Abstract

We examine the interactions between individual behavior, sentiments and the social contract in a model of rational voting over redistribution. Agents have moral “work values”. Individuals’ self-esteem and social consideration of others are endogenously determined comparing behaviors to moral standards. Attitudes toward redistribution depend on self-interest and social preferences. We characterize the politico-economic equilibria in which sentiments, labor supply and redistribution are determined simultaneously. The equilibria feature different degree of “social cohesion” and redistribution depending on pre-tax income inequality. In clustered equilibria the unskilled are accounted responsible for their low income since they work less than the skilled and redistribution is low.

Keywords: Social Contract, Endogenous Sentiments, Voting over Taxes, Moral Work Values, Redistribution, Income Inequality, Politico-Economic Equilibria.

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

In this paper we explore the interplay between work ethics, sentiments and social policy. We begin with the premise that agents have standards of behavior relative to which they judge the actions of others, increasing their regard for those who exceed the standard and decreasing it for those who fall short. Similarly, according to social psychologists, agents’ self-esteem is affected by their own deviations from moral standards in much the same way. As agents’ sentiments change, so, too, will their behavior. Moreover, this is likely to affect their view of the benefits of social programs and the worthiness of participants. The converse is true as well: social policies or institutions – the social contract – generally affect behavior and this, in turn, affects sentiments, as described above. Therefore, sentiments, behavior and social institutions must be determined jointly.

To study this interaction, we extend the model by Meltzer and Richard (1981) of rational voting over redistributive taxes to include endogenous sentiments. In their model, agents supply labor in return for competitive wages, and earnings are subject to a purely redistributive proportional tax. The tax structure is determined by majority rule and reflects the preferences of the median voter. Agents are assumed to be purely egoistic and the median income is below the mean. Under these circumstances, if labor supply were inelastic, the resulting tax policy would be fully confiscatory. However, since labor supply is endogenous and agents foresee the disincentive effects of taxation, they will temper their demands for redistribution and adopt a more moderate tax structure. An important implication of the model is that higher income inequality necessarily leads to greater equilibrium redistribution.

In contrast, we assume that agents are altruistic and that sentiments are determined endogenously. Specifically, we take the mean labor supply to be the social norm and we assume agents evaluate their own performance and that of others relative to this standard, increasing their regard for those who exceed the standard and decreasing it for those who fall short. The proposed model affords a plausible explanation for the emergence of different sentiments and social contracts. For example, consider the following four well-documented differences between the United States and Europe. First, in the US there is considerably greater inequality (in both pre-tax income and the distribution of skills) than in continental Europe. Next, despite having less inequality, European countries engage in significantly more fiscal redistribution. Third, the distribution of work hours is substantially more disperse in the

The impact on self-esteem and self-worth derives from the emotions of guilt and pride, which are referred to as self-regulative emotions by social psychologists because they induce reparative or self-correcting behavior. This is discussed below in sections 2 and 3.

The importance of work values is demonstrated by the fact that within the OECD approximately 60% of respondents to the World Values Survey either “strongly agree” or “agree” with the statement, “work is a duty towards society,” with little variation across countries.

For example, in 1996, the average before-tax Gini coefficient for European countries was 29.1 versus 38.5 for the United States (Deininger and Squire (1996)). Acemoglu (2003) documents that high school graduates in the US enjoyed a skill premium that is about 50% larger than in Europe.

The share of welfare transfers over GDP in 2000 was 11 in the US and 18% in Europe, and the share of total government spending for the same year (excluding interest payments) was 30% and 45%, respectively. See also Alesina and Glaeser (2004) and Alesina, Glaeser, and Sacerdote (2001) for an extensive discussion of the differences between US and continental Europe.
Finally, the fraction of individuals holding the poor responsible for their low income because of their laziness is much larger in US than in Europe. These stylized facts, which conflict or lie beyond the scope of theories with purely egoistic agents, are reconciled and rationalized by the predictions of our model.

Formally, we consider a continuum of agents who differ in their productivities. For simplicity, we assume there are only two types of individuals, skilled and unskilled, with the latter comprising more than half of the population. Agents have private preferences over consumption and leisure and social preferences that take into consideration the welfare of others. In addition, private preferences depend on self-esteem which is subject to the moral calculus mentioned above, namely, the more one works relative to the social standard of behavior, the greater the perception of oneself as industrious and the greater the sense in which leisure is "well deserved." The social component of the utility function consists of a weighted average of the (private) well-being of others, where the weights depend on their industriousness.

The endogenous variables in our model – labor supply, sentiments and taxes – are determined as follows. First, given their sentiments and the tax schedule, agents make labor supply decisions. Since there is a continuum of individuals, the labor supply decision has no impact on others and is therefore made on the basis of private preferences. Next, having determined their labor supplies, we assume agents evaluate such behavior relative to the moral standard, or average labor supply. Finally, given their sentiments, individuals vote over redistribution, anticipating the labor supply effects of taxation. Since the tax policy has an economy-wide effect, such voting decisions are made on the basis of social preferences. Since a majority of agents are unskilled, the median tax policy will be that preferred by an unskilled worker.

A politico-economic equilibrium consists of a vector of labor supplies, sentiments and tax policy such that each is optimal given the other components and all such variables are compatible. There are two types of politico-economic equilibria in our model. In a cohesive equilibrium all individuals conform to the social standard and supply equal quantities of labor. In these equilibria all agents receive equal social consideration. The chosen tax rate might be high relative to the second type of equilibrium. In contrast, in a clustered equilibrium, society is divided into two groups or clusters. One consists of the most productive individuals who work above the mean, while the other consists of the least productive individuals who work below the mean. In a clustered equilibrium the chosen tax rate might be lower than in a cohesive society. Whether an economy becomes cohesive or clustered...
depends on the degree of inequality of pre-tax income or skill level. If inequality is below a critical level, then cohesion results, whereas higher inequality leads to social clustering.

The theory provides several novel implications concerning the relationship between labor supply, inequality, redistribution and individual attitudes. First, the distinguishing feature of cohesive equilibria is that all agents adhere to the social norm. Hence, for low levels of inequality (associated with cohesive equilibria) we observe little or no dispersion in labor supply, while for high levels of inequality there is a widening gap between the labor hours of skilled and unskilled workers. Second, the model offers a plausible explanation of how inequality and redistribution might be inversely related in spite of the fact that the poor constitute a majority. In a cohesive equilibrium, all agents contribute the same level of effort and hence differences in income are solely attributable to the exogenous inequality in productivities. As such, those with low skill are seen to be poor through no fault of their own. In this case higher income inequality leads to support for greater redistribution. Such a positive relationship holds for moderately higher levels of inequality as well. But when productivities are sufficiently different that clustering occurs, this may lead to large differences in labor supply. In this case the poor are seen to be at least partly responsible for their low income and support for redistribution declines. It follows that we might observe one (cohesive) society with low pre-tax earnings inequality choosing to redistribute more than another (clustered) society with greater inequality. Moreover, such divergent attitudes toward the poor (and the cause of poverty) are endogenously (and accurately) determined.

The paper is organized as follows. Section 2 discusses the related literature. Section 3 describes the basic set up, characterizes optimal labor supply and discusses the determination of sentiments. Section 4 examines the emergence of socioeconomic equilibria, where the tax structure is taken as given. Section 5 studies preferences over redistribution and characterizes the politico-economic equilibria in which taxes, sentiments and labor supply are determined jointly. In Section 6 we specify functional forms which allow us to analytically characterize the different equilibria and to study explicitly the relationship between inequality, social cohesion and redistribution. Finally, Section 7 discusses the role of the assumptions and the robustness of the results. Proofs are relegated to the Appendix.

2 Related Literature

This paper is related to several literatures. First, it contributes to the literature on endogenous preferences, both private and social. The latter has been the subject of a number of recent papers attempting to explain reciprocal behavior. Generally, such papers, including Rabin (1993), Levine (1998), Fehr and Schmidt (1999), Bolton and Ockenfels (2000), and Falk and Fischbacher (2006), have focused on the interaction among pairs of players where each player attempts to infer the motive of its partner and then modifies its social preferences accordingly, giving greater weight to partners who are believed to be benevolent and less weight to those who are selfish or malevolent. In contrast, we consider the interaction among large groups (classes) of agents – hence, no single player is directly affected by any other – and we evaluate behavior relative to a social norm, with no attempt to infer

Note that a significant impediment to extending these theories to include more than two players is the difficulty in imputing motives to a single player when the outcome depends on the behavior of all players.
m motives.

Second, we propose a theory of the interaction between social norms and individual behavior. For the particular case of norms pertaining to work, seminal contributions by Moffit (1983) and Besley and Coate (1992) consider the case in which there is stigma associated with living on welfare. Lindbeck, Nyberg, and Weibull (1999) have extended this analysis to include voting over welfare benefits. There, individuals can choose between working full-time or being unemployed and receiving a subsidy. Agents bear a “psychic cost” from deviating from the norm and being stigmatized. However, the magnitude of this effect depends on the prevalence of such behavior – more common behavior is stigmatized less. Hence, the observed behavior of others influences the perceived cost of deviating from the norm and thereby affecting the decision to do so. Similarly, in our model, the violation of work norms entails psychological costs. Following the literature in social psychology on self-regulatory emotions, individuals experience guilt or pride when their behavior respectively falls short or exceeds their own moral standards. These emotions serve a self-regulatory function: the feeling of guilt for violating the standard increases moral pressure and induces an individual to undertake reparatory actions. As a result, moral values and economic incentives jointly determine individual behavior. Our model departs from the work of Lindbeck, Nyberg, and Weibull (1999) in two essential ways. First, we focus on the intensity of work effort, which here varies continuously, versus the binary choice of working full-time or living on welfare. This also implies that in our setup moral and economic incentives are non-separable and jointly influence behavior. Second, it is crucial in our model that moral judgements befall on others as well as oneself. It is the contrast between “normal” behavior and observed behavior that influences esteem. This allows us to study how inequality and moral values shape the social consideration of the different groups and, accordingly, preferences for redistribution and the social

\[10\] Elster (1989) distinguishes rational action in pursuit of future rewards from norm driven behavior. He discusses the scope of such norms to affect economic behavior – including work norms – and he considers several arguments for their existence. Some studies attempt to explain the emergence and/or persistence of different ethics or social norms. Lindbeck et al. (2006) study how parents seek to instill work norms in their children which are sustained by guilt. Tabellini (2007) study the adoption and transmission of values of generalized morality. In contrast, the present paper investigates the economic and political consequences of such norms, taking their existence as given.

\[11\] In particular, Lindbeck et al (1999) consider agents faced with such discrete choices. There, the moral component of the utility function is additively separable thus ruling out any influence on the substitution of labor for consumption. In their paper, “welfare stigma” entails a lump-sum psychological cost. A large body of research documents interactions between economic and non-economic incentives. Deci et al (1999) have shown definitively that tangible rewards undermine intrinsic motivation. Kehr (2004) finds that this is the case unless the extrinsic motivation does not deactivate task enjoyment. 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.”

\[12\] See also Bowles and Hwang (2008) for a mechanism design approach studying the role of separability of ethical and economic incentives.

\[13\] Several important contributions, most notably by Bénabou (2002) and Bénabou and Tirole (2002 and 2003), have investigated the related, but different, concepts of self-confidence, self-awareness and self-motivation. These papers entail incomplete information of the motives of other agents and analyze alternative incentive schemes and signaling mechanisms. Thus, agents’ motives do not change, but their knowledge of such motives does: observed behavior provides information with which to update beliefs. In contrast, in our model motives or sentiments do change. That is, observed behavior directly affects sentiments as well as determining the social standard. Finally, Brekke, Kverndokk, and Nyborg (2003) and Akerlof and Kranton (2004) 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.
contract.

