The Evolution of Ideology, Fairness and Redistribution

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Abstract

Ideas about what is "fair" above and beyond the individuals' position in the income ladder determine preferences for redistribution. We study the dynamic evolution of different economies in which redistributive policies, perception of fairness, inequality and growth are jointly determined. We show how including fairness explains various observed relationship between inequality, redistribution and growth. We also show how different beliefs about fairness can keep two otherwise identical countries in different development paths for a very long time.

1 Introduction

The poor want to tax the rich, but that is not all what determines redistributive policies. Ideas about what is "fair" and views about what is an acceptable level of inequality above and beyond the individuals' position in the income ladder also matter.[1] The same level of inequality may be more or less acceptable by different individuals in different countries depending upon their beliefs that wealth has been accumulated with effort and ability rather than by luck, connections or even corruption. In one word whether different levels of income and wealth are "deserved" or not.[2] These views about inequality and justice (which we may label "ideology") determine tax rates and the evolution of the distribution of income and wealth. But the latter itself generates changes in the proportion of income inequality due to effort or to other factors including luck and government intervention, thus changing individual views about redistribution.

In this paper we provide a politico economic model that can trace over time the evolution of polices (tax rates and transfer schemes), the evolution of

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[1] See for instance the recent survey of preferences for redistribution by Alesina and Giuliano (2010) and the references cited therein. Alesina, Di Tella and McCulloch (2004) discuss different level of inequality tolerance in various countries.

[2] See Fong (2001), Alesina and La Ferrara (2005) and Alesina and Giuliano (2010).

inequality, and the evolution of preferences for redistribution, as a function of changes in what is perceived as fair and unfair income differences. The introduction of fairness in the perception of people regarding inequality reconciles several empirical observations which would be inconsistent with models based upon individual income (and position in the income ladder) as the only determinant of voter views about taxes and transfers.

In our model different generations of voters are linked by bequest, thus redistributive policies in the past and past beliefs about what was fair (or both) influence current generation views about fairness and inequality. These intergenerational links lead to long lasting effects of current policies. We are especially interested in two types of experiment. One is how different initial conditions in different countries lead to long lasting differences in policies. The other issue we study is how shocks to inequality imply different policy reactions.

Regarding the former experiment we can study not only differences in the initial conditions of the economic system, but also, and perhaps more interestingly, differences in views about social justice and views about the fairness of the inherited (at time zero) level of inequality. For instance two countries may be completely identical except for their views about the fairness of their initial inequality, and as a result they may adopt different redistributive policies over a long period of time which determines different income and inequality dynamics. These different patterns of taxation, inequality, and growth would be completely unexplainable without reference to initial views about what is fair or not, i. e. about social justice. The same applies when the two identical countries have different views about what is "fair" in terms of inequality. These examples allow us to explain, for instance, different levels of redistribution between the US and Europe and their persistence along the lines of Alesina and Glaeser (2004) who stressed, informally, the role of the perception of poverty as an explanation of US versus Europe. We also show that for some parameter values economies with different initial beliefs but otherwise identical converge slowly to the same steady state. But for other parameter values identical economies but with different initial beliefs converge to two different steady states, thus their differences persist forever.

Another implication of our simulation is that, contrary to standard result from a Meltzer and Richard (1981) framework, more inequality may be associated with less redistribution. This is because different levels of measured inequality may be considered more or less fair. In addition, we can also analyze the case of different weights of rich and poor in the voting mechanism[3].

The second set of results concerns the effect of shocks to income inequality like those generated by wars (Piketty and Saez, 2003) or possibly the 2008-2009 financial crisis. We show how shocks to inequality may generate very different policy reactions depending on the perception of individuals about who lost and who gained, namely if those who lost were those who were rich because of "luck" (broadly defined) or were those who had become rich because of effort

[3] See in fact Perotti (1996) and Bénabou (1996) for empirical evidence regarding this relationship.

and ability. Thus the same measured changes in inequality may have different effects on changes of redistributive policies depending on the nature of how these shocks are perceived. An innovative feature of our model is that we can trace precisely the evolution of income, inequality, and redistributive policies, but also the views about : "fairness" in society, that is we can measure how much of the observed inequality is considered acceptable and fair and which part is not and we can experiment on shocks to these views.

This paper is related to the work of Alesina and Angeletos (2005a,b) but it is much richer in its dynamic dimension and it has a different voting mechanism. We adopt as our benchmark the same definition of fairness as theirs, but we also analyze different definitions and we emphasize the transition to the steady state, which may take a long time. Also, unlike those authors who use a median voter model, we adopt a probabilistic voting framework, which is a more flexible tool to analyze various types of distribution of political "power". The influence of beliefs about effort as a determinant of redistributive policies has been analyzed in a different context by Bénabou and Tirole (2006). In their paper, beliefs are not shaped only by actual data, but also by agents' targets and psychological needs. In the present paper beliefs are consistent with reality. The fact that past experiences and views about history affect beliefs is consistent with Piketty (1995) who analyzes the dependence of the redistributive preferences on past income.

The present paper is organized as follows. Section 2 describes the model: both the economy and the political aspects of it, and the equilibrium. Section 3 illustrates the dynamic evolution of the model and performs several experiments. The last section concludes. The Matlab codes used in the present paper are available from the authors upon request.

2 The economy

We have non overlapping generations of individuals, indexed by t. Population is constant, there is one active individual per-family, and the total mass of families is normalized to the unit interval. Each individual, indexed by $i \in [0,1]$, lives for one period and is characterized by a certain level of disutility of effort, $\beta_i > 0$, luck, $\eta_i \in R$, and inner abilities, $A_i > 0$. These family-specific variables are fully persistent over time. Each individual i cares positively about how much of her wealth to consume, c_{it}, and how much capital to bequeath to the next generation, k_{it}, and negatively on his/her effort, e_{it}, on the job. All choice variables are constrained to be non-negative. The private utility function is:

$$u_{it} = \frac{1}{(1-\alpha)^{1-\alpha}\alpha^{\alpha}} c_{it}^{1-\alpha} k_{it}^{\alpha} - \frac{1}{2\beta_i} e_{it}^2,$$

$0 < \alpha < 1$. The final life pre-tax income is:

$$y_{it} = A_i e_{it} + \eta_i + k_{it-1}, \tag{1}$$

Let w_{it} denote final life post-tax and transfer wealth. Each generation votes on the tax rate, τ_t, which is proportionally applied to end-of-life income y_{it}. All tax revenues are to be redistributed lump sum to all individuals. Hence,

$$w_{it} = (1 - \tau_t) y_{it} + G_t \tag{2}$$

where $G_t = \tau_t \int_0^1 y_{it} di$ is the percapita public transfer. Government budget is always balanced.

This warm glow intergenerational altruism implies that fraction α of her end of life wealth is bequeathed, as seen by maximizing u_{it} subject to $c_{it} + k_{it} = w_{it}$. Therefore, plugging the optimal consumption and bequest into the private utility function, we obtain:

$$u_{it} = w_{it} - \frac{e_{it}^2}{2\beta_i}. \tag{3}$$

Individuals vote on taxation at the beginning of life, before the effort choice is taken. Maximizing u_{it}, using (3), (1), and (2), gives

$$e_{it} = (1 - \tau_t) A_i \beta_i,$$

which shows that individual effort gets discouraged by expected taxation, and is increasing in the individual work ability and decreasing in the disutility of effort[4].

The definition of a period in which a tax rate is constant for one generation, identified as period, needs discussion. The equilibrium of the model is found below by computational methods and not in closed forms. it would be relatively straightforward to allow many periods within one generation and allow for a vote an a tax every period, so many votes and possible tax changes within one generation. However this complication would make the interpretation of the simulation more cumbersome and heavy. In addition, the choice of a "tax rate" should not be interpreted as the day to day or year to year changes in fiscal policy, but the broad redistributive stand of a certain period in a certain country. Say more redistribution in the US with the Great Society in the sixties, or with the New Deal in the Thirties, less redistribution with the Reagan revolution and what followed. In Europe an increase in redistribution at the end of the sixties, etc.

