Centre de Referència en Economia Analítica

Barcelona Economics Working Paper Series

Working Paper nº 254

Redistributive Taxation with Endogenous Sentiments

Matteo Cervellati, Joan Esteban and Laurence Kranich

April 2004

Redistributive Taxation
with Endogenous Sentiments[*]

Matteo Cervellati,[†]Joan Esteban[‡]and Laurence Kranich[§]

April 2004

Barcelona Economics WP nº 254

Abstract

To help explain differences between the US and EU "social contracts" as well as other cultural differences, we present a model of rational voting over redistribution where individual attitudes toward others are endogenously determined. Individuals differ in their productivities and their degree of social concern, and their behavior is influenced by moral standards. According to these, agents determine what they take to be proper behavior, here identified with the average labor supply, and they judge others accordingly. They increase their esteem for those who perform in excess of the norm and decrease their esteem for those who work less. This pertains to their self-esteem as well, which varies in relation to their own performance. Attitudes toward others influence the desired extent of redistribution. There are multiple politico-economic equilibria. In one equilibrium all individuals conform to proper behavior, their esteem for others is not biased towards any particular type, and the majority vote for high redistribution. In the other equilibrium, highly skilled workers work above the mean and are admired by everyone, while unskilled workers are considered lazy. Here, the majoritarian vote supports low redistribution. We contrast the US and EU social contracts in light of the predictions of the model.

Keywords: Social Contract, Endogenous Sentiments, Social Norms, Redistribution, Inequality, Politico-Economic Equilibrium,

JEL Classification: D64, D72, Z13, H3 and J2

Redistributive Taxation
with Endogenous Sentiments

April 2004

Abstract

To help explain differences between the US and EU "social contracts" as well as other cultural differences, we present a model of rational voting over redistribution where individual attitudes toward others are endogenously determined. Individuals differ in their productivities and their degree of social concern, and their behavior is influenced by moral standards. According to these, agents determine what they take to be proper behavior, here identified with the average labor supply, and they judge others accordingly. They increase their esteem for those who perform in excess of the norm and decrease their esteem for those who work less. This pertains to their self-esteem as well, which varies in relation to their own performance. Attitudes toward others influence the desired extent of redistribution. There are multiple politico-economic equilibria. In one equilibrium all individuals conform to proper behavior, their esteem for others is not biased towards any particular type, and the majority vote for high redistribution. In the other equilibrium, highly skilled workers work above the mean and are admired by everyone, while unskilled workers are considered lazy. Here, the majoritarian vote supports low redistribution. We contrast the US and EU social contracts in light of the predictions of the model.

1

1   Introduction

The contrast between the US and (continental) European (EU) societies has been the subject of increasing academic interest. In spite of their exhibiting similar economic fundamentals, these regions differ considerably in the form of their "social contracts," the attitudes (toward others and toward work) or circumstances that give rise to such differences, and the behavior that ensues under the two systems.[1] A number of contributions have attempted to explain these differences. (We review them in Section 6.) Generally, this is viewed as an instance of multiple equilibrium, but the causes of such multiplicities vary. Thus far, explanations have included capital market imperfections, differences in real or perceived income mobility, and psychological or moral differences.

In this paper, we provide a different explanation. Our main premise is that while individual attitudes or sentiments shape preferences over institutional environments (in particular, the welfare state and the extent of redistribution), institutions also influence individual attitudes. Therefore, attitudes and political choices must be treated jointly. When we allow for this reciprocal effect, we obtain two types of politico-economic equilibria characterized by different individual sentiments, different labor supply behavior, and different degrees of redistribution. We argue that the two types "fit" the available evidence for the US and the EU quite well.

In our model individuals supply labor and are paid their competitive wage. Their earnings are subject to a purely redistributive proportional tax, the proceeds from which are distributed uniformly. Agents differ in their productivities and in their (initial) degrees of concern for others. Most importantly, their behavior and their sentiments are influenced by *moral standards*. By this we mean that agents determine what they take to be proper behavior – here identified with the average labor supply – and they judge other agents accordingly, that is, they tend to increase their concern or esteem for those who perform in excess of the norm and decrease their esteem for those who underperform. This pertains to their self-esteem as well, which varies in relation to their own performance.

As agents' sentiments change, so too do their labor supply decisions, which affects other agents' evaluations and hence their behavior, in turn. Consequently, we are led to consider steady states of this dynamic process. Two types of steady state equilibria emerge. In one type all individuals conform to the ethical norm and supply equal amounts of effort. In equilibrium, there is an inverse relation between the level of altruism (the total esteem felt for others) and income. We call this a *cohesive* equilibrium. In the second type of equilibrium society is divided into clusters. One consists of the most productive individuals, who in equilibrium work above the average and receive the full admiration of everyone while another consists of the least productive individuals, who work less than average and earn no esteem. Whether an economy becomes cohesive or clustered crucially depends on the degree of inequality in individual

---

[1]See Alesina and Glaeser (2004) for a comprehensive analysis of the differential features of the two societies.

skills (pre-tax income) and on the social contract, i.e., the tax rate. Moreover, it may be path dependent.

Summarizing the different features of the two types of equilibria, the model yields four sets of testable predictions:

[1] PRE-TAX INCOME INEQUALITY: *Productivity differences and thus pre-tax income inequality must be low in a cohesive equilibrium, while they can be high in a clustered equilibrium.*

[2] INEQUALITY IN WORKING HOURS: *Clustered equilibria display greater dispersion in working hours across the population than cohesive equilibria.*

[3] INDIVIDUAL ATTITUDES: *In a clustered equilibrium, the highly skilled are perceived as hard working and are admired by everyone, whereas the low skilled are seen as lazy and are admired by no one. Moreover, these sentiments are shared by everyone, including the low wage earners themselves. In contrast, in a cohesive equilibrium agents' sentiments show no bias toward those of a particular income group.*

[4] REDISTRIBUTION: *In either equilibrium, higher inequality leads to higher taxation, but for the same degree of inequality there is necessarily more redistribution in a cohesive equilibrium than in a clustered equilibrium. Further, in a clustered society even the poor would not be supportive of highly redistributive policies.*

It follows from the model that if one of two countries has more inequality and less redistribution, then it must be in a clustered equilibrium while the other country is in a cohesive equilibrium. This is precisely the case for the US versus Europe, where the former has more inequality and lower redistribution. Contrasting the cases of clustered and cohesive societies, the available evidence for the US and the EU accords well with the predictions listed above.

The contribution of the paper spans three areas: (i) voting over taxes, (ii) endogenous preferences and social norms, and (iii) comparing the US vs. EU social contracts. We discuss each in turn.

(i) Our model is a novel extension of the classic papers by Romer (1975), Roberts (1977) and Meltzer and Richard (1981) *(henceforth M-R)* on voting over linear income tax schedules. Our claim is that individual attitudes toward others affect the desired tax structure which affects behavior which, in turn, affects attitudes. Hence, the problem of the choice of a "social contract" has to be modeled as a joint determination of attitudes, labor supplies and taxes. To this effect, we examine the case where individuals have social concern along with the standard egoistic motivation. The literature on this point is quite sparse[2] in spite of the fact that empirical evidence strongly suggests that individual

---

[2]To the best of our knowledge, the only papers to address the political economy of taxation with altruistic agents are Kranich (2002) and Snyder and Kramer (1988), even though Romer suggested that altruism might be necessary to explain the emergence of progressive income taxation.

attitudes towards redistribution are affected by factors other than private gain.[3] In our model, agents' preferences over taxes depend on the esteem they feel for one another. Therefore, the individual choice of taxes will reflect a blend of the motives of the egoistic voter and of the social planner.

As mentioned above, we find that the model can have multiple equilibria with distinct patterns of sentiments, labor supply behavior and redistribution. As in M-R, larger income inequality increases the egoistic gains from redistribution by the poor and hence the demand for redistribution in both types of equilibrium. However, our results depart from the classical formulation in two important respects. First, we can have multiple equilibria with two otherwise identical societies voting for different taxes – with the corresponding differences in labor supplies and attitudes. Secondly, when comparing two different societies, we find that for the same degree of income inequality clustered societies vote for less redistribution than cohesive societies. It follows that we may observe that the society with lower pre-tax earnings inequality – because it has remained cohesive – chooses to redistribute more than the society with larger inequality. Therefore, the model does not support the unconditional prediction of a negative relationship between inequality and redistribution.

(ii) The paper also contributes to the growing literature on the role of norms of behavior, moral values and endogenous preferences. Here we bring together different lines of research on work-related norms in a common framework, and we extend it to include the formation of attitudes toward others. Several important works have considered the role of social norms and ethics on economic behavior and on labor effort in particular. Elster (1989) made the point that effort provision can be influenced by norms, which are sustained by both the approval and disapproval by others and the psychological costs of violating the norm, possibly associated with feelings of anxiety and guilt. Our modelling of moral persuasion follows the second line. In this sense, our approach is close to the idea of "intrinsic motivation" of individual behavior.[4]

The papers of Moffit (1983) and Besley and Coate (1992) are particularly relevant to the analysis of this type of moral persuasion. They consider the case of social norms against living on transfers and the threat of 'welfare stigma.' Lindbeck, Nyberg and Weibull (1999) have extended this analysis to include individuals voting over welfare benefits. In Lindbeck et al (1999) the social norm is to "live off one's own work," and individuals can choose between working full-time for a wage or living on an unemployment subsidy. The psychological cost of deviating from the norm depends on the extent of compliance with the rule. Hence, the observed behavior of others influences one's attitude toward deviating, and the cost of deviating may affect the decision to do so.