Third, the paper contributes to the theoretical analysis of rational voting over redistribution. The seminal contribution of Meltzer and Richard (1981) is extended to include endogenous social preferences. When voting on redistribution in support of the poor, agents choose the level of redistribution that maximizes the sum of their egoistic utility and a (generalized utilitarian) social welfare function. Our modelling strategy is in line with recent empirical evidence suggesting the importance of other-regarding preferences in explaining support for redistribution to the poor and on the role of moral work values. Luttmer (2001) provides evidence that attitudes toward redistribution are driven by both self-interest and interpersonal preferences and finds that support for welfare spending decreases with the recipiency rate in the community. The evidence by Fong (2001), Corneo and Grüner (2002) and Alesina and La Ferrara (2005) show that individuals who believe in the role of hard work support less redistribution. Fong (2007) finds that unconditional giving increases significantly to recipients who appeared industrious as compared to those who appeared lazy.14 To the best of our knowledge no theoretical analysis has studied the link between social preferences, moral values and equilibrium redistribution in a unified framework.15 Some papers consider the issue of voting and redistributive taxation when agents have an ethical point of view but without the additional element of moral values. Snyder and Kramer (1988) and Alesina and Angeletos (2005) study the choice of redistribution when individuals care about fairness. Kranich (2001) provides a theory of voting over redistribution with endogenous labor supply, but when (altruistic) social preferences are given. There, agents vote iteratively on the basis of the current distribution of income rather than fully anticipating the effect of taxes. The results in this paper allow us to qualify the standard median voter hypothesis predicting a positive and monotonic relationship between inequality and redistribution which, as now well recognized, fails to hold in practice. Perotti (1996) reports the lack of any significant linear correlation while some authors, like De Mello and Tiongson (2006), find evidence of a significant non-monotonic relationship in the OECD countries.16 In line with these findings, our results suggest a possible non-monotonic relationship between inequality and social attitudes toward redistribution. The social consideration of each group is related to the labor supply of its members. As a result, there is less support for progressive redistribution when the poor are considered (partially) responsible for their low income due to their low effort.17

Finally, the paper contributes to the recent debate on the cause and interpretation of the observed

\footnote{Fong (2006) finds that moral worthiness is a more robust predictor of attitudes toward redistribution than prospective social mobility. In their field experiment, Fong and Luttmer (2007) manipulated respondents’ perceptions of the income, race and deservingness of Katrina victims. They find that subjective support for government spending to help the victims is significantly affected by deservingness manipulations.}

\footnote{The role of work values on voting behavior has been recognized for some time in other social sciences (see Kinder and Sears (1988)) although no formal theory has been proposed.}

\footnote{Rodriguez (1999) also fails to find evidence within US states. Milanovic (2000), despite finding a negative correlation between inequality and redistribution, finds no evidence that the median voter receives income gains from fiscal redistribution. See also Bénaou (1996 and 2000) for extensive surveys of the evidence.}

\footnote{Non median voter theories of redistribution include, Roemer (1998) that argues that the redistributive issue may be less salient than others, e.g. religion and Rodriguez (2004) that shows that if political influence is exerted by lobbying or campaign contributions then larger inequality may be associated with greater political influence of the rich and, hence, low redistribution.}
differences in “social contracts,” in particular between the US and the EU.\textsuperscript{18} The proposed explanations have included capital market imperfections, the relative role of luck versus effort in determining future income, and real or perceived differences in income mobility. Bénabou (2000) shows that in the presence of capital markets imperfections there is a trade-off between the efficiency gains from greater redistribution and the efficiency losses from increased tax distortions. In his model, there are multiple equilibria each associated with a different social contract.\textsuperscript{19} Hassler, Rodriguez Mora, Storesletten and Zilibotti (2003) characterize multiple equilibria in a dynamic voting model in which individuals’ expectations about (high) redistribution and (low) investment in education can be mutually supportive in equilibrium, thus affecting the correlation between effort and income. Piketty (1995) investigates the role of beliefs concerning the relative importance of luck and effort in income production and shows that they can be self-fulfilling. Similarly, in a model in which individuals have preferences for fairness and vote over taxes, Alesina and Angeletos (2005) show that there may be multiple, self-supporting equilibria in which a society that believes that much of inequality is (unfairly) due to luck will vote for more redistribution which will reduce the returns to effort and increase the role of luck. Bénabou and Ok (2001) present a model in which the (egoistic) poor face upward mobility prospects, and they characterize conditions under which the poor would rationally vote for a moderate level of redistribution. Finally, Bénabou and Tirole (2005) explore the cognitive hypothesis that individuals may censor evidence on social mobility that conflicts with their perception of reality, and they study the implications for redistributive politics. The emerging overly optimistic beliefs tend to moderate support for redistribution. Our contribution is complementary to this strand of literature and it does not rely on real or perceived differences in mobility, asymmetric information or imperfections in capital markets. In our case the different types of equilibria are associated with different endogenously determined sentiments toward oneself and others. The ultimate determinant of which type of equilibrium will prevail is the degree of pre-tax inequality.

3 The Model

3.1 Set Up

There are two commodities, consumption $c$ and labor $L$, and a continuum of agents on $[0, 1]$. Individuals are of one of two types, skilled or unskilled, distinguished by their productivities/wage, $\beta_s$ and $\beta_u$, respectively, where $\beta_u < \beta_s$. Average productivity is denoted $\beta$. Let $\pi$ denote the proportion of individuals of type $s$. We assume $\pi < \frac{1}{2}$, reflecting the fact that a majority of agents are unskilled. The amount of effective labor supplied by an individual with productivity $\beta_i$ is $\beta_i L_i$, for $i = u, s$. We assume output depends linearly on effective labor so that

$$Y = (1 - \pi)\beta_u L_u + \pi\beta_s L_s. \quad (1)$$

\textsuperscript{18}The comparison of the US versus EU social contracts has generated a significant amount of literature some of which is discussed below. For an overview of the main differences we refer the interested reader to the extensive analysis in Alesina and Glaeser (2004).

\textsuperscript{19}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.
Labor income is subject to a purely redistributive linear income tax described by the pair \((\tau, T)\), where \(\tau \in [0, 1]\) is the constant marginal tax rate and \(T\) is a budget balancing uniform per capita transfer. That is,

\[ T(\tau) = \tau \left[(1 - \pi) y_u + \pi y_s\right] \equiv \tau y, \tag{2} \]

where \(y_i = \beta_i L_i\) is the pre-tax income of individual \(i\) and \(y\) is average income. Hence, individual after-tax disposable income is

\[ y_i^d = (1 - \tau) y_i + T = (1 - \tau)\beta_i L_i + T, \tag{3} \]

which we assume is entirely consumed.

The overall welfare evaluation of an individual of type \(i\), which we denote \(V_i\), is composed of the sum of two components, private utility, \(v_i\), and social utility, \(w_i\). The latter captures the effect of \(i\)'s social concern for others and is studied in detail below. Hence, we have

\[ V_i = v_i + w_i. \tag{4} \]

**Private utility.** Focusing first on \(v_i\), we assume, as in Lindbeck et al. (1999), that private utility depends on consumption, \(c_i\), and leisure, \(l_i \in [0, L]\) (\(L_i = L - l_i\)), as well as on the psychological parameter \(\varphi_i\) which in this setting captures self-esteem. Thus, we write

\[ v_i = v(c_i, l_i, \varphi_i). \tag{5} \]

We assume \(v\) is strictly increasing and concave, that consumption and leisure are both normal goods, and that \(v_{cl} \geq 0\). We also assume initially that \(v\) satisfies the standard Inada conditions.\(^{20}\) In the sequel, the parameter \(\varphi_i\) will be determined endogenously through social interaction, but for now we take it as given. We denote \(\varphi = (\varphi_u, \varphi_s)\) with \(\varphi_i \in [\varphi_u, \varphi_s].\)\(^{21}\)

**Social utility.** Turning to the social or altruistic component of (4), we assume \(w_i\) consists of a weighted sum of the private utilities of the other agents. Let \(\alpha_{i,j} \geq 0\) denote the relative weight assigned by \(i\) towards an individual of type \(j\) so that \((1 - \pi)\alpha_{i,u} + \pi \alpha_{i,s} = 1\). The social component of overall utility is thus given by

\[ w_i = (1 - \pi)\alpha_{i,u} v_u + \pi \alpha_{i,s} v_s = [(1 - \sigma_i) v_u + \sigma_i v_s] \tag{6} \]

where

\[ \sigma_i \equiv \alpha_{i,s} \pi \tag{7} \]

\(^{20}\)We assume the Inada conditions \((\lim_{c \to 0} v_c = \infty, \lim_{c \to \infty} v_c = 0, \lim_{l \to 0} v_l = \infty, \text{ and } \lim_{l \to -L} v_l = 0)\) are satisfied in order simplify the exposition by insuring interior solutions. However, we relax this assumption in the second part of the paper where we illustrate the working of the model by means of a quasi-linear utility specification.

\(^{21}\)Since agents differ only in their productivities, all agents of the same type will behave in the same fashion in equilibrium. Hence, in our behavior-based theory of endogenous sentiments, we assume all such agents of the same type have the same self-esteem and regard for others.
is the weight that agent $i$ allocates to the group of agents of type $s$.\footnote{We thus exclude malevolence. This is for expositional convenience. The critical assumption for our results is that $\alpha_{i,j}$ is bounded below.}

### 3.2 Labor Supply

The choice variables in our model are labor supply, $L_i$, and the voting decision or preferred marginal tax rate, $\tau_i$. ($T$ will be determined by (2) and sentiments will be determined endogenously as a result of the labor supply decisions.) In this section, however, we focus on the labor supply decision only, taking the tax policy (and sentiments) as given.

Since there is a continuum of agents, each individual agent is negligible with respect to the entire economy. Therefore, their choice of labor supply cannot have a direct effect on the well-being of other agents. Consequently, in determining individual labor supply, only the private component of utility matters. (The social component will play a role in voting over taxes.) Thus, individual $i$ chooses its labor supply to maximize its private utility subject to the budget constraint (3), that is, $i$ solves

$$
\max_{L_i} v \left( c_i, L - L_i, \varphi_i \right)
$$

subject to

$$
c_i = (1 - \tau) \beta_i L_i + T
$$

$$
L_i \leq \bar{L}
$$

Substituting for $c_i$ and differentiating $v$ with respect to $L_i$, we obtain

$$
\frac{\partial v}{\partial L_i} = v_c ((1 - \tau) \beta_i L_i + T, i, \varphi_i) (1 - \tau) \beta_i - v_l ((1 - \tau) \beta_i L_i + T, i, \varphi_i). 
$$

Differentiating again, we have

$$
\frac{\partial^2 v}{\partial L_i^2} = v_{cc} \left( . \right) (1 - \tau)^2 \beta_i^2 - 2v_{cl} \left( . \right) (1 - \tau) \beta_i + v_{ll} \left( . \right) D < 0.
$$

Since $v$ is concave and satisfies the Inada conditions, it follows that the labor supply function is implicitly defined by the first order condition $\frac{\partial v}{\partial L_i} = 0$, or by

$$
\frac{v_l \left( (1 - \tau) \beta_i L_i + T, \bar{L} - L_i, \varphi_i \right)}{v_c \left( (1 - \tau) \beta_i L_i + T, \bar{L} - L_i, \varphi_i \right)} = (1 - \tau) \beta_i.
$$

Expression (9) implicitly defines the optimal labor supply as a function of the relevant parameters: net wage, self-esteem and per capita transfer, i.e.,

$$
L_i = \lambda((1 - \tau) \beta_i, \varphi_i, T).
$$

Here, the marginal rate of substitution between consumption and labor depends on $\varphi_i$, thereby affecting the labor supply decision. Totally differentiating with respect to $L_i$ and $\beta_i$ in (9), we obtain

$$
\frac{dL_i}{d\beta_i} = \frac{-1}{D} (1 - \tau) \left\{ v_{cc} \left( . \right) (1 - \tau) \beta_i L_i + v_c \left( . \right) - v_{cl} \left( . \right) L_i \right\},
$$

$$
\frac{dL_i}{d\beta_i} = \frac{-1}{D} (1 - \tau) \left\{ v_{cc} \left( . \right) (1 - \tau) \beta_i L_i + v_c \left( . \right) - v_{cl} \left( . \right) L_i \right\},
$$

8
where $-1/D > 0$. Let us denote by $\varepsilon_{vc,L}$ the elasticity of the marginal utility of consumption with respect to labor, that is,

$$
\varepsilon_{vc,L} = [vc(.) (1 - \tau) \beta_i - vd(.)] L_i/vc(.)
$$

Then (11) can be written as

$$
dL_i/d\beta_i = -1/D (1 - \tau) (\varepsilon_{vc,L} + 1) vc(.) \tag{12}
$$

Making the assumption that $|\varepsilon_{vc,L}| < 1$ insures that $dL_i/d\beta_i > 0$, or that labor supply increases with the wage.23

### 3.3 Work Norms, Self-Regulatory Emotions and Behavior

Having determined agents’ labor supplies, we turn now to the issue of how their behavior affects their self-perception as well as their impression of others. A vast literature in Social Psychology studies the role of moral values as determinants of individual behavior and of social interactions. Rokeach (1973) defines values as general and enduring standards that help us “to evaluate and judge, to heap praise and fix blame on ourselves and others”. Particularly important for the economic domain are moral values concerning work and industriousness. As Lukes (1973) notes, "work values" are crucial in western culture which “... celebrates the virtues of hard work and sacrifice. It equates idleness with sin”.