[4] As in Heckman (2008), we could distinguish between cognitive abilities (here summarized by A_i) and non-cognitive abilities ($1/\beta_i$).

2.1 Inequality and fairness

In addition to the standard utility function, we postulate that utility also depends negatively on some measure of inequality, i.e of income dispersion in society. In our benchmark case, as in Alesina and Angeletos (2005a) we posit that individuals tolerate inequality coming from innate ability and effort, but are averse to inequality coming from everything else, luck and taxation. More specifically, let us define "fair" utility and wealth as follows:

$$\begin{aligned} \widehat{u}_{it} &= \widehat{w}_{it} - \frac{e_{it}^2}{2\beta_i}, \\ \widehat{w}_{it} &= A_i e_{it} + \widehat{k}_{it-1}. \end{aligned}$$

As mentioned before, each agent chooses $k_{it} = \alpha w_{it}$, where α represents the generosity towards the next generation. Moreover, we can define fair consumption, fair bequest, and fair disposable wealth as:

$$\widehat{c}_{it} = (1-\alpha)\widehat{y}_{it} \qquad \widehat{k}_{it} = \alpha\widehat{y}_{it} \qquad \widehat{y}_{it} = \widehat{w}_{it} = A_i e_{it} + \widehat{k}_{it-1}. \tag{4}$$

The generation t individual i utility, U_{it}, is defined as:

$$U_{it} = u_{it} - \gamma\Omega_t, \tag{5}$$

where

$$\Omega_t = \int_0^1 (u_{jt} - \widehat{u}_{jt})^2 dj = \int_0^1 (w_{jt} - \widehat{w}_{jt})^2 dj. \tag{6}$$

and $\gamma > 0$ is the parameter which measures the importance of unfairness for society. This representation of utility implies that individuals in society dislike deviations from a distribution of wealth/utility in which everybody gets ONLY the benefits from effort and innate ability. Note that the difference between total wealth and fair wealth is due to luck and government intervention with taxes and transfers. The higher the tax rate, the lower the equilibrium choice of effort; therefore the larger is the percentage of individual income due to luck rather than effort, and the larger the proportion of differences across individuals due to luck rather than effort. In addition, to the extent that government transfers are NOT included in the definition of fair income because not due to effort, this is an additional channel through which higher taxes induce a higher proportion of income perceived as not fair over the fair portion.

While this is our benchmark case we also consider other cases in the numerical simulations of the model. In particular we consider situations in which tax and transfers are considered part of fair wealth: cases in which the effect of A_i as part of luck, i.e. being born smart is a lucky event; finally, we consider the case in which individuals dislike inequality per se, namely any deviation of wealth and utility from equality for all at the average is costly. We will indeed compare the dynamic evolution of the economy under these different assumptions about tolerance for inequality and the definition of fairness.

2.2 The polity

As for the political process, we use a probabilistic voting model[5]. Thus we assume that there are two parties - L, for "left", and R, for "right" - each of which simultaneously and credibly commits to a tax rate $\tau_P \in [0,1]$, $P = L$, R, at the beginning of each period - coinciding with a generation. The individuals vote for a party at the beginning of their life. Then the individuals choose efforts. The party that obtained the majority of the votes is the only one in office, and it will apply the announced tax rate (to end of life incomes) and will redistribute accordingly. Finally, individuals choose their consumption and bequest.

Individuals have heterogeneous degrees of political party identification[6]: in fact, the complete utility function is the following:

$$\tilde{U}_{itP} = u_{it} - \gamma\Omega_t + (\sigma_{it} + \varepsilon_t)\chi_L(P), \text{ where } P = L, R.$$

Variable P denotes the party that wins the election, and can take on values L (meaning "left") or R ("right"). Indicator function $\chi_L(P)$ takes on value 1 if $P = L$ and 0 if $P = R$. Random variable σ_{it} represents individual i's pro-party L ideological bias, while ε_t is an aggregate random variable capturing party L's popularity for generation t. While we assumed (for simplicity) that pecuniary utility shocks are fully persistent across generations, that is $\beta_{it} = \beta_i$, η_{it}=η_i, and A_{it}=A_i, political popularity may change from generation to generation both at the aggregate and at the family level. Each generation, ε_t will be uniformly distributed on support $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$, and individual specific variables σ_{it} are uniformly distributed on support $\left[-\frac{1}{2\varphi_i}, \frac{1}{2\varphi_i}\right]$. All random variables are independent. Therefore, in the support of the corresponding random variables, the density function of aggregate popularity of party L is $\psi > 0$, and family-specific density functions are $\varphi_i > 0$, and the correlated (aggregate) component of the party identification is assumed less variable than the individual component, that is: $\psi > \varphi_i$, $\forall i \in [0,1]$. The two parties commit to their candidate tax rates before they know the realization of the random variables ε_t and σ_{it}. They only care about winning the election, and hence choose their policies τ_t^D and τ_t^R by trying to maximize the probability of being elected, p_P, $P = L$, R. This is consistent with maximizing the expected rents from being in office[7].

[5] Note that this voting model does not require single peakness of preferences and has other desirable properties. See Persson and Tabellini (2000) for an excellent presentation of it.

[6] Lindbeck and Weibull (1987 and 1993).

[7] Let $\Pi^P > 0$ denote the (non-transferable) ego rent of party $P = L$, R, from being in

2.3 Equilibrium

After simple substitutions, and momentarily neglecting the party L bias component, we obtain the indirect utility function of each individual in each generation. That function ultimately depends on exogenous parameters, on expected taxation and on all the wealth distribution of the previous generation:

$$
\begin{aligned}
U_{it} &= (\delta_i(1-\tau_t)+\eta_i+k_{it-1})(1-\tau_t)+\int_0^1(\delta_j(1-\tau_t)\tau_t+\tau_t k_{jt-1})dj-(1-\tau_t)^2\frac{\delta_i}{2} \\
&-\gamma\int_0^1\left[(\delta_s(1-\tau_t)+\eta_s+k_{st-1})(1-\tau_t)+\int_0^1(\delta_j(1-\tau_t)\tau_t+\tau_t k_{jt-1})dj-\delta_s(1-\tau_t)-\widehat{k}_{st-1}\right]^2 ds \qquad (7) \\
&\equiv \hat{U}_{it}(\tau_t).
\end{aligned}
$$

Where $\delta_i \equiv A_i^2\beta_i$. It is straightforward to see that (the proof is in Appendix):

Lemma 1. *In pairwise majority voting, there will exist a unique equilibrium in which the two parties will select the same policy variable, $\tau_t^L=\tau_t^R\equiv\tau_t^*$, given by*

$$\tau_t^* = \arg\max_{\tau_t\in[0,1]}\int_0^1\varphi_i\hat{U}_{it}(\tau_t)di. \qquad (8)$$

As in other probabilistic voting models, the same equilibrium policy variable would also be chosen by a biased social planner who maximized the following weighted aggregate welfare functional:

$$W(\tau)\equiv\int_0^1\varphi_i\hat{U}_{it}(\tau_t)di,$$

with each individual's indirect utility function (where effort, consumption, and bequest are all optimal) being weighted inversely to vulnerability, $1/\varphi_i$, to party-related attributes. In the special case of individuals who have the same densities $\varphi_i=\varphi$, Lemma 1 implies that $\tau_t^*=\arg\max_{\tau_t}W(\tau_t)$ would coincide with the tax rate chosen by a social planner who adopts a utilitarian welfare functional. Notice that, from eq. (7), the equilibrium tax rate τ_t^* will depend on generation $t-1$'s bequest distribution k_{t-1}, generation $t-1$'s fair bequest distribution $\widehat{k}_{t-1}$, and of course the parameter vectors δ and η; that is $\tau_t^*=\tau^*(k_{t-1},\widehat{k}_{t-1},\delta,\eta)$.

office, the expected rent of party L will be $\Pi^L p_L=\Pi^L(1-p_R)$; whereas party R maximizes $\Pi^R p_R=\Pi^R(1-p_L)$.

