility constraint for L is binding, this implies that at \hat{q} the level of unemployment benefits must be independent of the policy chosen by L. Nevertheless, the tax rate necessary to finance the unemployment benefits is lower under the second policy, where both types contribute, than under the first. Thus, at \hat{q} , workers of type H strictly prefer the second policy to the first. This leads H to choose a higher threshold than L.

Appendix 4: Proof of Lemma 4

Let's assume for a contradiction that for a given q_t there exists two corresponding values of q_{t+1} , i.e. q'_{t+1} and q''_{t+1} with $q''_{t+1} > q'_{t+1}$. As ΔV is non-increasing in q , we must have:

$$\Delta V(q''_{t+1}) \leq \Delta V(q'_{t+1}).$$

But, as C_i is strictly convex, $C_i'^{-1}$ is strictly increasing. Thus, it follows that:

$$\begin{aligned} & f(q_t) + (1-f(q_t))[q_t C_H'^{-1}(\beta(1-f(q_t))\Delta V(q''_{t+1})) + (1-q_t)C_L'^{-1}(\beta(1-f(q_t))\Delta V(q''_{t+1}))] \\ & \leq f(q_t) + (1-f(q_t))[q_t C_H'^{-1}(\beta(1-f(q_t))\Delta V(q'_{t+1})) + (1-q_t)C_L'^{-1}(\beta(1-f(q_t))\Delta V(q'_{t+1}))]. \end{aligned}$$

By equation (28), this implies:

$$q''_{t+1} \leq q'_{t+1},$$

which is a contradiction.

Appendix 5: Proof of Lemma 5

Implicit differentiation of $q_{t+1}(q_t)$ as determined by equation (28) gives:

$$\begin{aligned} & \frac{dq_{t+1}}{dq_t} \left[1 - \beta(1-f(q_t))^2 \Delta V'(q_{t+1}) \left(\frac{q_t}{C_H''(\tau_t^H(q_t, q_{t+1}))} + \frac{1-q_t}{C_L''(\tau_t^L(q_t, q_{t+1}))} \right) \right] \\ & = f'(q_t) [1 - q_t \tau_t^H(q_t, q_{t+1}) - (1-q_t) \tau_t^L(q_t, q_{t+1})] + (1-f(q_t)) [\tau_t^H(q_t, q_{t+1}) - \tau_t^L(q_t, q_{t+1})], \\ & - f'(q_t) \beta(1-f(q_t)) \Delta V(q_{t+1}) \left[\frac{q_t}{C_H''(\tau_t^H(q_t, q_{t+1}))} + \frac{1-q_t}{C_L''(\tau_t^L(q_t, q_{t+1}))} \right] \end{aligned}$$

where:

$$\tau_t^i(q_t, q_{t+1}) = C_i'^{-1}(\beta(1-f(q_t))\Delta V(q_{t+1})).$$

We now need to substitute $q_t = 1$ into this equation, to use the fact that $f(1) = 1$ and to recall that, by assumption, $C_i''(0) > 0$. It follows that:

$$\frac{dq_{t+1}(1)}{dq_t} = f'(1) > 1,$$

where the last inequality follows from the fact that $f(1) = 1$ and $f(q) < q$ for all $q \in (0,1)$.

Appendix 6: Proof of Lemma 6

The proof of this lemma is similar to that of lemma 4. At q_+ the first policy, (8), is implemented while at q_- the second one, (9), is. Thus, from equation (27):

$$\lim_{\substack{q_t \rightarrow q_+ \\ q_t > q_+}} \Delta V(q_{t+1}(q_t)) < \lim_{\substack{q_t \rightarrow q_- \\ q_t < q_-}} \Delta V(q_{t+1}(q_t)) = \phi.$$

Substituting this in the right hand side of equation (28), it immediately follows that, if $q_- = q_+$, then:

$$\lim_{\substack{q_t \rightarrow q_+ \\ q_t > q_+}} q_{t+1}(q_t) < \lim_{\substack{q_t \rightarrow q_- \\ q_t < q_-}} q_{t+1}(q_t),$$

which is a contradiction (as by definition of q_+ and q_- , given by (31) and (32), both sides should be equal to \tilde{q}).

Now, we still have the possibility that $q_+ < q_-$. However, this would imply that there exists multiple equilibria for $q_t \in (q_-, q_+)$, which, by lemma 4, cannot be the case²⁶. We must therefore have $q_+ > q_-$.

²⁶ The proof of lemma 4 uses the fact that ΔV is non-increasing in q . In fact, here, all we need is that, whenever q is such that the first policy, (8), is implemented, $\Delta V(q) < \phi$.