We assume agents have standards of appropriate behavior and they judge their own behavior and that of others relative to the standard. Deviations from the standard affect self-esteem and the social consideration of others. The impact on self-esteem derives from the emotions of guilt and pride. The avenue through which this functions is well known within social psychology (see Tangney (2002)). Furthermore, a large and established body of experimental evidence documents the self-regulatory role of these emotions. For example, in experimental settings participants who experience guilt are much more likely to comply with moral standards. See e.g. Freedman et al. (1967), and Tangney (1995, 2002).24 Finally, there is ample evidence that deviations from social norms or behavioral standards affects the social consideration for others as well (see e.g. Crocker and Park (2003)).

Our modelling of the role of moral values is in keeping with these findings. We take the standard of behavior to be the average quantity of labor. Those who work more than the average are considered industrious and those who work less are considered lazy. This affects the social consideration they are afforded by other agents. In addition, those whose labor supply exceeds the norm experience pride and those who work less experience guilt. In this case, the “reparative action” brought on by guilt is to increase one’s labor supply.

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23Such a restriction is unnecessary in the second part of the paper, where we consider quasi-linear utility.

24In addition to the established evidence in experimental psychology, an increasing number of neurobiological studies document the key role of social self-conscious emotions for moral judgment and behavior (see Greene et al. (2001), Koenigs et al. (2007) and references therein). Koenigs et al. (2007) discuss previous findings and provide evidence based on functional magnetic resonance imaging and experiments. They find that patients with focal bilateral damage to the ventromedial prefrontal cortex (the brain region necessary for the generation of social emotions) produce an abnormal response to moral dilemmas. The findings support the necessary role of social emotions for moral behavior.
Thus, within our model, deviations from the moral standard affect (i) the level of self-esteem, \( \varphi_i \) and (ii) the distribution of social consideration, \( \sigma_i \). In addition, such deviations induce corrective behavior. To incorporate these features, we envision a discrete time adjustment process in which labor supply decisions are made on the basis of current sentiments (as described in the previous section), and sentiments change in response to the labor supply decisions.\(^{25}\) Formally, we model the previous effects as follows:

(i) [Self-esteem] Self-esteem changes in response to deviations from the moral standard. Specifically, working more than the mean increases self-esteem and working less decreases it:\(^{26}\)

\[
L_i(t-1) \geq L(t-1) \implies \varphi_i(t) \geq \varphi_i(t-1).
\]

(ii) [Social esteem] Esteem of agent \( i \) towards agent \( j, \alpha_{i,j}, \) is determined by past performance according to

\[
\alpha_{i,j}(t) = \frac{L_j(t-1)}{L(t-1)}
\]

that is,

\[
\sigma_i(t) = \frac{\pi L_i(t-1)}{L(t-1)}.
\]

Notice that (14) implies,

\[
L_j(t-1) \geq L_i(t-1) \iff \alpha_{i,j}(t) \geq \alpha_{i,i}(t).
\]

that is, hard working people earn higher esteem than those considered lazy because they are seen to be more deserving.\(^{27}\) Individuals working less (more) than average are taken to be partially responsible for their low (high) income. Hence, the social concern felt towards them will readjust accordingly.

Finally, as already mentioned, moral values have a self-regulative role. The reparative action triggered by guilt is to supply more labor. This requires that the marginal rate of substitution (for \( v \)) between consumption and leisure is increasing in \( \varphi \), that is,

\[
\frac{d}{d\varphi_i} \left( \frac{v_i}{v_c} \right) > 0.
\]

Hence, guilt leads to an increase in labor supply, and, conversely, pride in one’s accomplishments reduces the moral pressure to work. Thus, the marginal effect of the latter is to reduce labor supply.\(^{28}\)

\(^{25}\)In spite of the fact that we formally introduce time, the model is essentially static. Our goal is simply to characterize the fix points of the adjustment process for self-esteem and social consideration. Describing these effects in terms of a discrete time adjustment process clarifies the information agents have available at the moment of making their labor supply and voting decisions.

\(^{26}\)When considering the relationship between contemporaneous, or within period, variables, we omit reference to time. In addition, we omit such reference in the sequel when referring to steady state values.

\(^{27}\)The assumption that social consideration is allocated in proportion to labor supply is made for simplicity. As discussed in Section 7, below, one could alternatively assume that deviations from an initial distribution \( \alpha^0 \) are allocated in proportion to labor supply (with stationarity characterized by \( L_i = L \) for all \( i \), such as in \( \alpha_{i,j}(t) = \alpha_{i,j} \frac{L_j(t-1)}{L(t-1)} \)). This would allow for an initial bias in favor of the poor when their low earnings occur through no fault of their own. Also, one could rescale the allocation of social esteem to reflect the findings in Luttmer (2001) that individual support for redistribution is larger if it helps members of the same group. All qualitative results would be unchanged.

\(^{28}\)As discussed in Section 7, this self-regulative role of moral values turns out to be key for insuring the stability of equilibrium moral standards but is not required for the existence of equilibrium. In particular, if agents were to decrease
To see this, note that differentiating (9) we obtain
\[
\frac{dL_i}{d\varphi_i} = - \frac{1}{D} [v_{i\varphi}(\cdot) (1 - \tau) \beta_i - v_{i\varphi}(\cdot)].
\] (17)

From (16) together with the first order condition (9) we have,29
\[
\frac{dL_i}{d\varphi_i} < 0.
\] (18)

The labor supply function \( \lambda((1 - \tau) \beta_i, \varphi_i, T) \) in (10) thus has the property that both higher economic rewards (net wage) and increased moral pressure (associated with the perception of being lazy) increase labor effort.

At this point, a few comments on the role of moral values for work motivation are in order. First, the assumed ethical rule does not take personal circumstances into account when passing judgement on others. While there are instances in which it would be natural to do so, we simply take the average work week as the benchmark.30 Secondly, moral values constitute only one of the relevant psychological factors that influence work effort. A large body of research in social psychology has documented a number of important determinants.31 In our simple model, we abstract from differences between employers or contracts, and instead we concentrate exclusively on moral values and moral emotions. Finally notice that, following Rosenberg (1965), psychologists treat self-evaluation as multidimensional, comprising notions of perceived worth both in relation to values and standards and in relation to competence in task performance. In particular, the literature distinguishes between self-esteem, which is affected by self-conscious emotions such as guilt and pride, and self-confidence, which concerns beliefs about one’s ability to perform. Here, too, we abstract from issues of doubt concerning competence and restrict our attention to moral values.32

labor supply in response to guilt, i.e. if (16) had the opposite sign, much of the analysis would still hold, although equilibria in which all agents conform to the standard would be unstable.

29 Differentiating and using the first order condition for optimal labor supply (9), we can rewrite (16) as
\[
\frac{\partial}{\partial \varphi_i} \left( \frac{v_i}{v_c} \right) = \frac{1}{v_c} [v_{i\varphi} - v_{i\varphi} (1 - \tau) \beta_i] = \left( \frac{v_i}{v_c} \right) \left( \frac{v_{i\varphi}}{\varphi v_i} \right) \left( \frac{v_{i\varphi} (1 - \tau) \beta_i}{v_c} \right) = \left( \frac{v_i}{v_c} \right) \left( v_{i\varphi} - \varepsilon_v \varepsilon_v \varepsilon_v \varepsilon_v \right).
\]

Hence, (16) is equivalent to assuming the elasticity of the marginal utility of leisure with respect to self-esteem is larger than the elasticity of the marginal utility of consumption, \( \varepsilon_v \varepsilon_v \varepsilon_v \varepsilon_v > 0 \).

30 Similarly, in their model of taxpayer resentment as a determinant of welfare stigma, Besley and Coate (1992) link the stigma to being a welfare recipient, irrespective of personal characteristics. Also Lindbeck et al (1999) assume that the psychological cost of living on unemployment benefits is not conditional on one's productivity. As discussed below the consideration of personal circumstances does not affect the qualitative results as long as individual behavior is judged in comparison to a social standard.

31 Most of these studies concern work inside organizations rather than in society at large. For example, Latham and Pinder (2005), in their recent survey of theories and empirical evidence, document the importance of job characteristics and design and perceived fairness on the job or task enjoyment, along with values and self-regulation. These results are closely related to the literature on intrinsic and extrinsic motivation (Deci (1971)). In economics this issue was first discussed by Kreps (1997) and Frey (1997). Frey and Jegen (2001) survey the theory and evidence on the role of non-economic motivation. See also Falk and Fehr (2002), Gneezy and Rustichini (2001) and Murdoch (2002).

32 Changes in self-esteem and self-confidence also tend to affect behavior differently. While a reduction in self-confidence
4 Socioeconomic Stationary Equilibria

Thus far we have explained how labor supply is determined in response to the prevailing sentiments and how sentiments vary with labor supply. Next, we analyze the stationary points of this reciprocal process. (We address the determination of the tax policy in the following section.) For given \( \tau \) we wish to consider combinations \((L, \varphi, \sigma)\) such that for each \( i = u, s \), (a) \( L_i \) satisfies (10) at \( \varphi_i \); (b) \( \varphi_i \) is invariant at \( L \) under the adjustment process (13), and (c) \( L \) and \( \sigma \) satisfy (14). Condition (c) says the distribution of social consideration is consistent with relative performance. We refer to such a combination as a socioeconomic stationary equilibrium, or SE equilibrium for short.

Notice that from the assumed dynamics of sentiments (13) and from (18) self-esteem provides a countervailing force to the complete polarization of labor supply; those working less than the standard face moral pressure to work more, and those with high self-esteem have an incentive to work less. This is similar to the welfare stigma effect in Lindbeck et al. (1999) where individuals face moral pressure to work and avoid the stigma of welfare, and they receive additional utility when they accede to this moral standard. Here, since self-esteem changes in response to observed relative performance, there is a tendency to converge to an endogenous social norm concerning effort provision. Nevertheless, as we shall see below convergence is not always possible.

There can be two different types of SE equilibria in which economic behavior and sentiments are mutually compatible. In the first type, everyone conforms to the moral standard and supplies the average number of work hours. No agent will have a reason to modify its sentiments for any other agent or its self-esteem. Furthermore, since in this case all agents supply the same quantity of labor, equilibrium sentiments are such that \( \sigma_i = \pi_i \) for all \( i \). Hence, there is no bias or discrimination in the allocation of social consideration; i.e., the share of \( i \)'s social consideration allocated to the type \( s \) agents corresponds to the proportion of type \( s \) agents in the population. Because of this feature and the conformity of behavior, we call this type of SE equilibrium cohesive.

The second type of equilibrium consists of corner solutions of the process of socioeconomic interactions. In such an equilibrium the population is partitioned into two groups or clusters, one set of individuals (type \( s \)) work above the mean and another set (type \( u \)) work below. In addition the poor are considered partially responsible for their low income due to their lower labor supply. Sentiments become endogenously polarized: those working below the average will be regarded as lazy and suffer from both low social consideration and low self-esteem. We call such an SE equilibrium clustered.

We now characterize the conditions under which either of the two types of SE equilibria exist.

For given \( \beta \) and \( \tau \), a cohesive SE equilibrium consists of a vector \( \varphi \) such that it is optimal for both types to supply the same quantity of labor \( L \). We start by noting that when \( L_i = L \) for all \( i \), the per capita transfer is given by \( T = \tau \beta L \).\(^{33}\) Using (10), we can identify the pairs of \( \varphi_i \) and \( \beta_i \) for which

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\(^{33}\)Recall that \( \beta \) is the average productivity.
both types would choose to supply $L$. This is given implicitly as the solution to

$$F(\beta_i, \varphi_i, \beta, L, \tau) \equiv \lambda((1 - \tau) \beta_i, \varphi_i, \tau \beta L) - L = 0, \text{ for } i = u, s. \quad (19)$$

Next, we investigate values of $\beta$ and $\tau$ such that there exist $L$ and $\varphi_i \in [\varphi, \overline{\varphi}]$ for which (19) is satisfied for both $i = u, s$.