2.4 Intergenerational Links

The equilibrium tax rate τ_t^* determines the level of capital and fair capital for each family of the current generation. Therefore the link between different generations is summarized by the dynamics of k_{it} and $\widehat{k}_{it}$:

$$k_{it} = [\delta_i(1-\tau_t) + \eta_i + k_{it-1}]\,(1-\tau_t)\alpha + \alpha G_t \tag{9}$$

$$\widehat{k}_{it} = \alpha\delta_i(1-\tau_t) + \alpha\widehat{k}_{it-1}. \tag{10}$$

.

2.5 Discussion

Note that in eq. (10), “fair” bequest - i.e. of fair initial wealth, over the generations - are obtained by removing from the parental end of life wealth the effects of the “luck” variable, η_i, and of the taxes paid to and transfers received from the other individuals by government imposition. However, the indirect effect of tax rates on individual efforts is included in this definition of fairness. The reader may wonder why "$(1-\tau_t)$" should enter the "fair income": after all, it is an individually rational response to the distortion induced by taxation, and indeed $e_{it} = (1-\tau_t)A_i\beta_i$, If redistribution did not exist in the model, the individual would have exerted a first best effort level $e_{it}^F = A_i\beta_i$. We have run simulations under such a different view of fairness, based on "potential" rather than actual efforts, without much change in the results about the dynamics of k_{it}. By eq. (10), it simplifies the dynamics of $\widehat{k}_{it}$, which would tend to $\frac{\alpha\delta_i}{1-\alpha}$. However, the results of our computations do not change qualitatively.

Another objection could be raised against purging additive luck η_i rather than both luck and ability A_i. Formally, luck enters additively while ability as the marginal product of effort: both could be viewed as "gifts of nature". Replacing A_i with $\bar{A} = \int_0^1 A_i di$ would both be reasonable and consistent at the macroeconomic level (fair value added = actual value added). Using $\bar{A}e_{it} = \bar{A}(1-\tau_t)A_i\beta_i$ as the valued added component of the end-of-life wealth, however, would not change the qualitative results much, as actual individual ability, A_i, would still enter multiplicatively indirectly via optimal effort choice. Purging this effect too, in addition to neglecting macroeconomic consistency, would not change much[8].

[8] Notice that, while in the previous case replacing A_i with its expected value in the direct abilities reduced the variance of δ_i (due to the elimination of the quadratic exponent on abilities), eliminating the variance of A_i completely could even increase the variance of δ_i.

3 Intergenerational Dynamics

Starting from an initial vector of actual and fair wealth levels, $(k_{i0}, \hat{k}_{i0})_{i\in[0,1]}$, we can iterate the model and determine the intergenerational evolution of $(k_{it}, \hat{k}_{it})_{i\in[0,1]}$ and τ_t^* for all $t \in N$. We use equations (7), problem (8), and eq.s (9) and (10), which, once iterated for an arbitrary number of generations, allow calculating the whole sequence of equilibrium values of the endogenous variables of our dynamic economy with an arbitrary number of agents, for all parameter vectors, initial wealth distribution, and initial fair wealth distribution. By simulating the model for a sufficiently high number of generations, we can approximate the stable steady state value of the endogenous variables associated with each initial condition. The Matlab codes we have used to generate our examples are available upon request.

It is important to notice that generation t's pair of distributions $(k_{it}, \hat{k}_{it})_{i\in[0,1]}$ describe the interaction of real and "ideal" variables at time t. More precisely, the comparison between how society currently is - the actual distribution $(k_{i0})_{i\in[0,1]}$ - and how society thinks it "should be" - the fair distribution $(\hat{k}_{i0})_{i\in[0,1]}$ - sets the goals of the political action; together with the method of political competition - i.e. pairwise majority voting - this describes the political ideology prevailing for generation t in that economy. The resulting political equilibrium generates the evolution of $(k_{it+1}, \hat{k}_{it+1})_{i\in[0,1]}$, and therefore the political ideology (i.e policy goals) prevailing in the next generation. Thus we trace the evolution of ideology, fairness and redistribution, as well as the aggregate GDP percapita. We focus our attention on the effects of:

1. different initial beliefs about the fair wealth distribution (sub-section 3.1).
2. different initial inequality (section 3.2).
3. alternative formulations of the fairness concepts (section 3.3).
4. different initial levels of aggregate wealth: poverty traps (section 3.4).
5. temporary shocks to wealth inequality (section 3.5).

3.1 Different Initial Ideas of Social Justice

As suggested by Alesina and Angeletos (2005a), and Alesina and Glaeser (2004), part of the long term differences in the welfare states in US and Europe can be explained by the interplay of initial conditions and ideas of fairness. A society where citizens believe that the observed cumulated wealth differences are derived from previous family luck will choose to redistribute more than a society in which voters think that the current capital accumulation depended on past efforts and talents: the idea of social justice influences the fiscal policy and affects the real variables in the economy. In Europe, preexisting forms of feudalism and wealth related to nobility differed from the US, where modern capitalism developed without a long previous history of privilege and class differences. Marxist thinkers like Engels in fact correctly predicted that precisely for this reason communist parties would have had a harder time in establishing themselves in the US rather than in Europe.

In this section, we simulate the dynamics of two societies, characterized by identical real economic and personal characteristics, but with *different initial ideas* of the fair wealth distribution. In the first country, A, every individual of generation 0 believes that all wealth levels of their cohort should be equal to be fair. At the other extreme, the citizens of country B are initially convinced that the prevailing capital distribution is exactly the fair one.

To correctly interpret the simulations in Figure 1a below, the reader should imagine two economies identical in all market fundamentals, including inequality, but that at some point in their history a generation occurred to judge differently the (same!) prevailing wealth distribution. In fact, our "period zero" is simply the start of our period of interest, but, of course, a long history might have preceded the "initial generation" we are considering, which otherwise would have started with no initial capital.

Therefore a different way of interpreting this results is this: all of the sudden in an unexpected matter a new generation is born with extremely egalitarian views, with a break of the past. Thus we study how a new egalitarian generation of individuals might affect the resulting political equilibrium and economic performance over the subsequent generations.