Our model also considers the "psychic costs" of deviating from the social norm. However, it departs from the work of Lindbeck et al. in two essential

---

[3]See Corneo and Gruner (2002) and Fong (2001) for evidence that individual attitudes toward redistribution cannot be explained by egoistic motives alone. Since the influential work of Rabin (1993), the role of utility externalities and the perception of fairness in determining individual behavior has been widely acknowledged.

[4]See the survey by Frey, B.S. and R. Hegen (2001) and the paper by Falk and Fehr (2002).

ways. First, we focus on the intensity of work effort, which in our model varies continuously, versus the discrete choice of working full-time or living on transfers. And second, it is crucial in our model that moral judgements befall on others as well as oneself. We assume it is the contrast between "normal" behavior and observed behavior which influences the esteem for the individual.[5,6] In our model, the contemporaneous choice of labor supply depends on the current attitudes toward others as well as ones' self-esteem and in turn affects future parameters and thus labor supply decisions. Hence, we face a dynamic interdependence between social and economic interactions.

(iii) Finally, the paper contributes to the growing literature which attempts to explain why the US and EU have such different "social contracts" in spite of the obvious similarities in their fundamentals. We devote Section 6 to discussing this issue and thus defer doing so here in any great detail. There we provide evidence in support of the claim that the US is in a clustered equilibrium while the EU is in a cohesive equilibrium. We would emphasize that our model offers a unified framework for explaining differences in tax structure as well as documented differences in the variance of labor time, in attitudes toward the poor and toward the redistributive role of the state.

The paper is organized as follows. Section 2 describes the basic model. Section 3 studies individual preferences for redistribution. Section 4 examines the evolution of individual attitudes and behavior and characterizes the stationary equilibria. Section 5 is devoted to politico-economic equilibria where taxes, sentiments and labor supply are simultaneously determined. Section 6 contrasts the testable implications of the model with the available evidence for the US and the EU and reviews the literature on alternative explanations for the differences in question. Finally, the concluding section considers the robustness of our results and the role played by the different assumptions. Proofs are relegated to the Appendix.

2   The Model

There is a continuum of individuals on $[0, 1]$. Let β be the constant marginal productivity of labor, which equals the wage in a competitive market. Individual productivity can be of two types β_s and β_u corresponding to skilled and unskilled labor, respectively, with $\beta_u < \beta_s$. The proportion of the population with skilled

---

[5]This formulation of sentiments is similar to Levine (1998) where individuals take the private welfare of others into consideration much as in our model. However, there, actual sentiments are fixed but private information, and the weight one attaches to other agents' utility depends on the perception of their sentiments toward you. Hence, individuals play a signalling game to convey their intentions or their true sentiments. In contrast, we consider large societies and assume away strategic behavior.

[6]Brekke, Kverndokk and Nyborg (2003) and Akerlof and Kranton (2003) also consider cases in which agents derive utility from conforming with a social norm or belonging to a group. The former considers a similar question of voluntary contributions to a public good, and the latter investigates group identification and identity. Both focus on self-image rather than passing moral judgement on others.

labor is π while the proportion of unskilled is $(1 - \pi)$. We assume that a majority is unskilled and hence $\pi < \frac{1}{2}$.

The overall welfare evaluation of an individual of type $i = u, s$ is denoted V_i and depends on its private utility, v_i, as well as on social utility, w_i, where the latter captures the effect on the individual's own well-being derived from the esteem felt for others. Hence, we have

$$V_i = v_i + w_i. \tag{1}$$

Social utility will play a role when voting over taxes. However, when it comes to chosing the individual labor supply, only the private component of utility matters. Individuals are of a negligeable size and hence by their private decisions cannot affect the well-being of the others.

Focusing initially on v_i, therefore, we assume as in Lindbeck et al (1999) that private utility depends on consumption, c_i, and work effort, L_i, as well as on self-esteem, φ_i. The parameter φ_i will be determined endogenously below through social interaction, but for now we take it as given.

For concreteness, we assume private utility to be of the form

$$v(c_i, L_i, \varphi_i) = c_i + \left(1 - \frac{L_i^2}{2}\right) \varphi_i. \tag{2}$$

Therefore, self-esteem influences the marginal rate of substitution between consumption and effort.[7] Individuals who regard themselves as lazy, and therefore have low self-esteem, will not enjoy a marginal increase in leisure time (ceteris paribus) as much as those who feel they have worked hard.[8]

As in M-R and Roberts (1977), we assume that labor income is subject to a purely redistributive linear income tax characterized by the pair (τ, T), where $\tau \in [0, 1]$ is the constant marginal tax rate and T is a uniform per capita transfer. That is,

$$T(\tau) = \tau \left[(1 - \pi)y_u + \pi y_s\right] \equiv \tau \bar{y}, \tag{3}$$

---

[7]Lindbeck et al (1999) assume instead that the individual may have a sense of guilt which is additively separable, thus ruling out any influence on the substitution of labor for consumption. For them this is a lump-sum psychological cost. In contrast Falk and Fehr (2002, p. 713) make the point that "the convention to take the disutility of effort as exogenously given induces economists to disregard potential determinants of the (dis) utility of effort." In this paper we allow the marginal disutility of effort to vary *with the level of effort*; moreover, it is affected by the behavior of others. Deci (1971) was the first to argue that besides external rewards "internal motivation" plays a key role in the supply of individual effort. [See also Murdoch (2002) for a related concept of intrinsic motivation.] This topic has recently attracted the attention of economists. [See Kreps (1997) and Frei (1997) and more recently Bénabou and Tirole (2003).] As for the empirical evidence that effort may depend on moral motivation, see Deci, Koestner and Ryan (1999), Gneezy and Rustichini (2000) and Frey and Jegen (2001).

[8]As formulated here, self-esteem provides a built in mechanism which prevents complete polarization of labor supply: those with low self-esteem have an incentive to work more and those with high self-esteem have an incentive to work less. In contrast, polarized behavior would occur if, contrary to our assumption, the pride of having worked hard induces individuals to work even more (and the lazy ones to work even less). In spite of this tendency to depolarize, there may be stationary equilibria in which unskilled workers work uniformly less than skilled workers.

where y_i is pre-tax income of individual i and $\bar{y}$ is the average income.

Individual after-tax disposable income is

$$y_i^d = (1 - \tau)y_i + T = (1 - \tau)\beta_i L_i + T \qquad (4)$$

and is entirely consumed.

From the first order conditions for a maximum we obtain the labor supply

$$L_i\left(\beta_i, \varphi_i, \tau\right) = (1 - \tau)\beta_i \frac{1}{\varphi_i}. \qquad (5)$$

Individual labor supply is thus increasing in the monetary reward $(1 - \tau)\beta_i$ and decreasing in self-esteem φ_i.

Hence, the indirect private utility of an individual of type i is

$$v(\tau, T, \beta_i, \varphi_i) = \frac{(1 - \tau)^2 \beta_i^2}{2\varphi_i} + T + \varphi_i. \qquad (6)$$

Turning to the social component, w_i, of overall utility, we assume individuals care about others in as much as they feel esteem for them. We denote by $\alpha_{i,j} \in [0, 1]$ the esteem or concern felt by an individual of type i towards an individual of type j.[9] This esteem is then the weight that i assigns to the (private) utility of j in an additive extended utility function.[10] We shall denote by $\boldsymbol{\alpha}_i$ agent i's weights $(\alpha_{i,u}, \alpha_{i,s})$, and by $\boldsymbol{\alpha}$ the full matrix of weights. Similarly, $\boldsymbol{\varphi}$ will denote vector of self-esteem parameters (φ_u, φ_s).

Hence, the social component of overall utility is

$$w_i = (1 - \pi)\alpha_{i,u}v_u + \pi\alpha_{i,s}v_s = \bar{\alpha}_i\left[(1 - \sigma_i)v_u + \sigma_i v_s\right] \equiv \bar{\alpha}_i\widetilde{w}_i, \qquad (7)$$

where $\bar{\alpha}_i$ is the (average) social concern of individual i,

$$\bar{\alpha}_i \equiv (1 - \pi)\alpha_{i,u} + \pi\alpha_{i,s}, \qquad (8)$$

and

$$\sigma_i \equiv \frac{\alpha_{i,s}\pi}{\bar{\alpha}_i} \qquad (9)$$

---

[9] Note that by taking that $\alpha_{i,j} \geq 0$ we are excluding malevolence. We impose this restriction for expositional convenience. Our results only require that sentiments be bounded below.

Similarly, the presumption that agents are only distinguished by their productivities and that all agents with the same productivity share the same feelings toward others is not restrictive. A richer description might allow agents to differ in their initial altruism parameters as well. However, this would not affect our qualitative results. In an earlier version of the paper we showed that in a steady state equilibrium with endogenous esteem either the coefficients attached to other agents would necessarily converge (in a clustered equilibrium) or else all those with the same productivity would share the same aggregate concern for others (in a cohesive equilibrium) and this would differ systematically across productivity levels.

[10] See Sen (1966) and Ray and Ueda (1996) for earlier models of individual behavior with extended preferences.

is the share of social concern that individual i allocates to the group of agents of type s. Therefore, the social component of overall utility can be written as the product of the individual specific weighted social utility $\widetilde{w}_i$ and the degree of social concern $\bar{\alpha}_i$. Individuals are thus partly egoistic and partly (biased) social planners, and the role of the latter depends on the degree of social concern.