From (18) we know that for each $i$, there is a maximum labor supply, denoted by $L_i(\tau, \beta_i, \beta)$, and a minimum labor supply $L_i(\tau, \beta_i, \beta)$ that are compatible with $\varphi_i$ being in $[\varphi, \overline{\varphi}]$. These are given implicitly by

$$L_i = \lambda((1 - \tau) \beta_i, \varphi, \tau \beta L_i) \quad \text{and} \quad \overline{L}_i = \lambda((1 - \tau) \beta_i, \overline{\varphi}, \tau \beta \overline{L}_i). \quad (20)$$

The next proposition establishes that a necessary and sufficient condition for the existence of a cohesive SE equilibrium is that the intervals $[L_u, \overline{L}_u]$ and $[L_s, \overline{L}_s]$ have a non-empty intersection. Conversely, that the intersection is empty is both necessary and sufficient for there to exist a clustered SE equilibrium.

**Proposition 1.** For any $(\beta, \tau)$ the following hold:

i) A cohesive SE equilibrium exists if and only if

$$\overline{L}_u(\tau, \beta_u, \beta) \geq L_s(\tau, \beta_s, \beta). \quad (21)$$

In this case there are generally multiple equilibria. That is, for every $L^o \in [L_s(\tau, \beta_s, \beta), \overline{L}_u(\tau, \beta_u, \beta)]$ there exist $\varphi_u, \varphi_s \in [\varphi, \overline{\varphi}]$ for which (19) is satisfied at $L_i = L^o$, for $i = u, s$. In all such equilibria $\alpha_{i,j} = 1$ for $i, j = u, s$ and hence $\alpha_i = \pi$ for all $i$.

ii) A clustered SE equilibrium exists if and only if

$$\overline{L}_u(\tau, \beta_u, \beta) < L_s(\tau, \beta_s, \beta). \quad (22)$$

In this case, the equilibrium is unique and is given by:

$$L_u = \lambda((1 - \tau) \beta_u, \varphi_u, T) < L_s = \lambda((1 - \tau) \beta_s, \overline{\varphi}, T)$$

where $T = \tau((1 - \pi)\beta_u L_u + \pi \beta_s L_s)$, and by $\varphi_u = \varphi$, $\varphi_s = \overline{\varphi}$ and $\alpha_{i,j} = \frac{L_i}{T}$ for $i, j = u, s$ and $\sigma_i = \frac{\pi L_i}{T}$ for all $i$.

This proposition establishes that one or the other, but not both, of the two types of SE equilibrium will always exist. For any $\beta$ it may be possible to observe multiple cohesive equilibria parameterized by the degree of industriousness and sustained by different degrees of moral pressure to work, while, when it exists, the clustered equilibrium is unique. Whether the equilibria are cohesive or clustered depends crucially on both the degree of inequality in $\beta$ and the level of redistribution $\tau$. If inequality in $\beta$ is too large, then the moderating effect of self-esteem on labor supply will be insufficient to overcome the difference, and cohesiveness will not be sustainable. On the other hand, redistribution tends to equalize the economic rewards to labor for the two types of workers and hence changes the relative

$^{34}$Note that while the following expression contains the consistency requirement $T = \tau \beta L$, the first order condition (9), from which $\lambda$ is obtained, precludes consideration of the effect of one’s labor supply on aggregate transfers. Therefore, the following expression should be viewed as an accounting relationship that is required to hold at an SE equilibrium rather than as a first order condition.
return of moral and economic rewards to effort. These issues are investigated in greater detail in the next section where we consider the endogenous choice of redistributive policy.

Before turning to this, however, we highlight the relative differences of the two types of agents in any stationary equilibrium. In a clustered SE equilibrium the unskilled are poorer and less industrious than the skilled despite facing larger moral motivation to work. Also in any cohesive SE equilibrium in which \((19)\) is satisfied by both types for the same \(L\), totally differentiating this expression with respect to \(\beta_i\) and \(\varphi_i\) and using \((12)\) and \((18)\), we readily obtain that

\[
\frac{\partial \varphi_i}{\partial \beta_i} > 0.
\]

Hence, in a cohesive equilibrium where all individuals work the same it must be that those who receive higher (lower) economic rewards feel less (more) moral pressure to work.

**Proposition 2.** In any stationary SE equilibrium the individuals with higher productivity have greater self-esteem and face lower moral motivation to work than those with low productivity.

## 5 Endogenous Redistribution

So far we have taken \(\tau\) as given, and we have seen that attitudes and behavior will differ depending upon the type of socioeconomic equilibrium to emerge. We begin this section by considering the opposite: what level of redistribution will be chosen by a group of individuals with given sentiments? We then categorize the effect of taxes in determining the type of SE equilibrium.

### 5.1 From Sentiments to Taxes

On the majoritarian choice of income tax schedules we follow the approach developed by Romer (1975), Roberts (1977) and Meltzer and Richard (1981). In our case, unskilled workers constitute the majority and hence we shall focus on their preferences over taxes. Given their sentiments, individuals vote over redistribution. When voting, agents are aware of the distortions caused by income taxation on labor supply and anticipate the existence of a public budget constraint. Therefore, from equation \((10)\), for given \(\varphi_i\), the optimal labor supply is a function of the tax rate \(\tau\) and of the per capita transfers \(T\):

\[L_i(\beta, \varphi, \tau, T)\] for \(i = u, s\). Notice, however, that the existence of the public budget allows us to express the per capita transfer as a function of \(\tau\) only,

\[T = \tau [(1 - \pi) y_u (\tau, T) + \pi y_u (\tau, T)] \equiv \tau y (\tau, T)\] \hspace{1cm} (23)

As in Meltzer and Richard (1981), for any \(\tau\) the assumed normality of leisure insures that the RHS (right hand side) of \((23)\) is a strictly decreasing function of \(\tau\) implying that for any \(\tau\) there exists a unique \(T\) which balances the public budget. This allows us to express the per capita transfer and the individual indirect private utility as a function of \(\tau\) only,

\[\nu_i (\tau) \equiv v_i \left( (1 - \tau) y_i (\tau) + \tau y (\tau), \bar{L} - L_i (\beta, \varphi, \tau) \right) ,\]
where \( y_i(\tau) \equiv \beta_i L_i(\beta, \varphi, \tau) \) and \( y(\tau) \equiv [(1 - \pi) y_u(\tau) + \pi y_s(\tau)]. \)

The degree of redistribution preferred by an unskilled worker, denoted \( \tau^u \), maximizes its indirect total utility subject to the public budget constraint (23), taking into account the induced change in the optimal labor supplies. Therefore, \( \tau^u \) is the solution to the following maximization problem:

\[
\tau^u = \arg \max_{\tau \in [0,1]} V_u(\beta, \varphi, \tau) = \arg \max_{\tau \in [0,1]} \{ \nu_u(\tau) + [(1 - \sigma_u)\nu_u(\tau) + \sigma_u \nu_s(\tau)] \}.
\] (24)

Consider, first, the preferred level of redistribution of an egoistic agent. The problem is identical to that in Meltzer and Richard (1981). Its solution, as given by the following first order condition, would constitute the majoritarian choice since the unskilled comprise a majority of the population:\(^{35}\)

\[
\frac{dv_u(\tau)}{d\tau} = \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} + (1 - \tau)\beta_u \frac{\partial L_u}{\partial \tau} \right] + \frac{\partial v_u}{\partial L_u} \frac{\partial L_u}{\partial \tau} = 0.
\]

Using (9), this condition simplifies to

\[
\frac{dv_u}{d\tau} = \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] = 0.
\] (25)

Therefore, the preferred tax rate is increasing in inequality (i.e., \( y - y_u \)). Let us denote by \( \tau^m \) the tax rate satisfying the first order condition for an interior optimum in the egoistic case (25).

When individuals have social preferences, their attitude toward redistribution is affected by the relative consideration of the different groups. The marginal effect on total utility of a variation in \( \tau \) is given by

\[
\frac{dV_u(\tau)}{d\tau} = \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] + \left\{ (1 - \sigma_u) \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] + \sigma_u \frac{\partial v_s}{\partial c} \left[ y - y_s + \tau \frac{dy}{d\tau} \right] \right\}.
\] (26)

Notice that

\[
\left. \frac{dV_u(\tau)}{d\tau} \right|_{\tau = \tau^m} < 0
\]

and this implies that when unskilled workers are socially concerned, they will prefer a tax rate smaller than \( \tau^m \). An interior solution for the equilibrium tax rate \( \tau^u > 0 \) is characterized by setting (26) equal to zero and verifying that the indirect utility is locally concave at \( \tau = \tau^u \)

\[
\left. \frac{d^2 V_u(\tau)}{d\tau^2} \right|_{\tau = \tau^u} < 0
\] (27)

These considerations imply the following,

**Proposition 3.** For any given allocation of social consideration across groups \( \sigma \), and any \((\varphi, \beta)\) such that \( y_u < y \), we have that \( \tau^u < \tau^m \). That is, the majority rule tax rate is smaller than in the egoistic case. Furthermore, for any interior \( \tau^u \) the equilibrium tax is decreasing in \( \sigma_u \).

\(^{35}\)In the remainder of the section we use the abbreviated notation \( L_i \) for \( L_i(\beta, \varphi, \tau) \), \( y_i \) for \( y_i(\tau) \) and \( y \) for \( y(\tau) \) when no ambiguity will result.
This proposition implies that the individual demand for redistribution is more moderate than in the egoistic benchmark since agents with social preferences internalize the effect of redistribution on the well being of others. A larger \( \sigma_u \) implies a reduction of the relative social consideration of the poor, and, accordingly, the demand for redistribution is lower. As discussed in more detail below, this implies that the support for redistributive policies in favor of the poor is lower whenever they are accounted responsible for the fact that their income is low partly due to their low effort provision.

5.2 From Taxes to Sentiments

Given current sentiments \((\varphi, \sigma)\), individuals vote over the tax policy as described in the previous subsection. But then the new tax policy might induce a change in behavior, and this, in turn, might affect agents’ self-esteem and relative consideration for others. In this subsection we begin to investigate the effect of \( \tau \) on the type of stationary sentiments to emerge in equilibrium.

From Proposition 1 we know that for any given level of \( \tau \) a cohesive equilibrium will emerge only if the unskilled face sufficient moral pressure to work (stemming from low self-esteem) to overcome the adverse incentive effect of taxation. Indeed, if \( \tau \) is too large, this may reduce the return to labor to such an extent that moral suasion is insufficient even when self-esteem is minimal.

The intuition behind this result hinges on the normality of leisure which implies that, ceteris paribus, the incentive to supply labor diminishes as fiscal transfers become larger and the tax rate higher. In fact for any given vector \( \varphi \), the negative effect of taxation on labor supply is stronger for unskilled workers. The logic of the argument is as follows. Consider again (19), which identifies the quantities of labor compatible with a cohesive equilibrium: \( F(\beta_i, \varphi_i, \beta, L, \tau) \equiv \lambda ((1 - \tau) \beta_i, \varphi_i, \tau \beta L) - L = 0 \) for \( i = u, s \). An increase in \( \tau \) has two effects. In the first place it reduces the net wage of both types leading to a lower labor supply. In the second place because of the change in the lump-sum transfer, for any given cohesive labor supply \( L \), the consumption of the unskilled increases. In fact in a cohesive equilibrium the consumption of agent \( i \) is given by \( c_i = [(1 - \tau) \beta_i + \tau \beta] L = [\beta_i + \tau(\beta - \beta_i)] L \).

Hence, an individual would consume more than its pre-tax earnings if and only if its productivity is below the mean. The MRS between consumption and leisure increases and hence labor supply is reduced. For the unskilled workers, the two effects go in the same direction and this implies that the labor supply by the unskilled definitely decreases. For any \( \beta L \), consumption decreases with \( \tau \) for the skilled workers and this tends to increase labor supply. The two effects go in opposite directions so that the net result is ambiguous.