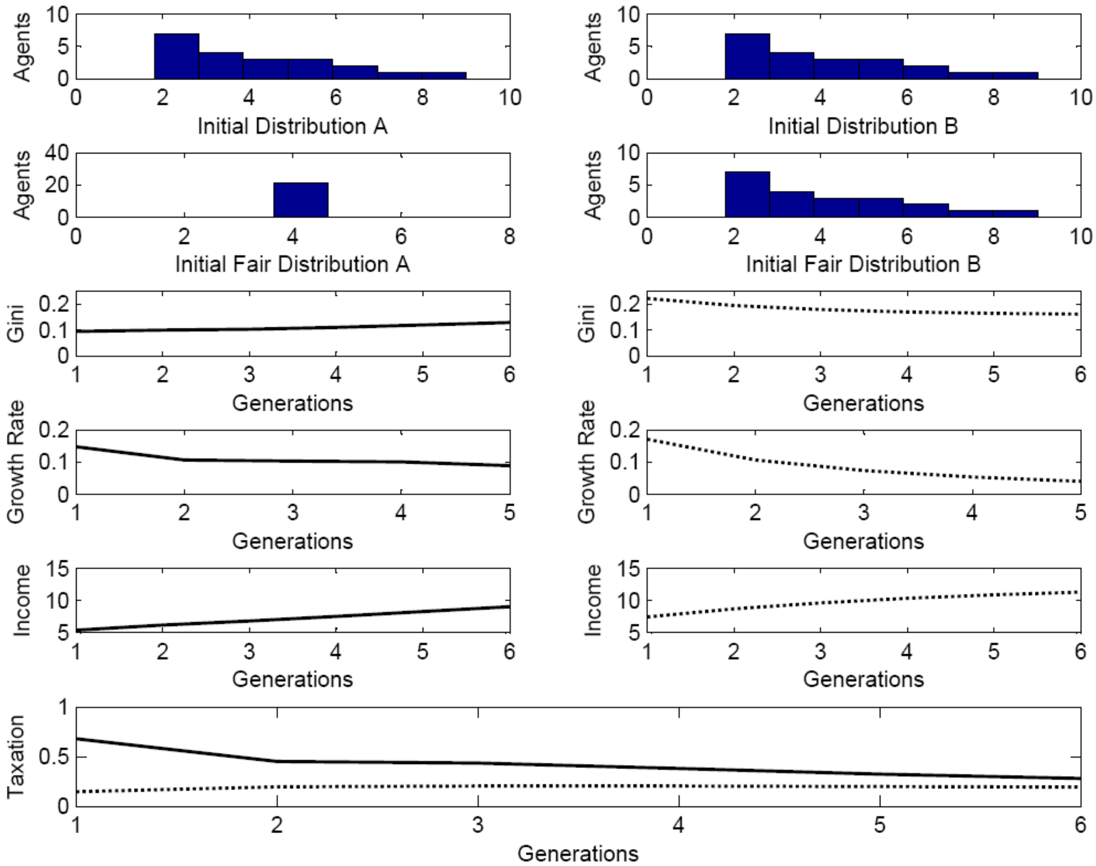

Figure 1a

Figure 1a shows that, as a consequence of a perception of unfairness in the initial wealth distribution, country $A's$ voters chose a very high tax rate in period zero. This reduces inequality (even in the first period), but it also induces the successive generation to consider unfair the part of their inherited wealths stemming from the redistribution driven unearned changes in their predecessors' wealth. To correct the combined sources of unfairness still requires high taxes for a sufficiently long sequence of generations. Meanwhile, this does not take place in country B, where as a consequence work effort is higher and capital accumulation faster.

Individual preferences and the equilibrium tax rate (something we can name ideology) evolve from generation to generation. Consider country A. The first generation judges all inequality unfair; the second generation will believe their parents' ideal of their generation's fairness, but it will attribute part of the current pre-tax inequality to the efforts and abilities of their generation's members: therefore the desired tax rate will be lower. Incidentally note that the high tax rate chosen by the first generation in country A will induce a relatively low choice of effort and work, and therefore the percentage of individual income due to lack is relatively high, thus the tax rate desired by generation 1 will still be relatively high. In country B the first generation will not tax inequality because they perceived it as fair. Obviously the chosen tax rate will not be zero due to the need for correcting the effect of luck on unfairness within their cohort. But then the following generation will perceive that some of the inherited inequality is due to luck and therefore will choose to tax it. Unlike country A, since the initial tax rate was quite low much of the inequality within generation 1 will be due to effort, not luck, and therefore the chosen tax rate will not be much higher than in period zero. This shows that the two countries will remain rather different in terms of policy goals and tax/transfer redistributive schemes for many periods/generations. Initial conditions matter much. Policy goals (ideology) evolve over time together with the evolution of the economy, but initial differences in perception imply long lasting differences across countries.

More precisely, let us review the evolution of ideology implicit in eq. (10): $\widehat{k}_{it} = \alpha\delta_i(1-\tau_t) + \alpha\widehat{k}_{it-1}$. Individuals belonging to generation t believe that every member of their cohort should bequeath a wealth level that reflects the bequest parental choice of a fraction, α, of their end of life income; however that fraction should have been taken provided they earned the "fair" end-of-life wealth, given by $\widehat{y}_{it} = \delta_i(1-\tau_t) + \widehat{k}_{it-1}$. Thus individuals believe in the idea of fairness of their parents (as from the presence of "$+\widehat{k}_{it-1}$" in the formula); however, since the term "$\delta_i(1-\tau_t)$" is just the equilibrium value of $A_i e_{it}$, they also believe that the additional "fair" income of their peers should only arise from their individual efforts and productive abilities. Since, in turn, the effort chosen by the individual turns out to be equal to $e_{it} = (1-\tau_t)A_i\beta_i$, its level will also reflect the individual's love for work, indeed represented by β_i. Thus the view of fair versus unfair inequality evolves from generation zero to generation 1 and this will imply different choices of tax rates and different bequests. The same considerations apply in the transition from generation 1 to 2, and one can simulate the model forward to trace the transition to a steady state.

As shown in Figure 1b, we can keep track of the level of the variance of the wealth distribution viewed as fair by all the future generations in country A: as we can see, that level increases over time. The offspring of a very egalitarian generation, though agreeing with their parent's view of the world of their times, by critically assessing the productive participation by their peers, will become increasingly more tolerant of wealth disparities.

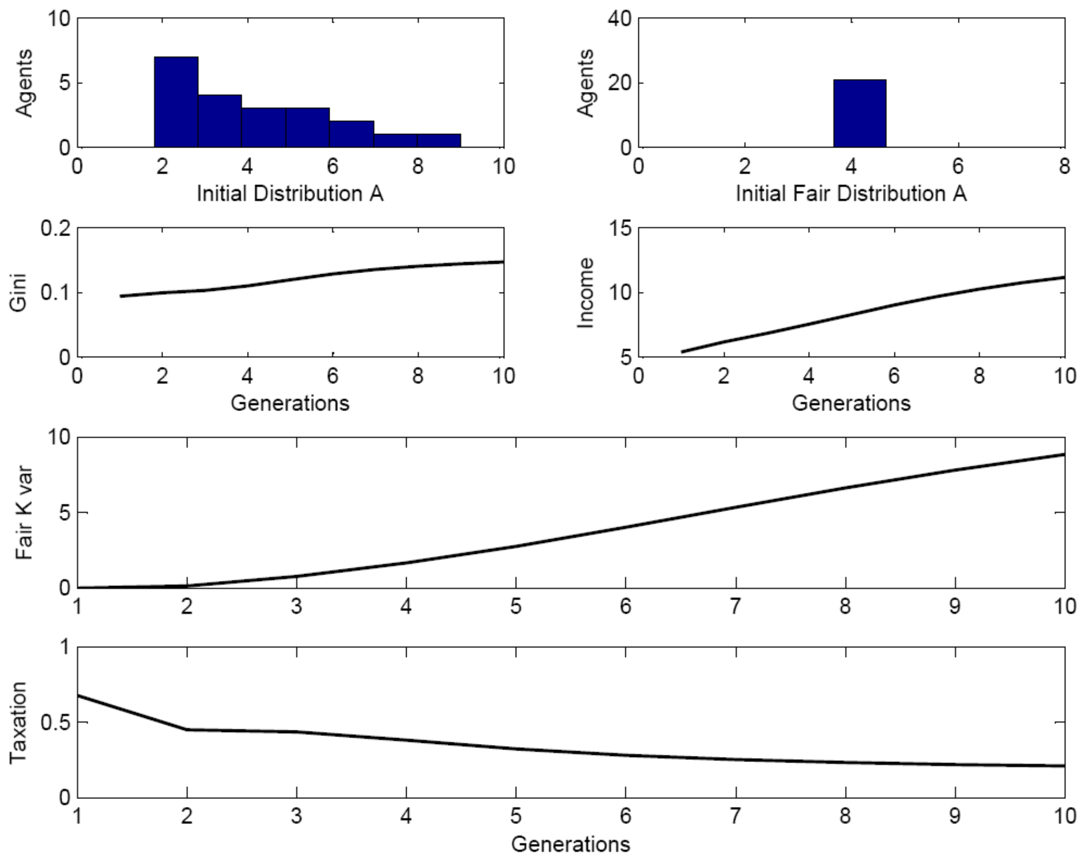

Figure 1b

In summary, differences in ideas of social justice of a generation can persist for several generations. These ideas evolve slowly together with the evolution of the economy.