We can then write individual total utility as

$$V_i = v_i + \bar{\alpha}_i \widetilde{w}_i. \tag{10}$$

3 Preference for Redistribution

We now turn to the choice of a social contract, i.e. the choice of τ. In this respect, we follow the approach developed by Romer (1975), Roberts (1977) and Meltzer and Richard (1981) and consider a direct democracy in which the policy is chosen by simple *majority voting*. In our case, the majority is constituted by the unskilled workers and they will determine the degree of redistribution. We shall focus on their preferences over taxes.

Following the convention in the literature, we assume that voters are aware of the distortions caused by income taxation on labor supply and anticipate the existence of a public budget constraint.[11] Economic and political choices are based on *current* preferences. Individuals anticipate the effect of taxation on labor supply decisions but not the evolution of preferences possibly triggered by a change in the social contract. Therefore, when comparing alternative tax regimes, individuals take as given the vector $\boldsymbol{\varphi}$ and the matrix $\boldsymbol{\alpha}$. Later, these parameters will be made endogenous and determined in equilibrium jointly with the chosen taxes and labor supplies. But for now we consider them exogenous.

The degree of redistribution preferred by an unskilled worker maximizes its total (indirect) utility (10), subject to the public budget constraint (3). The individual preferences over taxes are a weighted mix of its egoistic preferences and its perception of the social good.

In such a simplified model it is possible to explicitly characterize the choice of taxes. For this purpose the following two indices will be useful. First, we define an inequality index, I, by the relative gap between mean and low income, that is,

$$I \equiv \frac{\bar{y} - y_u}{\bar{y}}. \tag{11}$$

Secondly, we define a measure of the bias (toward u) by the unskilled in allocating its esteem between the two types as

$$\delta \equiv \frac{\bar{y} - \widetilde{y}^u}{\bar{y}}, \tag{12}$$

where $\widetilde{y}^u \equiv [(1 - \sigma_u)y_u + \sigma_u y_s]$.

---

[11]In contrast, Kranich (2001) assumes that agents vote over quadratic taxes and modify their labor supply iteratively rather than simultaneously.

If an individual has no such bias and allocates its esteem uniformly across the population – thus making $\sigma_u = \pi$ – then $\bar{y} = \tilde{y}^u$ and $\delta = 0$. When u's esteem is biased in favor of low productivity individuals, then $\sigma_u < \pi$ and we have $\bar{y} > \tilde{y}^u$ and hence $\delta > 0$. Conversely, $\delta < 0$ when u's esteem exhibits the opposite bias.

Using (5), we obtain the following expressions for the effects of τ on labor, gross earnings and transfers, respectively:

$$\frac{dL_i}{d\tau} = -\frac{L_i}{1-\tau}, \ \frac{dy_i}{d\tau} = -\frac{y_i}{1-\tau} \text{ and } \frac{dT}{d\tau} = \frac{1-2\tau}{1-\tau}\bar{y}.$$

Differentiating the egoistic (indirect) utility v_i (6) with respect to τ and using these we obtain

$$\frac{dv_i}{d\tau} = \bar{y} - y_i - \frac{\tau}{1-\tau}\bar{y}.$$

Then from (10) we obtain the first order condition

$$\begin{aligned}
\frac{dV_u}{d\tau} &= \frac{dv_u}{d\tau} + \bar{\alpha}_u\left[(1-\sigma_u)\frac{dv_u}{d\tau} + \sigma_u\frac{dv_s}{d\tau}\right] \\
&= (1+\bar{\alpha}_u)\frac{1-2\tau}{1-\tau}\bar{y} - y_u - \bar{\alpha}_u\tilde{y}^u = 0.
\end{aligned} \tag{13}$$

Solving (13) and using the definitions of I and δ, we obtain the unique most preferred tax by an unskilled individual, τ_u.

Proposition 1 *For any $\langle \boldsymbol{\alpha}, \boldsymbol{\beta}, \pi \rangle$ the tax rate τ_u preferred by an unskilled individual is given by*

$$\tau_u = \frac{I + \bar{\alpha}_u\,\delta}{1 + \bar{\alpha}_u + I + \bar{\alpha}_u\delta}, \tag{14}$$

with all the variables evaluated at τ_u.[12]

With no social concern, i.e. $\bar{\alpha}_u = 0$, the problem becomes identical to the one studied in M-R and the demand for redistribution is increasing with inequality. Relative to this benchmark, when $\bar{\alpha}_u > 0$ preferences over redistribution will be affected by the degree of social concern $\bar{\alpha}_u$ and by the bias in the allocation of individual esteem as captured by δ. Let us examine the role of these two factors separately.

Consider, first, the case in which σ_u displays no bias so that $\delta = 0$. Then, the effect of social concern is to reduce the preferred tax relative to the egoistic case among the individuals who were favorable to redistribution. Poor individuals with unbiased altruism will weight the cost of taxation to the rich together with the benefits of redistribution towards the poor. As a result, their redistributive demands will be more moderate than under pure egoism. As for the role of

_____

[12]Proof in the Appendix.

the bias in individual sentiments, the direction in which τ_u diverges from the benchmark case is determined by the sign of δ, i.e. whether the unskilled have a pro-poor or pro-rich bias.

To sum up, as in M-R, equilibrium redistribution increases with income inequality I. However, now social concern for others (when there is no bias) moderates the demands of the poor, and the presence of a bias in the allocation of sentiments can either raise or lower the demand for redistribution, depending on whether the sentiments are biased in favor of the skilled or of the unskilled.

4 Endogenous Esteem

We assume individuals are endowed with an ethical view that industriousness is good and idleness is bad. They judge the degree of industriousness of each person on the basis of that person's labor effort relative to the social mean. In response to the observed behavior, they increase their esteem for those who work above the mean and decrease their esteem for those who work below.

At this point, two comments on the assumed behavior are in order. First, we abstract from consideration the possibility that agents might behave strategically for the purpose of eliciting greater esteem from others or even greater self-esteem. Rather, individuals are assumed to behave sincerely on the basis of their current sentiments, which are treated as fixed at the point of decision-making.

Our second comment is that this ethical rule does not take personal circumstances into account when passing judgement on the behavior of others. While there are certainly times when special circumstances warrant special consideration, in the aggregate the "average work week" is often used as a benchmark.[13] Therefore, this seems a reasonable starting point when modeling attitudes in large societies.[14]

Formally, individuals observe labor effort in $t-1$, $L_i(t-1)$, and compare it with the average effort $\bar{L}(t-1)$. On this basis, individuals pass moral judgements on the basis of which they update their esteem parameters $\alpha_{i,j}$ at time t. Specifically,

$$L_j(t-1) \gtreqless \bar{L}(t-1) \Longrightarrow \alpha_{i,j}(t) \gtreqless \alpha_{i,j}(t-1), \forall i, j, \alpha_{i,j}(t) \in [0,1]. \qquad (15)$$

We shall not consider the dynamics of sentiments; rather we will concentrate on the steady states only. A steady state of our model consists of a pattern of work effort, $L(t)$, and sentiments, $\alpha(t)$, such that $L_i(t) = L_i(t-1)$ and $\alpha_{i,j}(t) = \alpha_{i,j}(t-1)$ for all i, j.

---

[13]Similarly, Besley and Coate (1992) consider both the statistical discrimination and tax payer resentment view for the case of welfare stigma. In the former case, the individual conditions, i.e. being needy or not being needy, matter for moral judgments. In the second, the stigma is linked to the status of the welfare recipient and not conditioned on personal characteristics. In our model we follow the second view.

[14]Lindbeck et al (1999) also assume that the psychological cost of living on unemployment benefits is not conditional on one's productivity.

Notice that the total esteem for others, or the social concern, $\bar{\alpha}_i$ (8) is an indication of the degree to which society as a whole complies with the ethical norm, as perceived by individual i. Further, notice that since actual behavior is taken as the sole basis for modifying sentiments, in a steady state individuals must have the same esteem for any two people who work the same number of hours.

Let us now consider the determination of φ_i, i's self-esteem. In the same manner as Lindbeck et al. (1999), we assume that one derives self-esteem from behaving in accordance with one's moral standards, and that working above the mean increases one's self-esteem. Moreover, we assume that the smaller the number of other individuals working above the mean, i.e., the more exclusive one's behavior, the greater the pride. Thus, we take self-esteem to depend negatively on the degree of social compliance as perceived by the individual, $\bar{\alpha}_i(t)$, and positively on one's labor effort relative to the mean $\frac{L_i(t-1)}{\bar{L}(t-1)}$. For concreteness we adopt the following formulation:

$$\varphi_i(t) = \frac{1}{1 + \bar{\alpha}_i(t)\frac{\bar{L}(t-1)}{L_i(t-1)}}. \tag{16}$$

We are interested in the stationary points of the dynamic process by which individual sentiments condition individual choices and, in turn, such choices influence future sentiments. There can be two types of stationary equilibria in our model.

The first type corresponds to the case in which everyone conforms to the moral standard and supplies the average number of work hours. Whatever is the matrix $\boldsymbol{\alpha}$ of coefficients necessary to support such behavior, no agent will have a reason to modify its esteem for any other agent or its own self-esteem. Furthermore, since in this case all agents supply the same quantity of labor, it turns out that individuals allocate their esteem over others without any bias or discrimination and hence $\sigma_i = \pi_i$ for all i. Because of this feature we call this type of stationary outcome cohesive.

The second type of stationary equilibrium is characterized by corner solutions of the dynamic process of socio-economic interactions. One set of individuals will work above the mean and another set will work below. In such an equilibrium, we shall have endogenous social clustering: those working above the mean will be perceived as industrious and will be the object of social admiration, whereas the other group will be perceived as lazy and will receive no social consideration. For obvious reasons we refer to this as a clustered stationary equilibrium.