This differential effect of redistribution on the labor supply of the different types of agents implies that if redistribution is too large, then the economic incentives to the unskilled may be too weak. Under these conditions the moral incentives are insufficient to sustain a cohesive equilibrium.

At this level of generality it is not possible to explicitly characterize the link between redistribution and social cohesion. In order to further investigate the relationship between taxation and sentiments,
we now restrict attention to the family of preferences given by

\[ v(c, l, \varphi) = \frac{c^{1-\theta}}{1-\theta} + \frac{1}{2} f(L - L_i)(1 + \varphi_i) \]  

(28)

with \( \theta \geq 0 \), \( f'(.) > 0 \) and \( f''(.) \leq 0 \).

As we shall see, the effect of redistribution on sentiments will critically depend on the relative productivity of the two types of workers, which we denote by

\[ \tilde{\beta} \equiv \frac{\beta_u}{\beta_s} \in [0, 1] \]  

(29)

In line with the previous discussion on the differential role of redistribution on moral and economic incentives we have the following,

**Proposition 4.** For any \( \tilde{\beta} \), there exists a unique threshold level of redistribution \( \tau(\tilde{\beta}) \in [0, 1] \) such that for any \( \tau \leq \tau(\tilde{\beta}) \) only cohesive SE equilibria exist, while for any \( \tau > \tau(\tilde{\beta}) \) only clustered SE equilibria exist. Furthermore, the larger the gap in productivities the lower the level of maximum redistribution compatible with the emergence of a cohesive equilibrium: \( \partial \tau(\tilde{\beta})/\partial \tilde{\beta} > 0 \).

According to this proposition, the choice of \( \tau \) will lead to a cohesive (clustered) equilibrium if \( \tau \) is sufficiently small (large).

Moreover, the critical level, \( \tau(\tilde{\beta}) \), depends on the productivity ratio. If \( \tilde{\beta} \) is sufficiently large or sufficiently small, then the choice of \( \tau \) will have no influence on the type of equilibrium. In the former case, the difference in wages is small enough so that the economy always settles in a cohesive equilibrium, while in the latter, it settles in a clustered equilibrium. We state this result in the following.

**Proposition 5.** There exist two critical levels of relative skills, \( \tilde{\beta}_0 \) and \( \tilde{\beta}_1 \) such that \( \tau(\tilde{\beta}_0) = 0 \) and \( \tau(\tilde{\beta}_1) = 1 \) with \( 0 \leq \tilde{\beta}_0 \leq \tilde{\beta}_1 < 1 \). For each \( \tau \) there is a threshold level \( \overline{\beta}(\tau) \in [\tilde{\beta}_0, \tilde{\beta}_1] \) such that for any \( \tilde{\beta} > \overline{\beta}(\tau) \) only cohesive SE equilibria exist while for any \( \tilde{\beta} < \overline{\beta}(\tau) \) only clustered SE equilibria exist. Moreover, \( \partial \overline{\beta}(\tau)/\partial \tau > 0 \).

If \( \tilde{\beta} \) lies outside the range \( [\tilde{\beta}_0, \tilde{\beta}_1] \), the type of equilibrium does not depend on the tax rate. Propositions 4 and 5 jointly imply that if inequality is too large, that is if \( \tilde{\beta} < \tilde{\beta}_0 \) then the equilibrium is always clustered for any \( \tau \), since \( \tau(\tilde{\beta}_0) = 0 \). On the opposite extreme if inequality is sufficiently low, \( \tilde{\beta} > \tilde{\beta}_1 \), then the equilibrium is always cohesive for any \( \tau \), since \( \tau(\tilde{\beta}_1) = 1 \). For intermediate levels of inequality, the type of equilibrium crucially depends on redistribution: low taxation produces cohesive equilibria and high taxation clustered equilibria.

### 6 Politico-Economic Equilibria

In the last section we studied how sentiments affect the choice of taxes and how the level of redistribution leads to different equilibrium sentiments. We now focus on the full politico-economic equilibrium of the model (henceforth PE equilibrium) in which sentiments, labor supplies and taxes are each variable and all are required to be mutually compatible. Thus, a PE equilibrium is characterized by a vector \( (L, \varphi, \sigma, \tau) \) such that \( (L, \varphi, \sigma) \) is an SE equilibrium at the tax rate \( \tau \), and \( \tau \) solves (24).


### 6.1 Existence and Uniqueness

In order to study the implications of social cohesion more precisely, we now characterize the equilibria for a restricted class of economies which permit an explicit analytical solution. Specifically, we consider the following specific forms of (28)\(^{37}\)

\[
v(c_i, L_i, \varphi_i) = c_i + \frac{1}{2} \left( 1 - \frac{L_i^2}{2} \right) (1 + \varphi_i),
\]

(30)

with \(\varphi_i \in [0, 1]\). In this case, the labor supply is given by,

\[
L_i(\beta_i, \varphi_i, \tau) = (1 - \tau) \beta_i \frac{2}{1 + \varphi_i}.
\]

(31)

As an index of inequality, we use the relative gap between mean and median income,

\[
I \equiv \frac{y - y_u}{y}.
\]

(32)

Notice that in this case \(I\) is proportional to the Gini index, which is given by \(G = (1 - \pi) I\).

We now define \(\tilde{y}^u\) as the *moral perception of mean income* by the unskilled:

\[
\tilde{y}_u \equiv [(1 - \sigma_u)y_u + \sigma_u y_s]
\]

(33)

According to \(\tilde{y}_u\), the unskilled weight the two incomes by the moral weights \(\sigma_u\) and \((1 - \sigma_u)\) rather than by the population weights \(\pi\) and \((1 - \pi)\). This reflects the fact that the former may be biased in assigning greater weight to one group than their population proportion warrants. We take a measure of such bias to be

\[
\delta \equiv \frac{(y - \tilde{y}_u)}{y}.
\]

(34)

Hence, \(\delta\) is the relative difference between the true mean and the moral perception of mean income. Notice that in a cohesive equilibrium \(\sigma_u = \pi\), and hence \(\delta = 0\). In a clustered equilibrium the poor are considered partially responsible for their low income so that \(\sigma_u > \pi\) and we have \(y < \tilde{y}_u\) and hence \(\delta < 0\). Here, because of the linearity of the labor supply functions (31) we have\(^{38}\)

\[
\delta = -\pi (1 - \pi) \frac{1 - 2\tilde{\beta}}{\pi + (1 - \pi) 2\tilde{\beta}} \frac{1 - 2\tilde{\beta}^2}{\pi + (1 - \pi) 2\tilde{\beta}^2}.
\]

(35)

It follows that in a clustered PE equilibrium the bias \(\delta\) depends on exogenous parameters only and is independent of \(\tau\).

\(^{37}\)The linear-quadratic formulation of utility has often been adopted in the literature. See, for example, Piketty (1995) and Alesina and Angeletos (2005)).

\(^{38}\)From the definition we have

\[
\delta = \frac{(\sigma_u - \pi) (2\tilde{\beta}_u^2 - \beta_s^2)}{(1 - \pi) 2\tilde{\beta}_u^2 + \pi \beta_s^2},
\]

where \(\sigma_u = \pi \beta_s/[(1 - \pi) 2\tilde{\beta}_u + \pi \beta_s]\). Substituting and manipulating, we obtain the expression in the text.
The indirect private utility of an individual of type $i$ is given by

$$v(\tau, T, \beta_i, \varphi_i) = \frac{(1-\tau)^2 \beta_i^2}{1 + \varphi_i} + T(\tau) + \frac{1}{2}(1 + \varphi_i). \tag{36}$$

Using (31), we obtain the following expressions for the effects of $\tau$ on labor, gross earnings and transfers, respectively:

$$\frac{dL_i}{d\tau} = -\frac{L_i}{1-\tau}, \quad \frac{dy_i}{d\tau} = -\frac{y_i}{1-\tau} \quad \text{and} \quad \frac{dT}{d\tau} = \frac{1-2\tau}{1-\tau}y. \tag{37}$$

Differentiating the egoistic (indirect) utility $v_i$ (36) with respect to $\tau$, we obtain

$$\frac{dv_i}{d\tau} = y - y_i - \frac{\tau}{1-\tau}y. \tag{38}$$

Then differentiating the total indirect utility with respect to $\tau$, we get the first order condition

$$\frac{dV_u}{d\tau} = 2\frac{1-2\tau}{1-\tau}y - y_u - \tilde{y}u = 0. \tag{39}$$

Let us assume for the moment that the first order condition for redistribution identifies a maximum. Solving (39) and using the definitions of $I$ and $\delta$, we obtain the unique preferred tax by an unskilled individual,

$$\tau^u = \frac{I + \delta}{2 + I + \delta}. \tag{40}$$

Let us now turn to the conditions for an interior optimum. Using the labor supply functions (31), one can show that the indirect total utility is a quadratic function of $\tau$.

Furthermore $V_u(0) > V_u(1)$. Therefore, $\partial V_u(0)/\partial \tau > 0$ is necessary and sufficient for the existence of a unique interior optimum. In the following proposition we identify the condition under which this inequality holds.

**Proposition 6.** For any $(\sigma, \beta, \pi)$ the tax rate $\tau^u$ preferred by an unskilled individual is given by

$$\tau^u = \frac{I + \delta}{2 + I + \delta}, \quad \text{if} \quad \pi > \frac{1}{2}\sigma_u, \tag{40}$$

and $\tau^u = 0$ otherwise.

---

Using (31) we can express the indirect utility of individual $i$ as

$$V_i(\tau) = \frac{1 + \varphi_i}{2} + \left\{ (1 - \sigma_u) \frac{1 + \varphi_u}{2} + \sigma_u \frac{1 + \varphi_u}{2} \right\} + (1 - \tau)^2 \left\{ \frac{\beta_i^2}{1 + \varphi_i} + \left( 1 - \sigma_u \right) \frac{\beta_u^2}{1 + \varphi_u} + \sigma_u \frac{\beta_u^2}{1 + \varphi_u} \right\}$$

$$+ (1 - \tau)^4 \left\{ (1 - \pi) \frac{\beta_u^2}{1 + \varphi_u} + \pi \frac{\beta_u^2}{1 + \varphi_u} \right\}. \tag{40}$$

Differentiating and evaluating at $\tau = 0$, we have the condition

$$V_u(0) = \left( \frac{\beta_u^2}{1 + \varphi_u} - \frac{\beta_u^2}{1 + \varphi_u} \right) ((\pi - \sigma_u) + \pi).$$

Using the labor supply functions (31), we have that $\left( \frac{\beta_u^2}{1 + \varphi_u} - \frac{\beta_u^2}{1 + \varphi_u} \right) > 0$ in any stationary equilibrium.
Inspection of (40) reveals that, ceteris paribus, the chosen tax is increasing in $I$ and in $\delta$. As mentioned earlier, if agents are not endowed with social preferences, then the problem becomes identical to Meltzer and Richard (1981) and the demand for redistribution is increasing with inequality $I$. With social preferences and given $\delta$, as in Proposition 3, the equilibrium demand for redistribution is more moderate than under pure egoism. As for the role of the bias in individual sentiments, the direction in which $\tau^u$ diverges from the benchmark case is determined by the sign of $\delta$. If $\delta < 0$ the support for redistribution towards the poor is low since they are object of relatively low social consideration. In a sense in a clustered equilibrium the poor are held partly accountable for their low income due to their lower effort provision.

We now characterize the PE equilibria. We begin by restating the conditions of Proposition 5. Due to the linearity of the labor supply function (31) the thresholds $\bar{\beta}_0$ and $\bar{\beta}_1$ coincide. To see this, note that according to (31), the extreme values of $L_u (\beta)$ and $L_s (\beta)$ are

$$
L_u (\beta, \tau) = 2 (1 - \tau) \beta_u \\
L_s (\beta, \tau) = (1 - \tau) \beta_s.
$$

Hence, an economy is in a cohesive PE equilibrium, i.e., $L_u (\beta, \tau) \geq L_s (\beta, \tau)$, if and only if

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

Expression (41) gives the pairs $(\tau, L)$ that are consistent with a cohesive PE equilibrium. From Proposition 5 and using (41) we have that the economy will be in a cohesive (respectively clustered) equilibrium only if

$$
\tilde{\beta} \geq (\leq) \frac{1}{2}.
$$

Because of the linearity of the labor supply function (31), $I$ is independent of $\tau$. Substituting into (32), we obtain

$$
I^* = \frac{\pi \left(1 - \tilde{\beta}\right)}{\pi + (1 - \pi) \tilde{\beta}} \text{ if } \tilde{\beta} \geq \frac{1}{2} \text{ and } I^o = \frac{\pi \left(1 - 2\tilde{\beta}^2\right)}{\pi + (1 - \pi) 2\tilde{\beta}^2} \text{ if } \tilde{\beta} < \frac{1}{2}.
$$

Therefore, we can examine the characterization of the politico-economic equilibrium separately in the two ranges $\tilde{\beta} \geq 1/2$. We next show that a multiplicity of cohesive equilibria can emerge. In spite of this all are characterized by the same degree of income inequality, which depends only on the exogenous parameters $\tilde{\beta}$ and $\pi$.