3.1.1 Multiple long-run equilibria

Thus far we have shown parameter values for which the two economies converge (perhaps after a long time) to the same steady state. But we can also choose parameter values for which the interactions between ideology, policy, and the economy we highlighted so far are strong enough to lead the effects of a one time change in ideology to last forever, that is we can have multiple steady states. This is shown in Figure 1c.

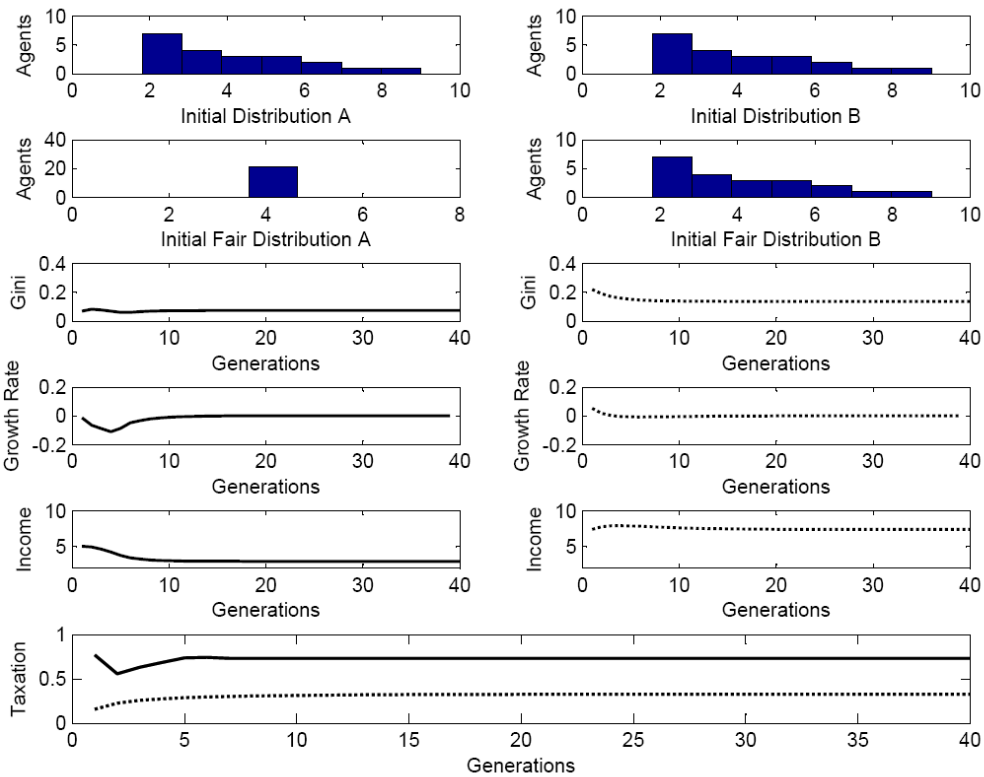

Figure 1c

As the reader can see from the figure, the strictly egalitarian ideology prevailing in an initial generation in country A can support a very strong redistributive policy. Such a high taxation would then discourage individual efforts so dramatically that a large part of individual's incomes will be the result of luck, and would hence be deemed very unfair. Therefore, the next generation will decide to tax a lot as well. In the long run the unfairness/redistribution/poverty trap will never be corrected, and the two economies will diverge in everything, with country B substantially richer, though more unequal, than country A.

3.2 Initial Inequality

In a dynamic version of Meltzer and Richard's (1981) model, higher initial inequality would lead to more redistribution, higher taxes and lower capital accumulation and growth. This is the prediction of Alesina and Rodrik (1994), and, in a related model, by Persson and Tabellini (1994). It is straightforward to reproduce this result in our framework. Imagine two countries with different initial level of inequality and in which there is no difference across countries about how much of the initial inequality is fair or not, and γ is the same in the two countries. Then there would be higher taxes and more redistribution in the country with more inequality. Simulations along those lines are available from the authors.

However, empirically, the relationship between more inequality and more redistribution has been questioned by Perotti (1996) first and then by others.[9] That is, the evidence that more inequality leads to more redistribution is fragile, meaning that in many cases the opposite holds. For instance Alesina and Glaeser (2004) point out that in the US there is at the same time more pre-tax inequality than in Europe and less redistribution. This result, namely a negative relationship between initial inequality and redistribution can be easily obtained in our model as the discussion of the previous sections should have made clear. Imagine two countries, with different levels of initial inequality, but suppose that in the country with more inequality the latter is considered fair, while in the other country the inequality, even though lower, is considered unfair. Imagine also that in the second country the parameter γ is especially high, namely in this country citizens are especially averse to inequality (unfairly induced). It is perfectly possible to generate examples in which more inequality leads to less redistribution. One needs different ratios of fair versus unfair inequality and/or different weights given in the two countries to the cost of inequality and fairness.

Another reason why inequality may not lead to more but less redistribution is the case when more inequality leads to a stronger influence of rich voters in the political equilibrium. [10] So far, in our probabilistic voting framework, we have worked under the assumption of common values of φ_i for all $i \in [0, 1]$. However, this may not be the case, as different voters are differently reactive to the parties' announcement of different policies, based on the relative importance they give to ideological and personal characteristics associated with the different parties. Our model allows all possible assumptions about the individual political biases. Obviously, every assumption likely affects how constituencies respond to each party's political platform, thereby affecting the policy announced by office motivated candidates. It is easy to check that when the rich have larger political influence and when wealth is correlated to more political influence redistribution is lower. This will of course imply higher growth a larger Gini. All the simulations regarding these cases are available upon request.

[9] See Bénabou (1996) for a survey.

[10] See Baremboim and Karabarbounis (2009) for some recent interesting empirical evidence on this point.

3.3 Different views about what is fair

In this section we analyze the effects of different views about fairness, by comparing three countries.

1) Country A is our benchmark case and we assume $\gamma = 0.1$. Thus individuals in country A have preferences described by eq.s (5) and (6);

2) Country B where issues of fairness and inequality aversion play no role so that $\gamma = 0$. This the traditional Meltzer Richard case in which redistribution occurs only for selfish reasons, namely the poor want to tax the rich;

3) Country C, where the individuals are averse to inequality per se, as measured by the variance of end-of-life post-tax wealth, w_{it}, , individuals in country C have preferences for redistribution in which:

$$\Omega_t^C = var(w_{it}). \tag{11}$$

In Figure 2 we compare the performance of economies with everything else equal, but the three different concept of social justice.