5   Politico-Economic Equilibria

In each type of stationary equilibrium, both individual attitudes and labor supplies will be different for any given tax policy. We shall now characterize the politico-economic equilibria of this economy and examine the tax rate that the

majority (consisting of unskilled workers) would select (i.e., the Condorcet winner) in either type of stationary equilibrium. Together with this we shall also obtain a number of testable implications concerning the differences between the two types of equilibria.

5.1 Cohesive equilibria

We start by taking the tax rate as given.

From the individual labor supply function (5) and (16), we have that for all cohesive equilibria

$$L = (1 - \tau)(1 + \bar{\alpha}_i)\beta_i, \text{ for all } i. \tag{17}$$

It is clear that there can be many such equilibria and that they can be parametrized by the associated equilibrium level of labor. The higher the perceived compliance $\bar{\alpha}$, the higher will be the common labor time supplied and thus the corresponding output.

Our first remark is about the relationship between social concern and productivity in a cohesive stationary equilibrium.

Remark 1 *In any cohesive stationary equilibrium the concern for others by any individual i, $\bar{\alpha}_i$, is inversely related to its productivity β_i and to its pre-tax income y_i.*

The intuition for this result is straightforward. In a cohesive equilibrium all individuals supply the same amount of labor irrespective of their productivity and hence of their wage earnings. From the labor supply expression (5), this can only be achieved if the self-esteem of high productivity individuals is high and that of the low productivity individuals is low. Finally, from (16) it can be seen that social concern is inversely related to self-esteem.

From this it follows that the maximum labor effort compatible with a cohesive equilibrium corresponds to the case in which the most socially concerned individuals – the unskilled – attain the maximal level of social consideration, $\bar{\alpha}_u = 1$, while the minimum labor corresponds to the case in which the least concerned – the skilled – attain the minimum level of concern, $\bar{\alpha}_s = 0$. Putting these observations together, we have the following remark.

Remark 2 *In any cohesive equilibrium the common labor supply L satisfies*

$$(1 - \tau)\beta_s \leq L \leq 2(1 - \tau)\beta_u. \tag{18}$$

Expression (18) gives the pairs (τ, L) that are consistent with a cohesive stationary equilibrium. The possibility of sustaining a given level of effort L in a cohesive equilibrium depends on both the spread in the distribution of productivities and the degree of redistribution.

From (18) it is immediate that for a cohesive equilibrium to exist at all, it is necessary that the interval of values for the equilibrium L be non-empty. Therefore, we have the following Remark.

Remark 3 *For a cohesive stationary equilibrium to exist, the relative gap in productivities must satisfy*

$$\frac{\beta_s - \beta_u}{\beta_u} \leq 1, \ or\ equivalently\ \frac{\beta_s}{\beta_u} \leq 2. \tag{19}$$

In a cohesive equilibrium all individuals work the same amount and hence the relative gap in productivities is identical to the relative gap in earnings. Our previous Remark implies that for a cohesive stationary equilibrium to be sustainable, inequality in pre-tax incomes cannot be too large.

Let us now turn to the existence of politico-economic equilibria. The politico-economic equilibrium tax rate τ^* will be the one preferred by the unskilled workers, i.e., $\tau^* = \tau_u$. Notice that ex ante there is no reason why a politico-economic equilibrium should exist for either type of stationary equilibrium. Considering the case of cohesive equilibria, these can exist only if the ratio of L to $(1 - \tau)$ is within fixed exogenous bounds, as given by (18). There is nothing to preclude the tax preferred by the unskilled workers from violating this condition for each L.

Taking into account that all individuals provide the same effort, it is immediate from (11) that the degree of equilibrium inequality in a cohesive equilibrium is

$$I^* = \pi \frac{\beta_s - \beta_u}{\bar{\beta}}. \tag{20}$$

where $\bar{\beta} \equiv \pi\beta_s + (1 - \pi)\beta_u$. Additionally, since individual esteem is unbiased in this case, $\delta = 0$.

Hence, substituting into (14) we obtain the following politico-economic equilibrium tax τ^*:

$$\tau^* = \frac{I^*}{1 + \bar{\alpha}_u + I^*}. \tag{21}$$

The politico-economic equilibrium tax τ^* is increasing in inequality, as in M-R. Furthermore, from (21) it is immediate that the greater the social concern felt by the unskilled workers, $\bar{\alpha}_u$, the lower is the chosen tax rate. That is, in our model in which agents emulate the industrious, concern for others moderates rather than exacerbates the desire for redistribution even among the population with low income. Thus, we have the following Remarks.

Remark 4 *Cohesive politico-economic equilibria with higher social concern will have lower taxation.*

Remark 5 *Cohesive politico-economic equilibria with higher pre-tax inequality will have higher taxation.*

There can be a continuum of values of $\bar{\alpha}_u$ for which a politico-economic equilibrium may exist. However, these values are bounded above by 1 and

below by $\hat{\alpha}_u$. The lower bound $\hat{\alpha}_u$ corresponds to the case in which the skilled workers are perfectly egoistic. From (17) and using (20), we find that the limit social concern of the unskilled satisfies

$$\hat{\alpha}_u = \frac{\beta_s - \beta_u}{\beta_u} = \frac{I^*}{\pi(1 - I^*)}. \tag{22}$$

Therefore we obtain the following result

Proposition 2 (Existence of Cohesive Politico-Economic Equilibria) *Every cohesive stationary equilibrium with a tax rate τ^* satisfying*

$$\frac{I^*}{2 + I^*} \leq \tau^* \leq \frac{I^*}{K + I^*}, \tag{23}$$

where $K = \frac{I^* + \pi(1 - I^*)}{\pi(1 - I^*)}$, is a politico-economic equilibrium.

Notice that according to (20), in spite of there being many possible steady state cohesive equilibria, there is a unique equilibrium level of inequality I^*. Therefore, the bounds on τ^* are well defined. Further, that inequality cannot exceed the bounds given by (18), i.e. $I^* \leq \frac{\pi}{1+\pi} < \frac{1}{3}$.

FIGURE 1 ABOUT HERE

The intuition for this result is as follows. Different equilibria differ in the level of equilibrium effort and in the degree of redistribution. We depict the combinations of L and τ compatible with the bounds (18) by the gray area in Figure 1. The locus TT contains the vectors (τ, L) for which individual labor supply and the chosen level of redistribution are mutually compatible.[15] It is immediate that in any cohesive politico-economic equilibrium the higher the tax, the lower is the labor supply and output.

5.2   Equilibria with Social Clustering

In the second class of stationary equilibria one type of individual works above average and the other below. Social esteem is stationary because the hard working types receive the full admiration of everyone while the other types earn zero esteem. Thus sentiments become completely polarized and biased in favor of the hard working types.

Using the labor supply functions (5) together with (16), one can easily deduce that in this type of equilibrium the skilled workers work more than the unskilled and hence $\alpha_{u,s} = 1$ and $\alpha_{u,u} = 0$. In such an equilibrium the unskilled workers

---

[15]Writing the preferred tax rate explicitly, starting from a distribution of sentiments compatible with a cohesive equilibrium and solving for τ^* we get the equilibrium level of redistribution: $\tau^* = \left(\bar{\beta} - \beta_u\right) / \left(2\bar{\beta} - \beta_u + \bar{\alpha}_u \bar{\beta}\right)$ where $\bar{\beta}$ represents the average productivity. This tax rate must be jointly compatible with optimal labor supply. Hence, using the expression for τ^* together with (17) we obtain the expression for the locus TT: $L = (1-\tau^*)^2 \beta_u (\bar{\beta} - \beta_u) / \left(\tau^* \bar{\beta}\right)$.

will be regarded as lazy – even by themselves – and suffer from social exclusion.[16] We therefore have the following observations.

Remark 6 *In a clustered equilibrium skilled workers will work more than the unskilled.*

Remark 7 *In a clustered equilibrium all individuals will have maximal esteem for the rich/industrious and no concern for the poor.*

From (11) we can easily compute the degree of inequality I^o in a clustered equilibrium, namely,

$$I^o = \pi \frac{\beta_s \ell^o - \beta_u}{\pi \beta_s \ell^o + (1 - \pi)\beta_u}, \tag{24}$$

where ℓ^o is the unique equilibrium value of the ratio between the labor supplies of the two types of workers, $\ell^o = \frac{L_s^o}{L_u^o} > 1$.[17]

In view of (14) we can obtain the clustered politico-economic equilibrium tax. We know that $\bar{\alpha}_u = \pi$ and hence the equilibrium value for the index of attitudinal bias δ is

$$\delta^o = -\frac{1 - \pi}{\pi} I^o. \tag{25}$$

Hence, we have the following Proposition.

Proposition 3 (Existence of Clustered Politico-Economic Equilibria)
For every economy there exists a unique clustered politico-economic equilibrium with τ^o characterized by

$$\tau^o = \frac{I^o}{1 + \frac{1}{\pi} + I^o}. \tag{26}$$

From (26) we observe the following:

Remark 8 *The unique Politico Economic clustered equilibrium tax is increasing with the equilibrium degree of inequality.*

Notice now that the equilibrium tax depends positively on the size of the skilled population, which in turn is equal to the equilibrium degree of (biased) social concern.

---

[16]Here we abstract from personal circumstances in judging the behavior of others. However, suppose we had type-specific standards of behavior. Then the same type of equilibrium would survive if we expected the unskilled to work less than the skilled provided the actual effort by the former remained below our expectations and that of the latter exceeded our expectations.