In order to compare income inequality across the two types of equilibria, consider economy $A$ with $\tilde{\beta}_A$ which is clustered ($\tilde{\beta}_A < \frac{1}{2}$) and economy $B$ with $\tilde{\beta}_B$ which is cohesive ($\tilde{\beta}_B \geq \frac{1}{2}$). Observe that $I^o$ in (43) is strictly decreasing in $\tilde{\beta}$. Also, note that $\tilde{\beta}_A < 1/2 < \tilde{\beta}_B$ implies $2\tilde{\beta}_A^2 < 1/2 < \tilde{\beta}_B$. Finally, we also have that

$$
I^* (1/2) = I^o (1/2) = \bar{T} \equiv \frac{\pi}{1 + \pi}.
$$

Taken together, these observations establish the following:
Lemma 1. The degree of income inequality in a clustered (cohesive) economy is always larger (smaller) than \( I \).

Next, we characterize the features of both cohesive and clustered equilibria. We begin with the former.

Consider any distribution of social concerns compatible with a cohesive equilibrium. All individuals equally contribute to total labor supply so that individual social consideration is unbiased: \( \delta = 0 \). As established above, a cohesive equilibrium can exist only if the ratio \( \frac{L}{1 - \tau} \) lies within the fixed bounds given by (41). However, there is nothing to preclude that, given the equilibrium tax \( \tau^a \), an arbitrary \( L \) violates this condition even if \( \widetilde{\beta} \geq \frac{1}{2} \). For example, from (41), if \( \tau = 0 \) then any \( L \in [\beta_s, 2\beta_u] \) can be sustained as a cohesive PE equilibrium. For \( \tau > 0 \) also \( L < \beta_s \) can emerge as a work norm.

Proposition 7. For any \((\beta, \pi)\) such that \( I^* \leq \bar{I} \), the PE equilibrium is characterized by a unique level of redistribution given by

\[
\tau^* = \frac{I^*}{2 + I^*}.
\]

and by a level \( L = L_u = L_s \) satisfying (41) given \( \tau^* \) resulting from (45).

For any \( I < \bar{I} \) there is a multiplicity of cohesive equilibria characterized by the unique level of redistribution \( \tau^* \), characterized in (45), and different levels of \( L \) satisfying the bounds established in (41). This multiplicity is sustained by different levels of self-esteem. Notice that the range of equilibrium levels of \( L \) shrinks as \( I \) gets larger, and in the limit, when \( I^* = \bar{I} \), the cohesive equilibrium level of \( L \) is unique and given by \( L = (1 - \pi) 2\beta_u + \pi\beta_s \).

Turning now to clustered equilibria, we know from Proposition 5, (35) and (43), that if income inequality is large enough, i.e. \( I^o > \bar{I} \), only clustered equilibria exist. In these equilibria \( I^o \) and the bias \( \delta^o \) are independent of the tax rate.

Proposition 8. For any \((\beta, \pi)\) such that \( I^o \geq \bar{I} \), there exists a threshold \( I_c \in (\bar{I}, 1) \) such that the unique clustered PE equilibrium tax is given by

\[
\tau^o = \begin{cases} 
\frac{I^o + \delta^o}{2 + I^o + \delta^o} & \text{if } I \in [\bar{I}, I_c) \\
0 & \text{if } I \in (I_c, 1].
\end{cases}
\]

where \( I^o \) is given in (43) and \( \delta^o \) in (35), while \( \tau^o = 0 \) if \( I \in (I_c, 1].\)

6.2 Inequality, Industriousness, Social Cohesion and Redistribution

We now investigate the relationship between income inequality and equilibrium redistribution. In the previous subsection we saw that for low levels of inequality there is generally a continuum of cohesive PE equilibria. But for all such equilibria, inequality is the same and given by \( I^* \) in (43), which depends only on the exogenous parameters \( \pi \) and \( \beta \). For high levels of inequality the economy has a unique clustered PE equilibrium, with the corresponding degree of inequality given by \( I^o \) in (43). In this case, too, the clustered PE equilibrium tax \( \tau^o \) depends – via \( \delta^o \) – on \( \pi \) and \( \beta \), as well as on \( I^o \).

\footnote{For clustered equilibria, the condition identifying \( I_c \) can be rewritten as \( \sigma_u \geq 2\pi \), which at the equilibrium value of \( \sigma_u \) (from (15)) is equivalent to \( \beta \leq (1 - 2\pi) / 4(1 - \pi) \). Using this information, one can obtain the unique threshold \( I_c \) from (43).}
In the following exercise, we hold $\pi$ constant and classify different economies/levels of inequality by variations in $\hat{\beta}$.

As a preliminary result notice that while in cohesive equilibria $\delta = 0$, in clustered equilibria there is a bias against those perceived as lazy, and the bias is increasing with inequality. We state this formally in the following lemma.

**Lemma 2.** For $I \leq \overline{I}$, $\delta = 0$, and for $I > \overline{I}$, $\delta < 0$ with $\partial \delta / \partial I < 0$.

This observation has important implications. The following proposition establishes the relationship between inequality and equilibrium redistribution in both cohesive and clustered economies.

**Proposition 9.** (i) For any $I \leq \overline{I}$, equilibrium redistribution in any cohesive PE equilibria is strictly increasing in inequality.

(ii) For any $I \geq \overline{I}$, the clustered PE equilibrium $\tau^o$ is a non-monotonic function of inequality: there exists a level of inequality $I^o > \overline{I}$ at which $\tau^o$ is maximal. Furthermore, for any $I \geq I_c > \overline{I}$, $\tau^o = 0$.

Figure 1 illustrates these findings.

![Figure 1. Inequality and Equilibrium Redistribution](image)

The intuition behind this result is as follows. Consider, first, the case of a cohesive society. Individual utility combines an egoistic component and a social component. As in the standard non-altruistic utility benchmark, the egoistic component would lead to an increase in taxation in response to higher inequality. As for the social component, because of the absence of any bias, it would mimic the choice of taxation by a utilitarian social planner. Hence, when we take the two components together, an increase in inequality would unambiguously lead to an increase in taxation.

In clustered economies, the low skilled individuals work below average and, as a result, their low income is partially attributable to their low effort. As a result the support for redistribution in favor of the poor is reduced since they are held partly accountable for their low income. The strength of the
bias in social sentiments depends on the level of skill inequality and labor supply dispersion. From Lemma 2, the higher the inequality, the larger is the gap in the two labor supplies, and hence the stronger the bias and the lower the support for redistribution stemming from the social component of utility. In this case, the egoistic and the social component of the utility work in opposite directions. For values of inequality slightly above \( I \) the degree of social clustering and the associated bias in sentiments are small. Under these conditions the positive effects dominates and an increase in inequality leads to an increase in redistribution. However, for a sufficiently high degree of inequality, the increase in the gap of labor supplies and the associated bias eventually dominates and the support for redistribution diminishes.

Summarizing, among cohesive economies, higher inequality is always associated with higher taxation. But as inequality increases beyond the threshold and the economy becomes clustered, eventually the equilibrium tax rate declines. Hence, our model predicts a non-monotonic relationship between inequality and redistribution.\(^{42}\)

7 Discussion

In this section we briefly discuss the robustness of our results.

**Self-Regulative Emotions.** Following the literature in social psychology, we have considered the case in which the emotions produced by deviations from moral standards have a self-regulatory role. In particular, guilt from failing to meet the work standard decreases self-esteem which increases the moral pressure to work by increasing the MRS between consumption and leisure. This self-regulatory role of guilt (and conversely pride) implies that moral values and economic incentives are substitutes. The resulting adjustment process is stable and leads to work in accordance with the standard unless inequality is excessively large.

The self-regulative role of moral values, equation (16), turns out to be key for the stability rather than for the existence of cohesive equilibria. To see this suppose for a moment that moral and economic incentives were complements, i.e. that the MRS between consumption and leisure were to decrease with \( \varphi \). In that case, failure to meet the standard would lower self-esteem and this would result in negative rather than positive pressure on labor supply. In spite of inverting the effects of guilt on labor supply, cohesive equilibria would still be possible for low levels of inequality and otherwise equilibria would be clustered. The difference would be that now cohesive equilibria are unstable: those working less than the mean would tend to reduce their labor supply in response to moral pressure and those working more would tend to increase theirs. Hence, clustered equilibrium would become an absorbing state.\(^{43}\) Consequently, the possibility of sustaining cohesive equilibria with work standards does not depend on the substitutability between economic and moral incentives, but rather on the

\(^{42}\)For illustrative purposes we have expressed the relationship between redistribution and the inequality index \( I \). Since the Gini index is given by \( G = (1 - \pi)I \), the non-monotonic relationship described in Proposition 9 holds also once expressed in terms of Gini coefficients as proved in the Appendix.

\(^{43}\)We show in the appendix that, for the case of linear utility, when moral and economic incentives are complements, the maximum level of inequality for which there exist cohesive equilibria is exactly the same as for the substitute case. However, such equilibria are unstable, and a clustered equilibrium would be likely to occur instead.
relative strength of the two. Related to this point, notice that the politico-economic implications
do not depend on the self-regulatory role of self-esteem. Assuming complementarity between moral
pressure and wages would imply that the only stable equilibria are clustered. However, the degree of
social clustering would be increasing with inequality. This implies that the non-monotonic behavior of
equilibrium redistribution, which is driven by the progressive increase in the bias in allocating social
esteem, would continue to occur.

**Allocation of Social Consideration.** The assumption (15) that social consideration is allocated
in proportion to labor supply is made for simplicity. One could assume instead that social consideration
is biased initially toward the poor or toward one’s own group. Our qualitative results would remain
unchanged since the main point is that, whatever the level of social consideration of the poor, the
support for redistribution in their favor declines in a clustered equilibrium because poverty is partly
attributable to lower effort. This mechanism, in particular, does not require that the poor assign to
themselves less weight than to the rich.

**Distribution of Types.** The implication of including a larger number of types requires a more
detailed discussion. Indeed, one might suspect that this is the main cause of the existence of a clustered
socioeconomic equilibrium. We have explored this possibility in our earlier work. With additional
types, the analysis becomes substantially more involved but the main insights remain the same. With
an arbitrary number of productivity levels, there still exist cohesive socioeconomic equilibria in which
everyone conforms to the social norm. Also, two-cluster equilibria continue to exist, with a threshold
type dividing those who work above the mean from those who work below. However, in this case,
there may exist equilibria with a third cluster consisting of individuals with intermediate ability each
supplying the mean quantity of labor. Such three-cluster equilibria are hybrids, exhibiting some of
the attributes of cohesive equilibria and some of clustered equilibria. As with cohesive equilibrium in
the two group case, one finds that the range of productivities among those individuals conforming to
the standard, hence the size of the group, depends on the degree of inequality in productivities and
on the degree of redistribution.

Politico-economic equilibria are characterized similarly to the two-type case. It can easily be
verified that for the linear quadratic case, indirect preferences over tax rates are single-peaked for any
number of types. This guarantees the existence of a voting equilibrium with the equilibrium tax rate
being that chosen by the median among the distribution of peaks. With general utility functions the
determination of the voting equilibrium is substantially more complicated, and additional restrictions
must be imposed to guarantee the existence of a majority rule equilibrium. In that case, while the
main features of the different equilibria are unchanged, we cannot be certain that the comparative
static analysis would be unaffected.