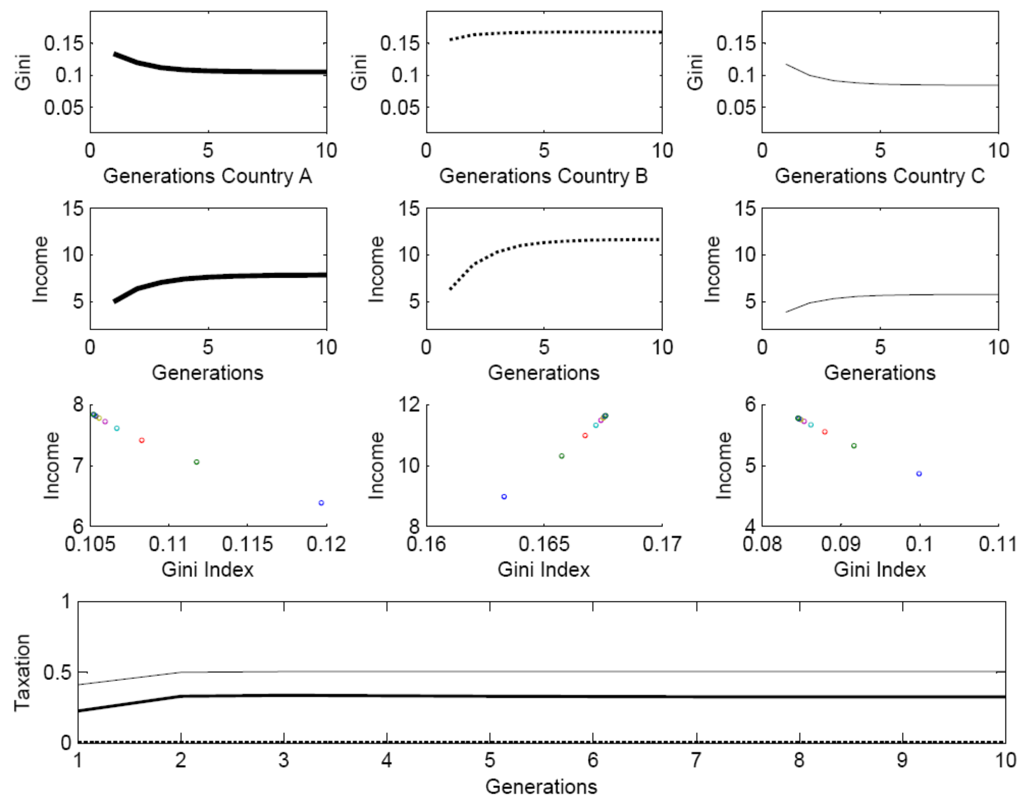

Figure 2

As in the figure, country B immediately starts with no redistribution (the tax rate always stays on the horizontal axis: $\tau_t^B = 0$, for all t $(= 1, 2, ...)$, whereas countries A and C tends to a steady state with positive redistribution. The reason why the usual inequality-redistribution channel is not apparent in country B is the presence of probabilistic party loyalty, along with the symmetric party bias among the citizens. However, positive taxation is immediately obtained also in the $\gamma = 0$ case as soon as we introduce asymmetric policy bias. Thus the fact that in this experiment $\tau_t^B = 0$ is just a special case, but in any case country B would have lower taxes than countries A and C. In our example, country B will become persistently richer than country A, which in turn gets richer than country C. Country A's tax rate tends to 32.63%, while country C's tax rate tends to 50.38%. This may suggest that the persistent differences between the European (country C) and American (country A) ideologies may regard inequality per se (Europe) versus undeserved inequality (US).

In both countries A and C we note an inverse relationship between Gini coefficient and mean income, while the country which does not redistribute, B, shows a positive relationship between the two.

3.4 Poverty Traps

By poverty trap we mean a situation in which a country does not manage to exit poverty because the policies induced by poverty itself are not growth enhancing. There are many channels that may lead to poverty traps. Here we emphasize one related to incentive to redistribute due to fairness considerations. [11] Consider two economies sharing the same distribution of luck, willingness to work, and inner abilities, but different initial levels and distributions of capital and fair capital. Assume that one economy, A, starts from a low and unequal level of capital endowment; while the other, B, from a high and similarly unequal level of capital endowment, as shown in Figure 3a:

[11] For work on redistribution and poverty traps see Perotti (1993) and Bénabou (1996).

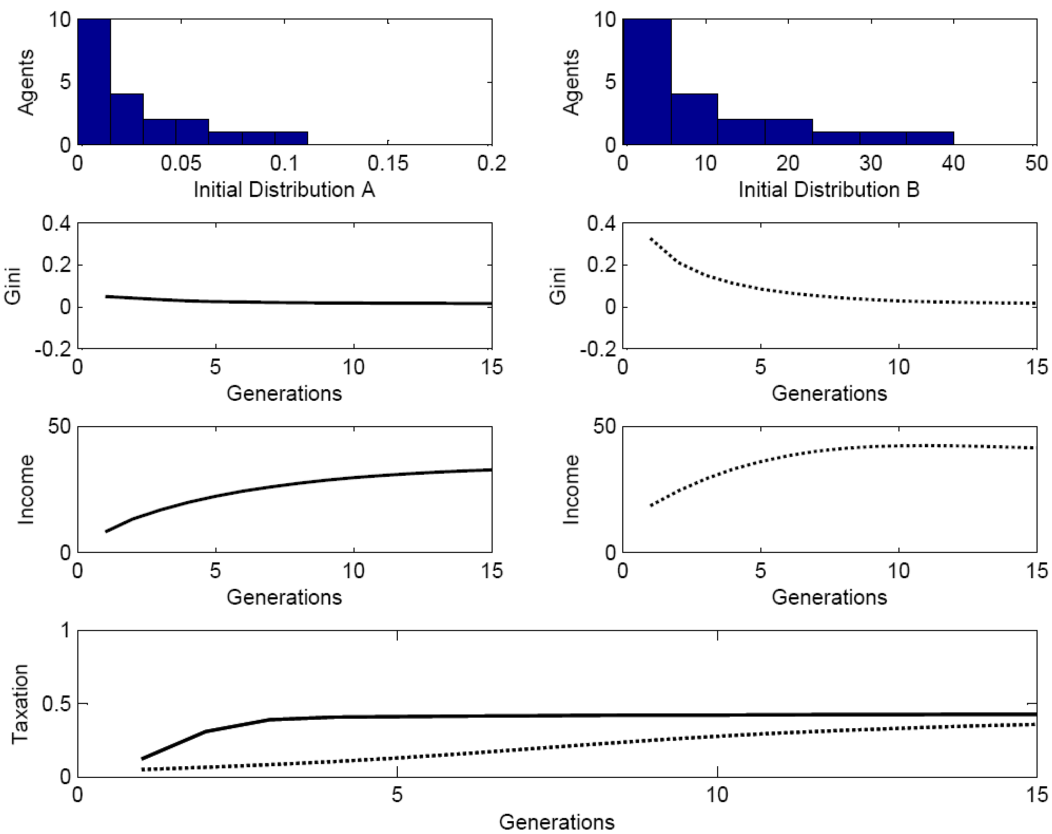

Figure 3a

In both countries the initial level of fair wealth is set equal to the actual initial wealth distribution[12]. This example is representative of cases in which, when the country is poor, the luck component represent a larger share of realized income, and this induces the voters to prefer a high level of taxation. The poorer country starts with a higher redistribution, while the rich country simply increases redistribution at a lower pace. This in turn disincentives efforts and capital accumulation, thereby causing lower aggregate wealth accumulation. The country is cast for long into a poverty trap; with high taxes and low income.

[12] This is to avoid the consequences of imposing unexplained (hence arbitrary) fairness motivated initial redistributive policies. Of course, over the generations the fair and unfair wealth distributions will differentiate, thereby endogenously inducing unfairness driven redistributive decisions.

Eventually, after some generations, in the previous figure, the poorer country starts slowly to accumulate more capital and to vote for reducing tax rates. Growth starts to increase and the poorer country starts to catch up with the other country's level of capital and taxation. The evolution of the concept of fairness plays a very important role also in this case. As the generations pass by, the agents in the poorer country start to consider more and more fair the differences in the capital accumulation deriving by the abilities and the efforts. In this way taxation reduces and the capital accumulation can finally begin.