[17]Proof in the Appendix.

15

5.3 Cohesive vs Clustered Politico-Economic Equilibria

In this subsection we compare the features of the two types of politico-economic equilibria.

We start by bringing together our two previous Propositions into the following result.

Proposition 4 *If inequality in skills is moderate – i.e. $\frac{\beta_s - \beta_u}{\beta_u} \leq 1$ – there are two types of politico-economic equilibria possible: cohesive and clustered. Beyond this threshold the unique politico-economic equilibrium is clustered.*

What are the consequences for society of being in one or the other equilibrium?

Observe that in the clustered equilibrium the workers with higher skills will be working more than the unskilled, while in the cohesive equilibrium all were working the same. Hence,

Remark 9 *For the same gap in productivities, earned income is more unequally distributed in a clustered equilibrium than in a cohesive equilibrium.*

We cannot give a general answer to the question of when we will see more redistribution. The differences across the two equilibria have opposing effects on the chosen tax rate. In a cluster equilibrium higher inequality will egoistically induce the choice of more redistribution, but the esteem bias towards the rich will favor lower redistribution. Which of the two forces dominates and precipitates more or less redistribution in the clustered than in the cohesive equilibrium cannot be established in general.

However, when comparing across different economies we can furnish the following result.

Proposition 5 *For the same level of inequality, I, the degree of redistribution chosen in a cohesive equilibrium is strictly larger than the one chosen in a clustered equilibrium. Furthermore, the gap $(\tau^* - \tau^o)$ increases with I.*

This directly follows from comparing τ^* with τ^o as characterized in (21) and (26) while bearing in mind that for any cohesive equilibrium the social concern by the unemployed, $\bar{\alpha}_u$, satisfies $\bar{\alpha}_u \leq 1 < \frac{1}{\pi}$.

This is summarized in Figure 2 which depicts the equilibrium redistribution in cohesive and clustered societies as a function of the degree of inequality.

FIGURE 2 ABOUT HERE

The model predicts that in either type of equilibrium the demand for redistribution increases with income inequality. However, if we compare economies in different types of equilibria – possibly precipitated by the extent of inequality – the economy with higher inequality may choose a lower tax rate. Therefore our model rejects the standard unconditional prediction of a negative relationship between inequality and redistribution across countries. Inequality leads to

16

lower redistribution whenever it is associated with social clustering involving an ethical bias toward the more productive members of society. Furthermore, the gap in the degree of redistribution widens with inequality since in clustered societies the social opposition to redistribution becomes stronger.

6   Discussion: US vs EU

The reasons why the US and European societies have implemented such different social contracts in spite their having such similar fundamentals is a matter of current debate. We now consider the predictions of our model in light of the evidence.

Our model yields two very distinct types of equilibria, cohesive and clustered; and behavior, attitudes and taxes differ between the two. Which kind of equilibrium corresponds to each case? Here the model yields a clear prediction: *if one of two countries has more inequality and less redistribution, then it must be in a clustered equilibrium while the other country is in a cohesive equilibrium.* Indeed, if both countries are in the same type of equilibrium, more inequality necessarily leads to more redistribution.

Our contention is thus that the US, having more inequality and less redistribution, must be in a clustered equilibrium while the EU is in a cohesive equilibrium. In this section we consider the testable features of each type of equilibrium and check whether the available evidence supports this view. We end the section by surveying the various arguments that have been advanced in the literature and contrast them with our own.

6.1   Testable Implications of the Model: US vs. EU

In the model we present each type of politico-economic equilibrium is characterized by the following features:

[1] PRE-TAX INCOME INEQUALITY: *Productivity differences and thus pre-tax income inequality must be low in a cohesive equilibrium, while they can be high in a clustered equilibrium.*

Concerning pre-tax earnings inequality, Katz and Autor (1999) report that the log of the ratio of the 90th percentile to the 10th percentile earner in 1994 was 1.45 in the US and 0.81 in Germany, for instance. Furthermore, they find that the dispersion has increased over the 70s to the 90s.[18] This trend toward an increased dispersion in earnings in the US economy has lead some sociologists and economists to argue that the middle class is the process of disappearing.[19]

The second dimension of inequality relevant to the model is the distribution of skills. Katz and Autor (1999) report a significantly higher spread in individual skills in the US, possibly driven by the technological shocks of the 80s and 90s.

---

[18]See also Devroye and Freeman (2001).

[19]See, for instance, Kosters and Ross (1988), Horrigan and Haugen (1988), and Duncan, Smeeding and Rodgers (1991). Wolfson (1994) and Esteban and Ray (1994) mention this phenomenon as a motivation for the concept of "polarization" of a distribution.

Skills in production are not only difficult to measure. They are not easy to define. The work of Devroye and Freeman (2001) addresses this problem using the OECD's International Adult Literacy Survey to assess the cognitive skills of the respondents. They document a much larger variation in the US, UK and Canada than in continental Europe.[20] For Acemoglu (2003), high school graduates in the US enjoy a skill premium that is about 50% larger than in Europe.

[2] INEQUALITY IN WORKING HOURS: *Clustered equilibria display greater dispersion in working hours across the population than cohesive equilibria.*

In this respect, Evans et al (2001) and Jacobs (2003) show that there is substantially more dispersion in hours worked in the US (and the UK) than in continental Europe.[21] Jacobs (2003), based on data from the Current Population Survey, finds that in the US 27 percent of the male labor force works 48 hours or more per week (28 percent in the UK). In contrast, Evans et al (2001) find that only 9 percent of the German and French male labor force works 50 hours or more (2 percent in the Netherlands).[22] Moreover, the distribution of the population over the weekly hours worked depicted[23] in Evans et al (2001) show a strong concentration of the population around 38-40 hours for EU countries, while for the UK (US is not included in the study) the largest share of respondents concentrate on 50 hours or more. As a matter of fact, in the UK the share of the population that works 38-40 hours (25%) is smaller than the share working 50 hours or more. In Germany, France and the Netherlands this share is around 65-70% of the population.

[3] INDIVIDUAL ATTITUDES: *In a clustered equilibrium, the highly skilled are perceived as hard working and are admired by everyone, whereas the low skilled are seen as lazy and are admired by no one. Moreover, these sentiments are shared by everyone, including the low wage earners themselves. In contrast, in a cohesive equilibrium agents' sentiments show no bias toward those of a particular income group.*

Attitudinal differences are more difficult to quantify than, say, hours worked or incomes. However, and with all due caution, there is some evidence to suggest that the behavior predicted by our model accords with the available data for the US and the EU countries.

In this respect, we venture the following claims:

a) *Role of work ethics.* While fundamental, this point is probably beyond the scope of hard evidence. Yet, it is obvious that modern Western culture seems

---

[20]The mean and standard deviation (in brackets) are respectively: US 283 (60). UK 281 (53), Germany 291 (40) and the Netherlands 295 (40).

[21]Alesina et al. (2001) also mention the spread in hours worked as a differential characteristic of the US. Using data from the Luxemburg income study they present a table with the median and the mean hours per income quintile.

[22]These figures are very similar to the ones for the year 1994 published at OECD, *Employment Outlook (Chapter 5, p. 158)* , based on the *European Union Labor Force Survey (Eurostat)* and the *Current Population Survey* for the US.

[23]The data were not supplied.

deeply permeated by this idea. Christian – and most emphatically Protestant – ethics assign a major role to the virtues of working hard. In a recent in-depth study, Lamont (2000) investigates the social attitudes of the US and French working classes. She finds that the hypothesis that Americans and Europeans have fundamentally different values is not supported by evidence. In both countries workers put hard work (together with the family) among the highest values and priorities.[24]

b) *Attitudes toward the poor.* Lamont (2000) documents important differences concerning the perception of others. While in France, workers value positively redistribution to the poor as a device to avoid social exclusion, the American counterparts explicitly state that the poor should not be supported because their situation is mainly due to their lack of effort. Another source of evidence is the World Values Survey. As reported in Alesina et al (2001), this survey shows that while 60% of Americans believe the poor are lazy, only 26% of Europeans share this belief, also in accordance with the predictions of our model. Finally, Fong (2001), based on the US 1998 Gallup Poll Social Audit (Gallup, 1998), which is restricted to American attitudes, finds that 40% of the respondents believe that lack of effort is the cause of poverty and 57% that effort is responsible for a person being rich.

[4] REDISTRIBUTION: *In either equilibrium, higher inequality leads to higher taxation, but for the same degree of inequality there is necessarily more redistribution in a cohesive equilibrium than in a clustered equilibrium. Further, in a clustered society even the poor would not be supportive of highly redistributive policies.*

Government intervention in the market economy is historically less in the US than in Europe, but this difference has substantially increased over the last thirty years. The share of welfare transfers over GDP in 2000 was 11 percent in the US and 18 percent in Europe, and the share of total government spending for the same year (excluding interest payments) was 30 percent and 45 percent, respectively. But this is not the only channel through which Europe has built a more redistributive society than the US. Income taxes are more progressive, education and health are publicly provided, and the labor market is much more regulated. On this point, we refer the interested reader to the comprehensive analysis of Alesina and Glaeser (2004) and Alesina et al. (2001).

We do not have direct, uniform evidence comparing the *distribution* of attitudes toward redistribution across the income spectrum for the US versus EU; we have only the degree of redistribution actually chosen by the voters. The only indirect data available pertains to peoples' feelings about inequality at different income levels. This information has been assembled by Alesina, Di Tella and McCulloch (2003), based on the US General Social Survey (1972-1997) and the Euro-Barometer Survey Series (1975-1992) where they question individuals about their happiness. They find that in Europe, the happiness of the poor is strongly negatively affected by inequality, while in the US poor seem to be

---

[24]See also Rokeach (1973).

totally unaffected by inequality.