**Utility and Production Function.** In our analytical characterization of the politico-economic
equilibrium, individual private utility was assumed to be additively separable and linear in income.
This is common in the literature, and it does not play a key role in establishing the qualitative results.
The specific assumption concerning preferences for leisure does not play a significant role either. In

\[ 41 \text{Indirect utility is quadratic in } \tau \text{ and strictly decreasing at } \tau = 1. \text{ This rules out any source of non-single-peakedness.} \]
the case of quasi-linear preferences, we have excluded an important reason for redistribution, namely, inequality aversion. Hence, the equilibrium tax rates we obtain are lower than if social preferences were strictly concave. Also, the non-monotonicity of redistribution with respect to inequality, which is driven by the increasing bias toward the high productivity types, does not depend on the actual formulation of the utility function. 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 the actual specification of individual preferences, nor does the fact that in clustered equilibrium the skilled workers would choose to work more than the unskilled.

Finally, as in Meltzer and Richard (1981) we have assumed that production is proportional to total effective labor supply. It is clear that nothing essential would change were we to assume that output is 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 suspect that the degree of complementarity among types of labor could play a role in the development of self-esteem as well as esteem for others. However, in a previous version of the paper we considered the entire class of CES production functions, and, to the contrary, we established that the degree of substitutability has no effect on the qualitative results.

8 Concluding Remarks

There is increasing awareness that moral values play a crucial role in determining individual behavior, social interactions and individual views on social policies. In this paper, we have presented a model in which agents have moral standards of behavior relative to which they judge the work effort of others as well as their own behavior. By affecting both the social consideration of others and self-esteem, such moral calculus influences voting and labor supply decisions. To examine this issue, we have generalized the seminal work of Meltzer and Richard (1981) to include rational voting over redistribution when agents have endogenously determined private and social preferences. The proposed framework allows us to analytically characterize the equilibria and the role of inequality. We find that two types of politico-economic equilibria might emerge. In a cohesive equilibrium, all agents conform to the standard of behavior and income inequality is based solely on exogenous differences in skill levels. As a result, voters are relatively supportive of redistribution since the unskilled are poor through no fault of their own. In this case, the self-regulatory emotions of guilt or pride provide the moral inducement to comply with the endogenously determined work standard. Such an equilibrium is possible only if the disparity in skills, or, equivalently, pre-tax income inequality, is not too large. However, if productivity differences are sufficiently great and such emotions fail to provide the necessary incentives, then a clustered equilibrium will occur in which agents choose to supply different quantities of labor. In this case, the poor are seen to be at least partially responsible for their low income and support for redistributive taxation diminishes. The type of equilibrium to emerge depends crucially on the degree of pre-tax inequality.

The model affords several theoretical predictions on the relationship between labor supply, income inequality, redistributive taxes and attitudes toward the poor. First, it predicts a possibly
non-monotonic relationship between inequality and the level of taxation. It also predicts the endoge-
nous emergence of work norms. We should expect little dispersion in work hours when productivity
differences are small. As societies become more unequal, however, labor supply becomes increasingly
dispersed. The different equilibria lead to, and are sustained by, quite different views of the cause of
poverty and attitudes toward the poor. These novel predictions appear broadly consistent with salient
differences between observed social contracts (in particular, in the US and continental Europe).

The paper can be seen as part of a larger effort to explore the interaction between moral values,
sentiments, behavior and social policy. Clearly, the composition of society, that is, the attitudes
and sentiments of its members, shapes the institutional environment. But the converse is true as
well: institutions affect behavior, and this, in turn, affects the sentiments of the constituents. Full
consideration of this reciprocal effect requires that social policy, individual behavior and sentiments
be determined jointly. This seems particularly true in considering such morally relevant conduct as
honesty and cooperation which are likely to influence individual behavior, preferences over policies
and the perception of others. While we have restricted our attention to the specific role of work norms
and fiscal redistribution, this behavior-based approach to the study of moral sentiments might be
applicable in other policy areas as well.\(^\text{45}\)

\(^\text{45}\)For a general discussion of the mutual influence between institutions and individual traits see Bowles (1998).
References


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9 Appendix.

9.1 Proofs and Figures

Proof of Proposition 1. Given that labor supply is monotonically increasing in individual productivity $\beta_i$ from (12), we know that $L_u(\tau, \beta_u, \beta_s) < L_s(\tau, \beta_s, \beta_s)$ and $L_u(\tau, \beta_u, \beta_s) < L_s(\tau, \beta_s, \beta_s)$.

It is necessary and sufficient for the existence of a cohesive equilibrium that $L_u(\tau, \beta_u, \beta_s) \geq L_s(\tau, \beta_s, \beta_s)$, i.e., that there is some $L$ that satisfies (9) for both $u$ and $s$ at $T = \tau \beta L$ and that every such $L$ is a cohesive SE equilibrium labor supply in which $(\varphi_u, \varphi_s)$ solves (19) for $i = u, s$. We next show that under these conditions clustered equilibria cannot emerge. Suppose $L_u(\tau, \beta_u, \beta_s) \geq L_s(\tau, \beta_s, \beta_s)$ and, to the contrary, suppose there is also a clustered equilibrium in which $L = (L_u, L_s)$, $L_u \neq L_s$. First, if $L_u < L_s$, since this is stationary, it must be that $\varphi_u = \varphi$ and $\varphi_s = \varphi$. But then $L_u = L_u(\tau, \beta_u, \beta_s)$ and $L_s = L_s(\tau, \beta_s, \beta_s)$, which contradicts $L_u(\tau, \beta_u, \beta_s) > L_s(\tau, \beta_s, \beta_s)$. Alternatively, if $L_u > L_s$, then in this case stationary implies $\varphi_u = \varphi$ and $\varphi_s = \varphi$. Hence, $L_u = L_u(\tau, \beta_u, \beta_s)$ and $L_s = L_s(\tau, \beta_s, \beta_s)$. Therefore, $L_u(\tau, \beta_u, \beta_s) > L_s(\tau, \beta_s, \beta_s)$. Since $L_u(\tau, \beta_u, \beta_s) > L_u(\tau, \beta_u, \beta_s)$, as shown above, this implies $L_u(\tau, \beta_u, \beta_s) > L_u(\tau, \beta_u, \beta_s)$, which is also a contradiction. It remains to be shown that $L_u(\tau, \beta_u, \beta_s) < L_s(\tau, \beta_s, \beta_s)$ is sufficient for the existence of a clustered equilibrium. However, if $L_u(\tau, \beta_u, \beta_s) < L_u(\tau, \beta_s, \beta_s)$ and $\varphi_u = \varphi$ and $\varphi_s = \varphi$, then the conditions of the definition of a clustered SE equilibrium are clearly satisfied.

Proof of Proposition 3. Rearrange (26) to get

$$\frac{\partial v_u}{\partial c} (2 - \sigma_u) \left[ y - y_u + \tau \frac{dy}{dT} \right] = -\sigma_u \frac{\partial v_s}{\partial c} \left[ y - y_s + \tau \frac{dy}{dT} \right].$$

(47)

Since $\frac{dy}{dT} < 0$ and $y_s > y$, the RHS is positive. Hence, the LHS must be positive as well which implies

$$y - y_u + \tau \frac{dy}{dT} > 0.$$  

(48)

If that is the case, then from (25) $\frac{dv_u}{dT} > 0$ at $\tau^u$. Hence $\tau^u < \tau^m$, or the level of redistribution preferred by the poor is smaller than in the egoistic case.

As for the effect of $\sigma_u$ on $\tau^u$, implicit differentiation yields

$$\text{sign} \frac{\partial \tau^u}{\partial \sigma_u} = \text{sign} \left( -\frac{\partial^2 V_u / \partial \tau \partial \sigma_u}{\partial^2 V_u / \partial \tau^2} \right) = \text{sign} \left\{ -\frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{dT} \right] + \frac{\partial v_s}{\partial c} \left[ y - y_s + \tau \frac{dy}{dT} \right] \right\} < 0.$$  

From (48) and from (26) and noting that by second order condition of a maximum $\partial^2 V_u / \partial \tau^2 |_{\tau^u} < 0$ by (27) we have that

$$\frac{\partial \tau^u}{\partial \sigma_u} < 0.$$  

Finally, as for the preferences of the skilled workers we have that

$$\frac{dV_s(\tau)}{dT} = (1 - \sigma_s) \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{dT} \right] + \frac{\partial v_s}{\partial c} \left( 1 + \sigma_s \right) \left[ y - y_s + \tau \frac{dy}{dT} \right].$$  

(49)
Since \( y - y_s + \tau \frac{dy}{d\tau} < 0 \), a purely egoistic skilled worker would optimally choose \( \tau = 0 \) (from the analogue of (25) for \( s \)). In an interior solution of (49)

\[
\frac{\partial v_s}{\partial c} (1 + \sigma_s) \left[ y - y_s + \tau \frac{dy}{d\tau} \right] = -\left( 1 - \sigma_s \right) \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right].
\]

(50)

As above, this implies \( y - y_u + \tau \frac{dy}{d\tau} > 0 \) at the solution \( \tau^* \). Hence \( 0 \leq \tau^* < \tau^* \) as well. Next we show that \( \tau^u > \tau^* \) even in the case in which \( \tau^* > 0 \), that is, when (50) holds with equality. Now, we compare the coefficients of the positive expression \( \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] \) in (50) and (47). By (7) and (13), \( \sigma_u = \sigma_s \) in a stationary equilibrium. Evaluating \( \frac{dV_u}{d\tau} \) and \( \frac{dV_u}{d\tau} \) at \( \tau^* \) we have

\[
\frac{dV_u}{d\tau} \bigg|_{\tau = \tau^*} = \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] - \frac{\partial v_u}{\partial c} \left[ y - y_u + \tau \frac{dy}{d\tau} \right] + \frac{dV_u}{d\tau} \bigg|_{\tau = \tau^*} < 0
\]

since \( \frac{dV_u}{d\tau} \bigg|_{\tau = \tau^*} = 0 \). Hence, \( \tau^u > \tau^* \geq 0 \).

**Proof of Proposition 4 and Proposition 5.** The first order condition for labor supply can be expressed as

\[
[(1 - \tau) \beta_i L_i + T]^{-\theta} (1 - \tau) \beta_i = \frac{1}{2} f' (\bar{L} - L_i) (1 + \varphi_i).
\]

In a cohesive SE equilibrium where \( L_i = L \) for all \( i \), and \( T = \tau \beta L \), this can be written as

\[
f' (\bar{L} - L) L^\theta = \frac{2}{1 + \varphi_i} [(1 - \tau) \beta_i + \tau \beta]^\theta (1 - \tau) \beta_i,
\]

where the LHS is strictly increasing in \( L \) while the RHS is independent of \( L \). From this expression, we have that (21) in Proposition 1 holds if and only if

\[
\frac{1}{1 + \varphi_i} [(1 - \tau) \beta_u + \tau \beta]^\theta \beta_u \geq \frac{1}{1 + \varphi_i} [(1 - \tau) \beta_s + \tau \beta]^\theta \beta_u.
\]

Rearranging the last expression, we have that a cohesive SE equilibrium exists if and only if

\[
\left( \frac{\beta_u}{\beta_s} \right)^{1/\theta} \geq \left( \frac{1 + \varphi_i}{1 + \varphi_i} \right)^{1/\theta} \left[ \frac{(1 - \tau) \beta_u + \tau \beta}{(1 - \tau) \beta_s + \tau \beta} \right].
\]

(51)

After some manipulation, (51) can be rewritten as

\[
\left( \frac{1 + \varphi_i}{1 + \varphi_i} \right)^{1/\theta} \left( \tilde{\beta} \right)^{1/\theta} \geq \left[ \tilde{\beta} (1 - \tau) + \tau \left( (1 - \pi) \tilde{\beta} + \pi \right) \right] = \frac{\tilde{\beta} (1 - \tau) + \tau \left( (1 - \pi) \tilde{\beta} + \pi \right)}{(1 - \tau) + \tau \left( (1 - \pi) \tilde{\beta} + \pi \right)} = 1 - \frac{(1 - \tilde{\beta})}{(1 - \tau) + \tau \left( (1 - \pi) \tilde{\beta} + \pi \right)},
\]

which can be written as

\[
H (\tilde{\beta}) \equiv \left( \frac{1 + \varphi_i}{1 + \varphi_i} \right)^{1/\theta} \left[ 1 - \frac{(1 - \tilde{\beta})}{1 + (\tau/(1 - \tau)) (1 - \pi) \tilde{\beta} + \pi} \right] \equiv G (\tilde{\beta}, \tau) \left( \frac{1 + \varphi_i}{1 + \varphi_i} \right)^{1/\theta}.
\]

(53)
Consider the RHS and the LHS of (53) in the space $\tilde{\beta} \in [0, 1]$. First, $H(.)$ is strictly increasing and either strictly concave for $\theta > 1$, strictly convex for $\theta < 1$, or linear for $\theta = 1$. Also, $H(0) = 0$ and $H(1) = 1$.