However, by slightly altering the parameters, we can show examples in which the poverty trap is more extreme, as shown in Figure 3b below[13]:

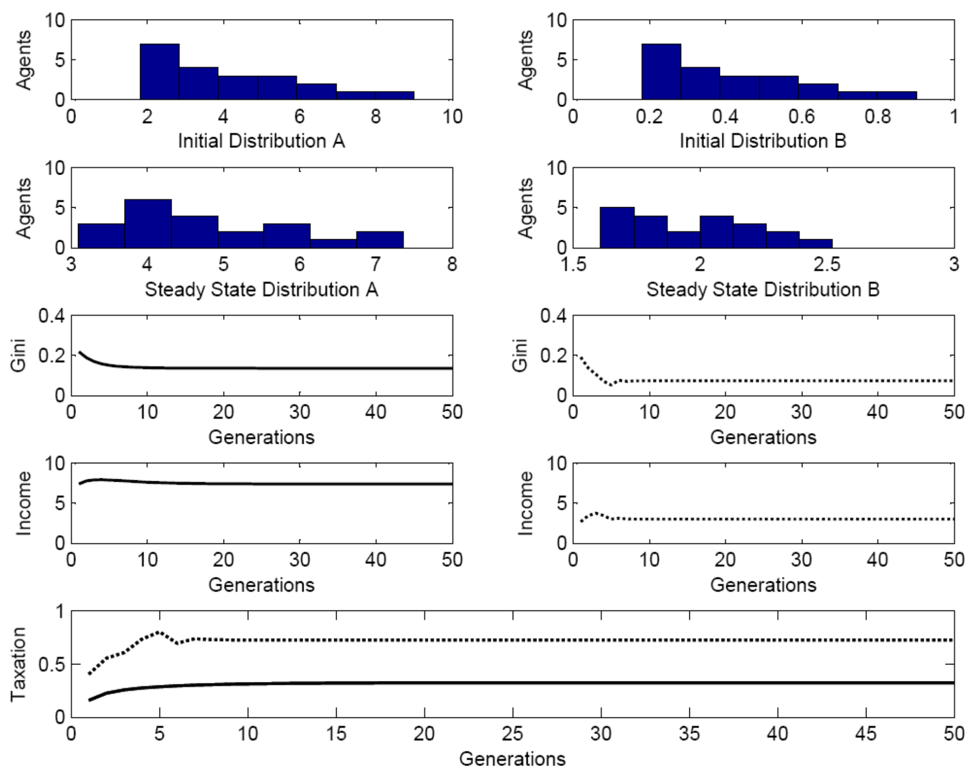

Figure 3b

[13] To generate this kind of examples, it suffices to slightly increase the value of γ and to slightly increase the dispersion of the luck distribution.

In this example, we have assumed that country B starts ten times poorer than country A, while both countries believed their own initial wealth distribution to be fair (to avoid adding interfering ingredients). In country B, sheer poverty implies that a large part of people end-of-life wealth is due to luck, which causes the election of very highly redistributive policy platforms. Once in place, they will discourage individual efforts, thereby causing luck to play a central role in individual enrichment; this in turn reinforces the perception of unfairness in the wealth distribution, and corroborates drastically redistributive policies, thus perpetuating the poverty trap. Country B will never catch up with country A: it will rather converge to a different steady state wealth distribution, characterized by more poverty, more taxation, and less inequality. It should be noted that very poor countries often do not have a well developed tax structure. Often in these countries redistributive policies take even more distorting forms often associated with corruption and many cases ethnic politics. All the factors would make matters even worse and increase the chances of a poverty trap.

3.5 Shocks to Wealth Distribution

Inequality is generally a slow moving variable, but a few large events can affect it quite much for a few years. Wars have been one example of such events, which have reduced wealth disparities by much. (Piketty and Saez, 2003). The financial crisis of 2007-2009 may also have deep effects on inequality, both on its actual measure and the perception of fairness of certain types of riches accumulated in financial markets pre crisis. What are the effects on fiscal policy and the evolution of inequality of these shocks? The next two sections show that opposite effects on policy may arise, depending on how the wealthy classes' losses are judged by the voters.

3.6 Shocks which equalize capital holdings

We can trace the effect of a shock in our stylized economy, by assuming that at some date - say, generation 4 - in country B - otherwise identical to country A - there is a shock that cuts all initial capital levels at a ceiling equal to 70% of the highest inherited capital level. We maintain the assumption of initial distribution viewed as fair. Figure 4 shows what would happen without the shock (country A) and with the shock (case B):

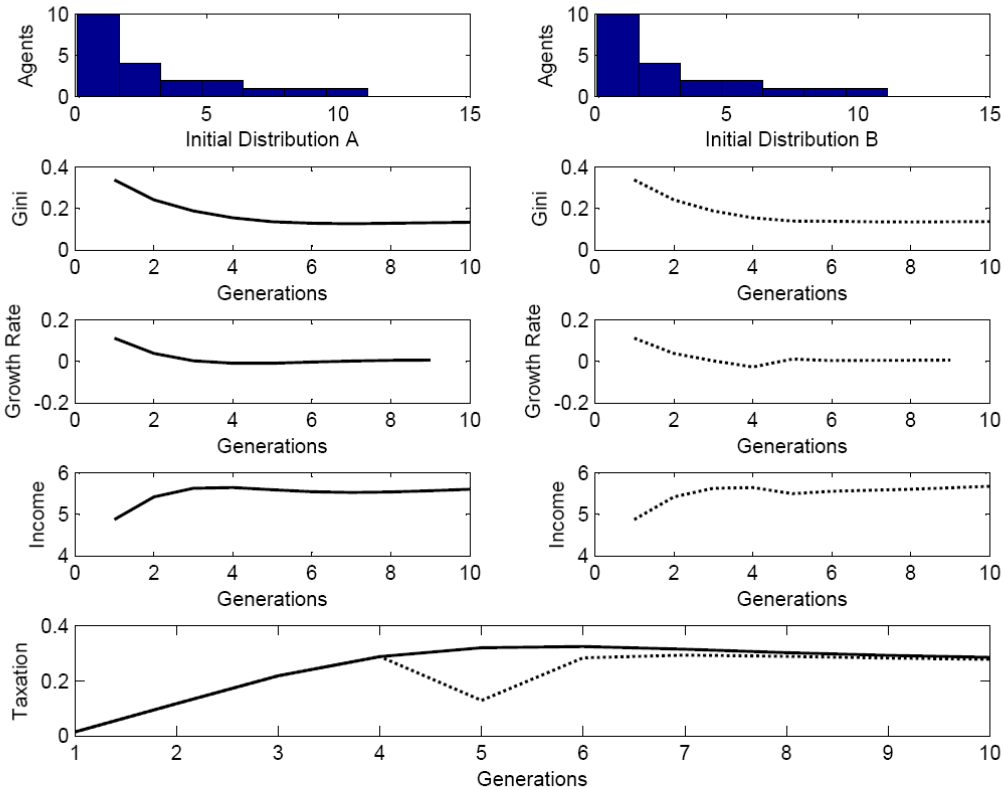

Figure 4

Since the shock is equalizing wealth levels, there is a temporary negative effect on the equilibrium tax rate due to the fairness motive: "too rich" wealth levels would be curtailed by the shock while "too poor" wealths are relieved by tax reduction. The reduction in redistribution is voted as soon as the shock arrives and allows the economy to witness only a relatively weak negative temporary effect on income and on inequality. The economy will re-absorb them completely within few generations. Moreover, the lower level of inequality following the shock has relatively persistent negative effects on voted taxation and positive effects on capital accumulation. In fact, for example, in the 10th generation (6 generations after the shock) tax rate in country A is 28.54% while in country B is 27.79%; similarly, country B's per-capita income is 1.19% higher than country A's per-capita income.