There is evidence concerning the attitudes in the US only. According to the US 1998 Gallup Poll (Gallup, 1998) – as cited in Fong (2001) – among American families with incomes of $10,000 or less, 35 percent report that the government should not redistribute wealth by heavy taxes on the rich and 21 percent believe that the poor should help themselves rather than this being the government's responsibility.[25] More interestingly, Fong finds that income is a very poor predictor of redistributive attitudes.[26]

6.2   US vs EU: Alternative Explanations

There have been a number of attempts to explain the differences between the US and the EU social contracts. Generally, the aim is to identify a single model of rational economic and political behavior that can possess multiple politico-economic equilibria in which the economy with higher inequality might choose a lower degree of redistribution. The main independent causes of multiple equilibria that have been explored so far are capital market imperfections, strategic behavior in a dynamic/repeated voting framework, higher real or perceived income mobility, and the role of psychological and moral determinants of individual behavior. Our contribution falls within the last category.

Bénabou (2000) develops a model with *capital market imperfections*, coupled with the realistic assumption that political power increases with income. As is well-known, in the presence of capital market imperfections, inequality in the distribution of incomes can *per se* produce inefficiencies in the allocation of resources.[27] Therefore, redistribution has two opposing effects. On the one hand, taxation creates distortions in the choice of effort (or investment or savings, in dynamic models) and these reduce efficiency. But, on the other hand, redistribution mitigates the distortionary effects of capital market imperfections on individual choices. We would find support for redistribution when the beneficial effects from the softening of the capital market constraints exceed the costs induced via redistribution. In Bénabou's (2000) model this happens when there is little inequality to start with. Otherwise, the economy settles into a politico-economic equilibrium with higher inequality and low redistribution.

Hassler, Rodríguez Mora, Storesletten and Zilibotti (2003) also obtain multiplicity of equilibria in a dynamic OLG model with repeated voting. In their

---

[25] For the entire sample these percentages are 53.9 percent and 30.2 percent, respectively.

[26] Using data from the 1992 International Social Survey Program (for 12 countries including US and European countries), Corneo and Gruner (2001) find that self interest, individual work ethic, and a social rivalry effect all matter. They find the variable "hard work is key" to be significant in all specifications for all countries. Consistent with our comparison of clustered and cohesive societies, they also find that the selfish motive alone – the variable "I would gain from redistribution" – would lead Americans to redistribute more than Germans. Overall, US workers seem to be more averse to redistribution due to their individual work ethics; the variable "hard work is key" reduces the demand for redistribution in the US but not in Germany.

[27] See Bénabou (1996) for an excellent and comprehensive survey of the literature on the different channels through which capital market imperfections create inefficiencies in unequal societies.

model individuals can invest in education at birth. This determines the probability distribution of their future random incomes. The amount they invest in education depends (negatively) on the degree of redistribution they expect to prevail in the future. The model may have multiple voting equilibria. If individuals expect high redistribution in the future, then they anticipate that the amount of education purchased today will be small and hence the number of future beneficiaries (and hence supporters) of redistribution will be large. But by the same argument low redistribution can be an equilibrium as well. Although the channel through which multiple equilibria arise is different than the one we explore, some of the implications of both models are similar. In both, a temporary productivity shock may lead to a permanent low redistribution equilibrium (by shifting the economy between equilibria). Furthermore, in both models, given a sufficiently high degree of inequality in pre-tax incomes, the low redistribution state is the unique equilibrium.

A good portion of the literature focuses on differential *income mobility* as the main source of differences between the US and the EU social contracts. The US is considered to be more meritocratic, where it is thought to be possible to climb the socio-economic ladder through one's own effort, while social position in the EU is thought to be more history dependent, governed by family circumstance but sprinkled with a bit of luck. Piketty (1995) was perhaps the first to incorporate voters' beliefs concerning the relative role of effort versus random circumstance in determining income into a model of redistributive taxation.[28] The larger the perceived role of randomness, the more individuals would vote for greater insurance. Bénabou and Ok (2001) develop a model in which the poor face upward mobility prospects, and they show that under plausible assumptions poor people would vote for a moderate level of redistribution. Their main point is that, in a highly mobile society – as the US is purported to be – poor people would be willing to accept less redistribution in order to ensure that they can retain a larger share of their potential future benefits.

The problem with this line of argument is that this belief does not seem to be substantiated by facts. There is no conclusive evidence that there is more income mobility in the US than in Europe. In spite of this lack of empirical support, however, it is well documented that Americans believe that theirs is a highly mobile society whereas Europeans think of theirs as quite rigid. As an illustration of the different perceptions on the role of luck versus effort, Alesina et al. (2001) report that according to the World Values Survey a majority of Europeans (54%) believe that income differences are a matter of luck, but only a minority of Americans (30%) believe so. This is also in line with the findings in Alesina and La Ferrara (2001) that even within the US the individuals who believe that America offers equal opportunities are more averse to redistribution than the ones who do not. As a result, the attention has shifted toward explaining why individuals may persist in a systematic misperception of reality,

---

[28]The same line of argument has been recently explored by Alesina and Angeletos (2002). They also study conditions for multiple self-fulfilling equilibria where low redistribution endogenously implies that luck is less important for personal income *vis a vis* effort.

augmenting the income mobility approach to include *psychological factors*.[29]

Bénabou and Tirole (2002) explore the cognitive hypothesis that individuals may censor evidence that conflicts with their perception of reality. Their main argument is that in societies with little redistribution, by fear of the unmitigated negative consequences of underperformance, individuals do better by increasing their motivation to work hard and hence tend to exaggerate their success probabilities. The individuals' need to maintain strong psychological incentives explains why in societies with little redistribution we see persistent over-optimistic beliefs about the degree of income mobility. These beliefs in turn tend to moderate support for redistribution.

We conclude our review by locating our model within this broad landscape. Our model is essentially static[30], abstracts from strategic considerations, and assumes no market imperfections. Thus none of the first three sources of multiple equilibria pertain. Rather, our model focuses on the role of psychological and moral determinants of individual behavior. The model is most like that of Lindbeck et al (1999). In both cases moral attitudes play a key role in explaining individual labor supply decisions and the desired degree of redistribution. However, in our case, individuals are driven by moral persuasions rather than by social stigma. Most importantly, we apply a similar moral calculus in determining esteem for others as in determining self-esteem (or guilt). This difference accounts for the fact that in their model there is generically a unique political equilibrium[31] whereas in ours we can have multiple equilibria (when inequality is moderate).[32] It also explains why the poor choose lower redistribution when inequality is high in spite of their constituting the majority of the population. The most distinctive feature of our approach is that we view the labor supply decisions, the individual sentiments and the preferences over taxation as interdependent. All are determined jointly in equilibrium. The institutional structure influences individual decisions and attitudes, and attitudes affect the desired level of redistribution and thus the institutional structure.

---

[29] Alesina et al. (2001) test for the explanatory role of psychological, political and economic factors. In their work each factor is separately examined as a potential source of the differences among two prototypical welfare states. They find that psychological and political factors appear to play an essential role.

[30] Although we described the process by which labor supply and sentiments are updated as "dynamic," the agents themselves are myopic and fail to consider the effect of their actions on future variables. Thus, the process can be interpreted equivalently as an algorithm for determining a fixed point in a static model.

[31] Hence, the model cannot provide an explanation for multiple equilibria. However, in their conclusion, they mention the possibility of multiple *partial* equilibria in which expectations are fulfilled but the tax structure need not be a majority equilibrium.

[32] Lindbeck et al. (1999) do extend their analysis to include exogenous altruistic feelings for others. However, the esteem for others is driven by completely different considerations. They assume that agents are Rawlsian and hence only care about the worst-off individual. This assumption is a bit paradoxical for while "living on transfers" is considered a source of guilt and shame, those who decide not to work are supposed to earn the consideration of others in determining the level of taxation.

7 Concluding Remarks

Let us conclude the paper by discussing the robustness of our results and by examining the role played by our simplifying assumptions.

First, individual private utility was assumed to be additively separable and linear in income. In our view this assumption does not play a key role in establishing the qualitative results. Clearly, by assuming linearity we have excluded an essential source for the *social* desirability of redistribution and hence the obtained equilibrium tax rates are possibly lower than under preferences strictly concave in consumption. The specific assumption made concerning preferences for leisure does not seem to play any key role in our results either. The argument that in a cohesive equilibrium low productivity individuals should compensate for low monetary rewards with a higher sense of obligation clearly does not depend on our specification of individual preferences, nor the fact that in clustered equilibria the skilled workers would be working more than the unskilled.

Secondly, we have also made the assumption that production is proportional to total effective labor supply. It is plain that nothing essential would change had we assumed output to be a strictly concave function of total effective labor. The implicit assumption of infinite substitutability among the different types of labor may be more significant. One might expect that the degree of complementarity among different types of labor could play a critical role in the development of self-esteem as well as esteem for each other. However, that is not the case. In a previous version of the paper we considered the entire class of CES production functions, and we established that the degree of substitutability has no effect on the qualitative results.