Notice that $G(\tilde{\beta}, \tau)$ is strictly increasing in $\tau$ with $G(\tilde{\beta}, 0) = \tilde{\beta}$ and $G(\tilde{\beta}, 1) = 1$. In particular denote by $\tilde{\beta}_1$ the level of relative productivity such that (53) is satisfied with equality for $\tau = 1$. This is given by

$$\tilde{\beta}_1 = \frac{1 + \varphi}{1 + \varphi} < 1. \quad (54)$$

Also, denote by $\tilde{\beta}_0 \in [0, 1]$ the relative productivity at which (53) is satisfied with equality for $\tau = 0$, which is given by

$$\tilde{\beta}_0 = \left(\frac{1 + \varphi}{1 + \varphi} \right)^{1/\theta} < 1 \text{ for any } \theta < 1 \text{ and } \tilde{\beta}_0 = 0 \text{ for any } \theta \geq 1.$$ 

Clearly, for $\theta \geq 1$, $\tilde{\beta}_1 > \tilde{\beta}_0$. But also for $\theta < 1$, since $\frac{1 + \varphi}{1 + \varphi} < 1$ and $\frac{1}{1 + \varphi} > 1$, $\tilde{\beta}_1 > \tilde{\beta}_0$. Therefore, we have an upper bound $\tilde{\beta}_1$ (that is, a lower bound for inequality) such that for any $\tilde{\beta} \geq \tilde{\beta}_1$ only cohesive SE equilibria exist and a lower bound $\tilde{\beta}_0$ such that for any $\tilde{\beta} < \tilde{\beta}_0$ only clustered SE equilibria exist. This proves Proposition 5.

Proposition 4 is proved by noting that by the monotonicity of $G(\tilde{\beta}, \tau)$ in $\tau$ and the Intermediate Value Theorem, for any $\tilde{\beta} \in [\tilde{\beta}_0, \tilde{\beta}_1]$ there always exists a unique interior $\tau(\tilde{\beta}')$ such that $\sigma < \tau(\tilde{\beta}')$, then only clustered equilibria are possible, while if $\tau \leq \tau(\tilde{\beta}')$, only cohesive equilibria exist. Also the larger $\tilde{\beta}'$ the larger the required $\tau$ necessary to make the functions $H(\tilde{\beta})$ and $G(\tilde{\beta}, \tau) \left(\frac{1 + \varphi}{1 + \varphi} \right)^{1/\theta}$ cross exactly at $\tilde{\beta}'$.

**Proof of Lemma 2.** The range of inequality $I$ for which the economy is in a cohesive/clustered SE equilibrium is characterized in Propositions 7 and 8. From (15) and (31), in any clustered equilibrium the bias in social sentiments is given by

$$\sigma_u = \frac{\pi \beta_u}{(1 - \pi) 2 \beta_u + \pi \beta_s}. \quad (55)$$

In this case the magnitude of the distributive bias $\delta$ is given by

$$\delta = \frac{(y - \bar{y}_u)}{y} = \frac{(1 - \pi) 2 \beta_u^2 + \pi \beta_s^2 - (1 - \sigma_u) 2 \beta_u^2 - \sigma_u \beta_s^2}{(1 - \pi) 2 \beta_u^2 + \pi \beta_s^2}. \quad (56)$$

Using (55) and rearranging, we can express the numerator of (56) as

$$(1 - \pi) 2 \beta_u^2 + \pi \beta_s^2 - 2 \beta_u^2 + \frac{\pi \beta_s}{(1 - \pi) 2 \beta_u + \pi \beta_s} (2 \beta_u^2 - \beta_s^2) = \pi (\beta_u^2 - 2 \beta_u^2) \left(1 - \frac{\beta_s}{(1 - \pi) 2 \beta_u + \pi \beta_s} \right) = -\pi \frac{(1 - \pi) (\beta_u^2 - 2 \beta_u^2)}{(1 - \pi) 2 \beta_u + \pi \beta_s}.$$ 

\[46\] One solution is always $\tilde{\beta}_0 = 0$ while the second solution is in the range $[0, 1]$ only if $\theta \leq 1.$
Therefore,
\[
\delta(I) = -\pi (1 - \pi) \frac{1 - 2\tilde{\beta}}{(1 - \pi) 2\tilde{\beta}^2} \frac{1 - 2\tilde{\beta}}{\pi + (1 - \pi) 2\tilde{\beta}} < 0 \text{ for } \tilde{\beta} < \frac{1}{2}.
\]

Computing the level of income inequality one gets
\[
I = \frac{\pi (1 - 2\tilde{\beta})}{(\pi + (1 - \pi) 2\tilde{\beta})},
\] (57)
which implies
\[
\delta = - (1 - \pi) I \frac{1 - 2\tilde{\beta}}{(\pi + (1 - \pi) 2\tilde{\beta})} < 0.
\]
From (57) we have
\[
\frac{\partial I}{\partial \beta} = - \frac{4\pi \tilde{\beta}}{(\pi + (1 - \pi) 2\tilde{\beta})^2} < 0.
\] (58)

The bias in social sentiments is increasing in \( I \) since
\[
\frac{\partial \delta}{\partial I} = - (1 - \pi) \frac{1 - 2\tilde{\beta}}{(\pi + (1 - \pi) 2\tilde{\beta})} + I \frac{\partial}{\partial \beta} \left( - (1 - \pi) \frac{1 - 2\tilde{\beta}}{(\pi + (1 - \pi) 2\tilde{\beta})} \right) \frac{\partial \tilde{\beta}}{\partial I} = \frac{\delta}{I} + 2I (1 - \pi) \frac{\partial \tilde{\beta}}{\partial I} < 0,
\] (59)
which proves the statement.

**Proof of Proposition 9.** (i) It is immediate from (45), that \( \partial \tau^*/\partial I^* > 0 \).

(ii) From Lemma 2, in clustered equilibrium \( \delta(I) < 0 \) and \( \frac{\partial \tilde{\beta}}{\partial I} < 0 \). And from Proposition 8 the equilibrium level of redistribution is \( \tau(I) = \frac{\delta + I}{2\pi + \delta + I} \). Therefore,
\[
\frac{\partial \tau^o}{\partial I} = \frac{1}{(2 + \delta + I)^2} \left( 1 + \frac{\partial \delta}{\partial I} \right) \geq 0 \iff 1 \geq \left| \frac{\partial \delta}{\partial I} \right|.
\]
Recall that \( I = \bar{I} = \frac{\pi}{1 + \pi} \iff \tilde{\beta} = 1/2 \), and \( \delta(\bar{I}) = 0 \). Then from (58) evaluated at \( \tilde{\beta} = 1/2 \) we obtain
\[
\frac{\partial \tilde{\beta}}{\partial I} \bigg|_{I=\bar{I}} = \frac{(1 + \pi)^2}{8\pi}.
\]

Hence, from (59) we have \( \frac{\partial \tau^o}{\partial I} \bigg|_{I=\bar{I}} = \frac{1}{(2 + \bar{I})^2} \left( \frac{3 - \pi^2}{4} \right) > 0 \). Notice also that from Proposition 8, there exists a level of inequality \( I' > \bar{I} \) such that \( \tau^o = 0 \). Hence, by continuity of \( \tau^o(I) \) and by Intermediate Value Theorem there exists a level \( I^o \) for which \( \tau^o \) is maximal.

**Redistribution as a function of the Gini Index.** From Proposition 9 we know that redistribution is maximal for some \( I > \bar{I} \) and the maximum value it is implicitly characterized by maximizing (40). Denote the preferred level of redistribution as function of inequality as \( \tau = \phi(I) \). Differentiating, we have
\[
d\tau = \phi'(I)dI.
\] (60)
Computing the Gini index for disposable income, we get $G = (1 - \tau) (1 - \pi) I$. By totally differentiating we have

$$dI = \frac{1}{(1 - \tau)(1 - \pi)} dG + \frac{G}{(1 - \tau)^2 (1 - \pi)} d\tau.$$  

Substituting and rearranging,

$$d\tau \left[ 1 - \frac{\phi'(I) G}{(1 - \tau)^2 (1 - \pi)} \right] = dG \frac{\phi'(I)}{(1 - \tau) (1 - \pi)}.$$  

Therefore,

$$\frac{d\tau}{dG} = \frac{\phi'(I) (1 - \tau)}{(1 - \tau)^2 (1 - \pi) - \phi'(I) G} = 0 \iff \phi'(I) = 0,$$

which implies that the change in redistribution as a function of the Gini index co-moves with the change in pre-tax income inequality $I$.

**Self-esteem and labor supply.** To understand the role of the regulatory function of self-conscious emotions, consider momentarily the case in which moral motivation and wages are complements rather than substitutes. That is, instead of (16), assume

$$v(c, L, \varphi) = c + 2 \frac{1 - L^2}{2} \frac{1}{1 + \varphi}$$

rather than 30. In that case the optimal labor supply would be

$$L_i (\beta_i, \varphi_i, \tau) = (1 - \tau) \beta_i \frac{1 + \varphi_i}{2}$$

instead of $L_i (\beta_i, \varphi_i, \tau) = (1 - \tau) \beta_i \frac{2}{1 + \varphi_i}$. This implies that an increase in self-esteem would lead to an increase rather than a decrease in labor supply. Hence, for any $\beta_i$ the maximum labor supply is attained at $\varphi_i = \varphi$ rather than at $\varphi_i = \varphi'$, as in the text.

From the Proof of Proposition 5 we know that for the utility formulation (30) the critical value

$$\beta_1 = \frac{1 + \varphi}{1 + \varphi'} < 1$$

divides the range of productivity ratios such that for any $\beta > \beta_1$ only cohesive equilibria exist, while for any $\beta < \beta_1$ only clustered equilibria exist. By a similar argument, using the utility formulation (63), we have that in a cohesive equilibrium

$$L_u (\beta_u, \varphi_u, \tau) = L_s (\beta_s, \varphi_s, \tau) \iff \beta_u (1 + \varphi_u) = \beta_s (1 + \varphi_s).$$

As in the text, an increase in the productivity spread leads skilled workers to work relatively more. This can be compensated, however, by a reduction in their self-esteem. Therefore, a cohesive equilibrium can be sustained as long as

$$\beta_u (1 + \varphi) \geq \beta_s (1 + \varphi') \iff \beta \geq \frac{1 + \varphi}{1 + \varphi'},$$

which is precisely the same threshold as in the case considered in the text. This implies that cohesive
equilibria can be sustained only if the productivity difference is not too large. Thus, what explains cohesive equilibria is not the substitutability between economic and moral incentives but rather the relative extremes of the two. Notice, however, that a cohesive equilibrium as in (65) is not stable. Any deviation leads dynamically to a clustered equilibrium. Consider, for example, the case in which $L_s > L_u$. From the dynamic evolution of self-esteem and social esteem (13) and (13), this leads to an increase in $\varphi_s$ and a decrease in $\varphi_u$. As result we observe a further increase in the gap $L_s - L_u$. The process continues until a clustered equilibrium is reached with $\varphi_s = \varphi$, $\varphi_u = \varphi$ and $L_s(\varphi) > L_u(\varphi)$.\footnote{In fact in this case a clustered equilibrium with $\varphi_u = \varphi$, $\varphi_s = \varphi$ and $L_u(\varphi) > L_s(\varphi)$ can also be sustained. This equilibrium, however, disappears when inequality is sufficiently large, that is if $\tilde{\beta} < \frac{1}{1+\tilde{\nu}}$.}

Hence, the role of the self-regulatory function of changes in self-esteem, as in (16), is to insure the stability of equilibrium. Finally, notice that the result on the non-monotonic behavior of equilibrium redistribution does not depend on the self-regulatory role of emotions since it is induced by the increasing bias against the poor in clustered equilibria.