3.6.1 Shocks which equalize individuals' productivities

Suppose now that the top individual abilities are curtailed: we will assume that for one generation $\tilde{t}$ (in the example of the figure $\tilde{t} = 4$) we have $\delta_{i\tilde{t}} = \min\{\delta_i, 0.60 \max_{j\in[0,1]} \delta_j\}$. That is, we set a temporary ceiling for the abilities/stamina equal to 60% of their highest level in normal times. Lower abilities are left unchanged. Figure 5 shows the effects:

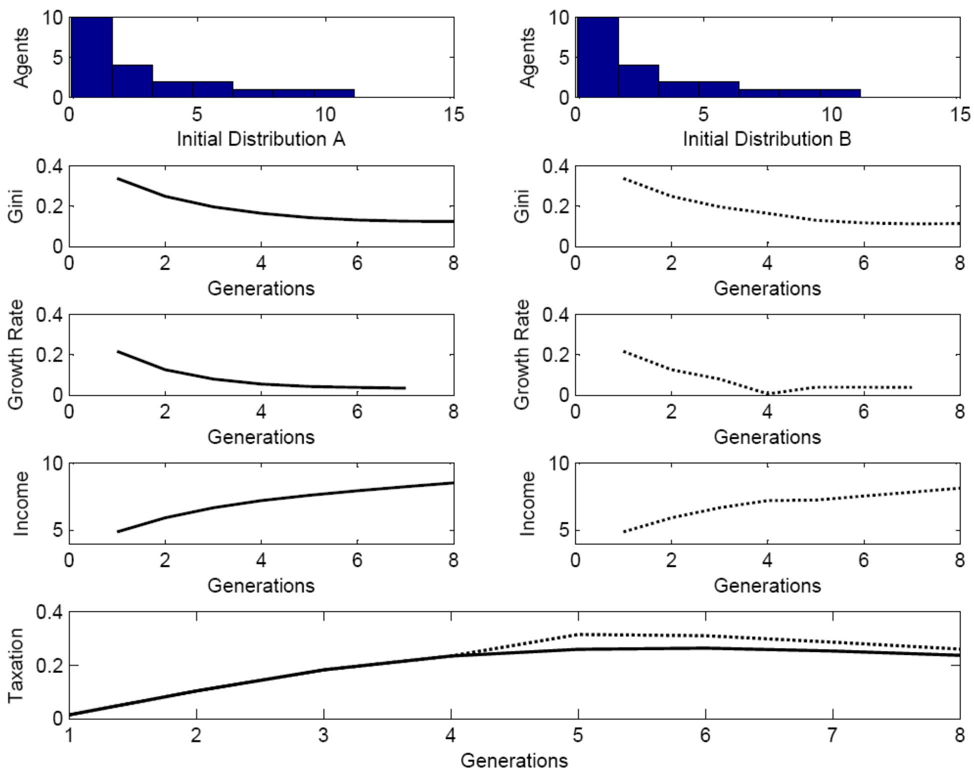

Figure 5

As we can notice in the figure, in country A there is no crisis, while in country B the shock arrives. As a consequence there is a relatively strong fall in the growth rate of country B. Unlike in figure 4, here the crisis is followed by an increase in redistribution: despite the crisis' equalizing power, country B's voters choose more redistribution and higher tax rates. Why so? Fairness considerations tilt fiscal policy in favour of higher redistribution: if it is not creativity or hard work that pays off the rich so much, then the relative importance of unjustified "luck" (which may include all sorts of non-work related sources of extra gains/losses[14]) increases. Therefore, the perception of unfairness in the creation of wealth would be mounting, thereby inducing voters to increase redistribution and exacerbate the economic consequences of the crisis. As shown in the example illustrated by Figure 5, in the generation after the crisis (generation 5), country A's tax rate is 25.97% while country B's tax rate is 31.5%. Moreover, as the figure shows, these effects could be persistent, which is not too surprising once realized that higher tax rates introduce additional departures from fairness, to be corrected by the next generation, and so on.

4 Conclusions

In this paper, we have shown how the evolution of the political ideology regarding the fairness of the constellation of income and wealth in society can generate economic and political persistence in inequality, redistribution, and growth. According to our simple framework, ideology does not entail cognitive distortions of reality[15], but it shapes the moral judgement on what wealth distribution would be fair, as well as it internalizes into people's preferences how strongly the distance between the current wealth distribution and the fair one makes people unhappy. Our model allows us to make sense formally of a variety of observations about the relationship between inequality, redistribution, and persistence of poverty which would be otherwise inconsistent with more standard models of redistributive policies.

Rather than reviewing again our results it is worth discussing possible extensions to this framework. Probably the most interesting one would be to extend the possible tax transfer schemes available to correct inequality. A particularly relevant one comes to mind, namely inheritance taxation. This model with its emphasis on fairness seems ideal to address issues of social justice like equalizing initial conditions versus redistribution. That is, an alternative view about social justice could be that everybody should start from the same initial conditions, and therefore inherited wealth, no matter how generated, should be heavily taxed to equalize everybody at birth. This of course would have implications on savings, capital accumulation, and the amount of bequest, but the structure provided by this model seems ideal to study this set of issues. Another generalization would be to allow non linear tax structures to permit for more progressive income and wealth taxation.

An additional extension would be to consider more than one voting within each generation, that is to break the identification of one period with one generation. The Matlab codes we have produced allow this extension quite easily and we do not expect significant changes in the qualitative nature of the results, but some interesting refinements of the dynamics may emerge, especially in a

[14] Outrageously high pensions by bailed-out bank managers, etc.

[15] As a complemetary strand of literature (see e.g. Piketty, 1995; Bénabou and Tirole, 2006; Bénabou, 2008) highlights.

model where one has both income taxes and inheritance taxation.

5 Appendix

Lemma 1. *In pairwise majority voting, there will exist a unique equilibrium in which the two parties will select the same policy variable, $\tau_t^L = \tau_t^R \equiv \tau_t^*$, given by*

$$\tau_t^* = \arg \max_{\tau_t \in [0,1]} \int_0^1 \varphi_i \hat{U}_{it}(\tau_t) di. \tag{12}$$

Proof. In fact, individual i of generation t will vote for party R if $\hat{U}_{it}(\tau_t^R) > \hat{U}_{it}(\tau_t^L) + \sigma_{it} + \varepsilon_t$, that is if $\sigma_{it} < \hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t$. Given our assumption on σ_{it}, this event happens with probability $\left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t\right] \varphi_i + \frac{1}{2}$. Aggregating over all individuals and using the law of large numbers, the fraction of votes that goes to party R is: $\pi_R = \int_0^1 \left\{ \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L) - \varepsilon_t\right] \varphi_i + \frac{1}{2} \right\} di = \int_0^1 \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^L)\right] \varphi_i di - \varphi\varepsilon_t + \frac{1}{2}$, where $\varphi \equiv \int_0^1 \varphi_i di$ is the average of the individual ideological densities. Party R wins if $\pi_R > \frac{1}{2}$, which happens if and only if $\varepsilon_t < \frac{\int_0^1 \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^D)\right]\varphi_i di}{\varphi}$. From our assumptions on ε_t, this happens with probability $\left(\frac{\int_0^1 \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^D)\right]\varphi_i di}{\varphi} - \left[-\frac{1}{2\psi}\right] \right) \psi = \psi \frac{\int_0^1 \left[\hat{U}_{it}(\tau_t^R) - \hat{U}_{it}(\tau_t^D)\right]\varphi_i di}{\varphi} + \frac{1}{2} \equiv p_R$. Party R therefore chooses $\tau_t^* = \arg\max p_R = \arg\max_{\tau_t^R} \int_0^1 \hat{U}_{it}(\tau_t^R)\varphi_i di$. Swapping notations, party D chooses $\tau_t^* = \arg\max p_D = \arg\max_{\tau_t^D} \int_0^1 \hat{U}_{it}(\tau_t^D)\varphi_i di$. By Weierstrass theorem a maximum certainly exists. Moreover, it is generically unique. Q.E.D.

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