Next, we have assumed only two productivity types. The implications of including a large number of types requires a more detailed discussion. Indeed, one might suspect that this is the major cause of the existence of a clustered equilibrium. We explored this possibility in our earlier work. The analysis becomes more complex and richer, but the main insights remain the same. With an arbitrary number of productivity levels, clustered equilibria continue to exist, with a threshold type dividing those who work above the mean from those who work below. In this case, together with the pure two-cluster equilibrium, we also have three-cluster equilibria with the medium range types supplying the mean quantity of labor. For those individuals conforming to the social norm, the relationship between monetary and moral rewards would be the same as in a cohesive equilibrium. Social concern would be inversely related to productivity. As in a cohesive equilibrium, one finds that the range of productivities among those individuals who conform to the mean depends on the degree of inequality in productivities and on the tax rate. Therefore, in those equilibria, the size of the population within the middle group that conforms to the average labor supply will depend on the degree of redistribution.

Politico-economic equilibria are charecterized similarly. It can easily be verified that for the general case, indirect preferences over tax rates are single peaked for any number of types. This guarantees the existence of a well-defined voting equilibrium with the equilibrium tax rate being that chosen by the me-

dian among the distribution of *peaks*.[33] While the main features of the different equilibria are unchanged, we have no basis to claim that the comparative statics analysis will remain essentially untouched.

Finally, in our model we have assumed that the distribution of individual skills is exogenous. This is particularly important because the inequality in pre-tax income or skill level plays a key role in the emergence of the different equilibria. It seems reasonable to assume that skills depend on education. But education is nowadays an integral part of the "social contract." Indeed the degree of egalitarianism produced by the educational system is clearly different in the US than in Europe. Making private or supplemental decisions concerning education seems an interesting extension of our analysis. However, including a second dimension in the political choice – redistribution via transfers and/or educational resources – is likely to render the problem intractable.

References

[1] Acemoglu, D. (2003) "Cross Country Inequality Trends" Economic Journal 113, 121-149.

[2] Akerlof, G. A. (1997) "Social Distance and Social Decisions" Econometrica 65, 1005-1027.

[3] Akerlof, G. A. and Kranton, R. (2000) "Economics and Identity" Quarterly Journal of Economics 115, 715-753.

[4] Akerlof, G. A. and Kranton, R. (2003) "Identity and the Economics of Organizations," mimeo

[5] Alesina, A. and Angeletos, G.M. (2002) "Fairness and Redistribution: US Versus Europe" mimeo

[6] Alesina, A. and La Ferrara, E. (2001) "Preferences for Redistribution in the Land of Opportunities" IGIER Working Paper n.178, 2000.

[7] Alesina, A, Di Tella, R. and MacCulloch, R. (2003) "Inequality and Happiness: Are Europeans and Americans Different?" NBER Working Paper 8198

[8] Alesina, A. and Glaeser, E. (2004) "Fighting poverty in the US and Europe: A world of Difference" Oxford University Press, forthcoming

[9] Alesina, A., Glaeser, E. and Sacerdote, B. (2001) "Why Doesn't the United States Have a European-Style Welfare State?" Brooking Papers on Economic Activity 2 - 2001

---

[33]Indirect utility is quadratic in τ and strictly decreasing at $\tau = 1$. This rules out any source of non-single-peakedness. Also private utilities are single crossing since consumption is assumed to be normal.

[10] Bénabou, R. (1996) "Inequality and Growth" in Bernanke B. S. and Rotemberg J.J. (eds) NBER Macroeconomic Annual. Cambridge and London MIT Press 11-74.

[11] Bénabou, R. (2000) "Unequal Societies: Income Distribution and the Social Contract" American Economic Review 90 96-129

[12] Bénabou, R. and Ok, E. (2001) "Social Mobility and the Demand for Redistribution: The POUM Hypothesis", Quarterly Journal of Economics, 116, 447-487.

[13] Bénabou, R. and Tirole, J. (2002) "Belief in a Just World and Redistributive Politics" mimeo.

[14] Bénabou, R. and Tirole, J. (2003) "Intrinsic and Extrinsic Motivation" Review of Economic Studies 70, 489-520.

[15] Bernheim, D. B. (1994) "A Theory of Conformity" Journal of Political Economy 101 (5) 841-877

[16] Besley, T. and Coate, S. (1992) "Understanding Welfare Stigma: Taxpayer Resentment and Statistical Discrimination" Journal of Public Economics 48 165-183

[17] Brekke, K. A., Kverndokk, S. and Nyborg, K. (2003) "An Economic Model of Moral Motivation" Journal of Public Economics, forthcoming

[18] Corneo, G. and Grüner, H.P. (2002) "Individual Preferences for Political Redistribution" Journal of Public Economics (83) 83-107.

[19] Darity, W. Jr. and Goldsmith, A. H. (1996) "Social Psychology, Unemployment and Macroeconomics" Journal of Economic Perspectives 10 (1) 121-140

[20] Deaton, A. (2003) "Fairness and Taxation" Annual Letter for the Royal Economic Society.

[21] Deci, E.L. (1971), "Effects of Externally Mediated Rewards on Intrinsic Motivation", Journal of Personality and Social Psychology, 18 105-115.

[22] Deci, E.L., Koestner, R. and Ryan, R.M. (1999), "A Meta-Analytic Review of Experiments Examining the Effect of Extrinsic Rewards on Intrinsic Motivation", Psychological Bulletin, 125 627-668.

[23] Devroye, D. and Freeman, R. (2001) "Does Inequality in Skills Explain Inequality of Earnings Across Countries?" NBER wp 8140.

[24] Duncan, G., Smeeding, T.M. and Rodgers, W. [1991], "W(h)ither the Middle Class? A Dynamic View," Levy Institute Conference on Income Inequality, Bard College.

[25] Earl, P. E. (1990) "Economics and Psychology: A Survey" Economic Journal 10 (402) 718-755

[26] Elster, J. (1989) "Social Norms and Economic Theory" Journal of Economic Perspectives 3, 99-117.

[27] Esteban, J. and Ray, D. (1994) "On the Measurement of Polarization," Econometrica 62, 819–852.

[28] Evans, J.M., Lippoldt, D.C. and Marianna, P. (2001) "Trends in Working Hours in OECD Countries", Labor Market and Social Policy, occasional papers no.45, OECD.

[29] Falk, A. and Fehr, E. (2002) "Psychological Foundations of Incentives" European Economic Review 46, 687-724.

[30] Fong, C. (2001) "Social Preferences, Self-Interest and the Demand for Redistribution" Journal of Public Economics (82) 225-246.

[31] Frey, B.S. (1997), *Not Just for the Money. An Economic Theory of Personal Motivation*, Edward Elgar.

[32] Frey, B.S. and Jegen, R. (2001) "Motivation Crowding Theory", Journal of Economic Surveys 15, 589-611.

[33] Gneezy, U. and Rustichini, A. (2000), "Pay Enough or Don't Pay At All", Quarterly Journal of Economics, 115 791-810

[34] Hassler, J. J.V. Redríguez Mora, Storesletten, K. and Zilibotti, F. (2003) "The Survival of the Welfare State" American Economic Review 93 87-112.

[35] Horrigan, M.W. and Haugen, S.E. (1988), "The Declining Middle Class Thesis: A Sensitivity Analysis," Monthly Labour Review 111, 3–13.

[36] Jacobs, J.A. (2003) "Changing Hours of Employment in American Families", University of Pennsylvania, Sociology Department working papers.

[37] Katz, L.F. and Autor, D.H. (1999) "Changes in the Wage Structure and Earnings Inequality", in O. Ashenfelter and D. Card, Handbook of Labor Economics, vol 3A, North Holland, 1463-1555.

[38] Kosters, M.H. and Ross, M.N. (1988), "A Shrinking Middle Class?". The Public Interest 90, 3–27.

[39] Kranich, L. (2001) "Altruism and the Political Economy of Income Taxation" Journal of Public Economic Theory 3(4) 455-469

[40] Kreps, D. (1997) "Intrinsic Motivation and Extrinsic Incentives" American Economic review 87, 359-364.

[41] Levine, D.K. (1998) "Modeling Altruism and Spitefulness in Experiments" Review of Economic Dynamics 1, 593-622.

[42] Lindbeck, A. and Nyberg, S. and Weibull, J.W. (1999) "Social Norms and Economic Incentives in the Welfare State" The Quarterly Journal of Economics 114, 1-35.

[43] Lindbeck, A. and Nyberg S. (2002) "Raising your Children to Work Hard: Altruism, Work Norms and Social Insurance" mimeo.

[44] Lamont, M.(2000) *The Dignity of the Working Men: Morality and the Boundaries of Race, Class, and Immigration* , Harvard University Press.

[45] Meltzer, A. H. and Richard, S.F. (1981) "A Rational Theory of the Size of Government" The Journal of Political Economy 89, 914-927.

[46] Murdock, K. (2002) "Intrinsic Motivation and Optimal Incentive Contracts", Rand Journal of Economics, 33 650-671.

[47] OECD (1994) "Employment Outlook", OECD.

[48] Piketty, T. (1995) "Social Mobility and Redistributive Politics" Quarterly Journal of Economics CX 551-583.

[49] Rabin, M. (1993) "Incorporating Fairness into Game Theory and Economics", American Economic review 83, 1281-1302.

[50] Rabin, M. (1998) "Psychology and Economics" Journal of Economic Literature XXXVI 11-46.

[51] Ray, D. and Ueda, K. (1996) "Egalitarism and Incentives" Journal of Economic Theory 71, 324-348.

[52] Roberts, K. W. S. (1977) "Voting Over Income Tax Schedules" Journal of Public Economics 8, 329-340

[53] Rokeach, M. (1973) "The Nature of Human Values" New York - Free Press

[54] Romer, T. (1975) "Individual Welfare, Majority Voting, and the Properties of the Linear Income Tax" Journal of Public Economics 4, 163-185.

[55] Sen, A. (1966) "Labour Allocation in a Cooperative Enterprise" Review of Economic Studies 33, 361-371.

[56] Snyder, J. and Kramer, G. (1988) "Fairness, Self-Interest, and the Politics of the Progressive Income Tax" Journal of Public Economics 36, 197-230.

[57] Wolfson, M.C. (1994) "When Inequalities Diverge," American Economic Review 84, Papers and Proceedings, 353–358.

8   Appendix

Proof of Proposition 1.

It is easy to verify that solving equation (14) and substituting appropriately yields $\tau_u = \frac{I + \bar{\alpha}_u \delta}{1 + \bar{\alpha}_u + I + \bar{\alpha}_u \delta}$. It remains to be shown that $\tau_u \geq 0$ and that this constitutes a maximum. Concerning the former, we will show that $I + \bar{\alpha}_u \delta \geq 0$, in which case $1 + \bar{\alpha}_u + I + \bar{\alpha}_u \delta > 0$ and hence $\tau_u \geq 0$.

Upon substituting terms, we see that $I + \bar{\alpha}_u \delta \geq 0$ if and only if

$$\left(\frac{\bar{y} - y_u}{\bar{y}} + \bar{\alpha}_u \frac{\bar{y} - \widetilde{y}^u}{\bar{y}} \right) \geq 0$$

which is true if and only if $(\bar{y} - y_u) + \bar{\alpha}_u(\bar{y} - \widetilde{y}^u) \geq 0$. Note that $(\bar{y} - y_u) = \pi(y_s - y_u)$. Then expanding terms and rearranging,

$$
\begin{aligned}
(\bar{y} - y_u) + \bar{\alpha}_u(\bar{y} - \widetilde{y}^u) &= \pi(y_s - y_u) + \bar{\alpha}_u(\pi - \sigma_u)(y_s - y_u) \\
&= [(1 + \bar{\alpha}_u)\pi - \bar{\alpha}_u \sigma_u)](y_s - y_u) \\
&= [(1 + (1 - \pi)\alpha_{u,u} + \pi\alpha_{u,s})\pi - \alpha_{u,s}\pi](y_s - y_u) \\
&= [1 + (1 - \pi)(\alpha_{u,u} - \alpha_{u,s})]\pi(y_s - y_u)
\end{aligned}
$$

Since $\pi \geq 0$ and $(y_s - y_u) \geq 0$, the sign of $I + \bar{\alpha}_u \delta$ is determined by $[1 + (1 - \pi)(\alpha_{u,u} - \alpha_{u,s})]$. And $[1 + (1 - \pi)(\alpha_{u,u} - \alpha_{u,s})] \geq 0$ if and only if $1 \geq (1 - \pi)(\alpha_{u,s} - \alpha_{u,u})$, or $\frac{1}{1-\pi} \geq (\alpha_{u,s} - \alpha_{u,u})$. But $\frac{1}{1-\pi} \geq 1$, and, given the upper and lower bounds on $\alpha_{i,j}$, $(\alpha_{u,s} - \alpha_{u,u}) \leq 1$. Therefore, $\tau_u \geq 0$.

Finally, we show that this constitutes a maximum. From (7) and (1) we obtain $V_u = v_u + (1 - \pi)\alpha_{u,u}v_u + \pi\alpha_{u,s}v_s$. Substituting from (6), we can express indirect utility as a quadratic function of τ:

$$
\begin{aligned}
V_u(\tau) &= (1 + (1 - \pi)\alpha_{u,u})\left[\frac{(1-\tau)^2 \beta_u^2}{2\varphi_u} + T + \varphi_u \right] + \pi\alpha_{u,s}\left[\frac{(1-\tau)^2 \beta_s^2}{2\varphi_s} + T + \varphi_s \right] \\
&= (1 + (1 - \pi)\alpha_{u,u})\left[\frac{(1-\tau)^2 \beta_u^2}{2\varphi_u} + \varphi_u \right] + \pi\alpha_{u,s}\left[\frac{(1-\tau)^2 \beta_s^2}{2\varphi_s} + \varphi_s \right] \\
&\quad + (1 + \bar{\alpha}_u)\tau\left[(1 - \pi)\frac{(1-\tau)\beta_u^2}{2\varphi_u} + \pi\frac{(1-\tau)\beta_s^2}{2\varphi_s} \right].
\end{aligned}
$$

Note that $V_u(0) > V_u(1)$. Also, from (13), we have

$$V_u'(0) = (1 + \bar{\alpha}_u)\bar{y} - y_u - \bar{\alpha}_u \widetilde{y}^u = (\bar{y} - y_u) + \bar{\alpha}_u(\bar{y} - \widetilde{y}^u),$$

which was shown to be nonnegative, above. This together with the fact that $V_u(\tau)$ is quadratic and $V_u(0) > V_u(1)$ are sufficient to conclude that the solution constitutes a maximum.

Proof of the uniqueness of the labor supply ratio in a clustered equilibrium.

Using (5) and (16), we obtain the respective labor supplies for the two types of workers:

$$L_u = (1-\tau)\beta_u \left[1 + \pi \left((1-\pi) + \pi \frac{L_s}{L_u} \right) \right]$$

and

$$L_s = (1-\tau)\beta_s \left[1 + \pi \left(\pi + (1-\pi) \frac{L_u}{L_s} \right) \right].$$

Taking the ratio of the two expressions and manipulating the result, we obtain the equilibrium condition

$$\psi(\ell) \equiv \pi^2 \ell^3 + (1 + \pi(1-\pi))\ell^2 - \frac{\beta_s}{\beta_u}(1+\pi^2)\ell = \pi(1-\pi)\frac{\beta_s}{\beta_u}.$$

Differentiating, we have

$$
\begin{aligned}
\psi'(\ell) &= 3\pi^2 \ell^2 + 2(1 + \pi(1-\pi))\ell - \frac{\beta_s}{\beta_u}(1+\pi^2) \\
&= 2\pi^2 \ell^2 + (1 + \pi(1-\pi))\ell + \frac{\psi(\ell)}{\ell}.
\end{aligned}
$$

Hence, we see (i) $\psi(0) = 0$, (ii) $\lim_{\ell \to \infty} \psi(\ell) = \infty$, (iii) $\psi'(0) < 0$, and (iv) $\psi'(\ell) > 0$ whenever $\ell > 0$ and $\psi(\ell) \geq 0$. This is sufficient to conclude that there is a unique ℓ satisfying the above equilibrium expression.
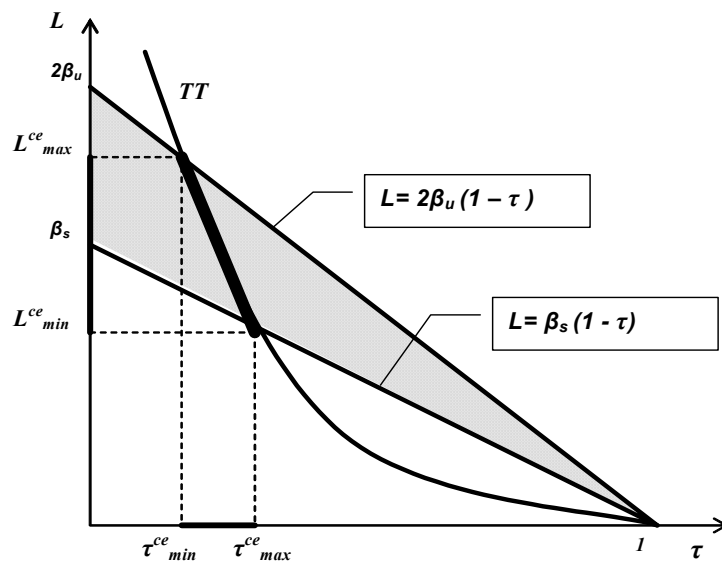
Figure 1

L

$2\beta_u$

TT

L^{ce}_{max}

β_s

L^{ce}_{min}

$L = 2\beta_u (1 - \tau)$

$L = \beta_s (1 - \tau)$

τ^{ce}_{min} τ^{ce}_{max} 1 τ

Figure 1: Cohesive Politico Economic Equilibria

Figure 2

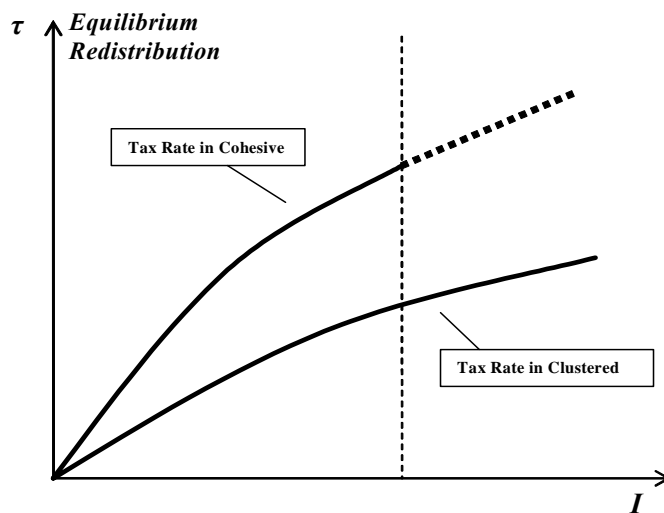τ *Equilibrium Redistribution*

Tax Rate in Cohesive

Tax Rate in Clustered

I

Figure 2: Inequality and Redistribution