Fairness and Redistribution: the Case of Latin American Countries*

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Abstract: Following the suggestion of modern egalitarians, the model proposed by Alesina & Angeletos (2005) sets up a fairness rule based on composition of equality, designated by the weights of effort and luck. However, empirical evidence for a set of Latin American countries suggests that, unlike developed countries, these societies do not have a well-established view about the role of merit on economic outcome. Therefore, this paper proposes a theoretical framework based on a new fairness rule, namely the perception that the country does not offer everyone with the same opportunities. The new parameterization leads to a unique and stable equilibrium, characterized by an intermediate level of taxation between the equilibria of the "U.S." and of "Europe".

Keywords: Redistribution; Fairness; Latin America.

JEL-Classification: D31, E62, H2, P16.

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1 Introduction

Social and income redistribution policies have increasingly become the focus of attention of traditional governmental powers. For instance, in the 1960s, members of the Organization for Economic Cooperation and Development (OECD) allocated an average of 8% of their GDPs to transfers and social spending. In the early 2000s this rate more than doubled, rising to 17% (Alesina & La Ferrara, 2005). In developing countries, especially in Latin America, the situation is even more conflicting. According to the Economic Commission for Latin America and the Caribbean (ECLAC) data,[1] social spending was three times bigger, increasing from 7% between 1960 and 1998 to 21% of the GDP in the 2000s.

At first, it was postulated that the change in the stance of governments resulted from a higher demand for income equality. This assumption is supported by models such as those of Mirrlees (1971) and of Meltzer & Richard (1981), in which government size is determined by a mechanism of resource redistribution, such that the larger the asymmetry of income distribution (income inequality), the stronger the redistributive policy.

Nonetheless, recent theoretical frameworks contest the direct association between redistributive policies and income inequality. Instead, the result of the economic policy is thought to indicate the social desire for fairness, determined by the tradition of modern egalitarians (cf. Roemer, 1996, 1998), that is: if the income is made up of two elements, one related to effort and one associated with luck,[2] the stronger the belief that luck is a determinant of income, the higher the demand for redistributive policies.[3]

This fairness rule is mainly illustrated by the comparison of the U.S. and the European scenarios. The U.S. has a larger inequality than that of Euro Zone countries (Gini coefficients of 0.36 and 0.31, respectively). However, Europe has a more progressive tax structure and a higher share of the government in the economy, by means of redistributive policies, social spending proportionally to the GDP, among others.[4] This is so because, even though inequality is larger than that observed in Europe, economic outcome results from effort for 80% of U.S. citizens. Thus, there is no reason for redistribution. The opposite reasoning holds for Europeans, with a rate of 40%.[5]

[1] Available at `http://www.eclac.org/`.

[2] In which unworthy activities, corruption, among others are summarized.

[3] Studies such as those of Piketty (1995) and Cervellati, Esteban & Kranich (2004) and Bénabou & Tirole (2006), as well as the empirical results obtained by Alesina, Gleaser & Sacerdote (2001), confirm this association.

[4] See further details in Alesina et al. (2001).

[5] The rates related to the belief that luck determines income are obtained from the

The importance of the "perception of injustice–redistributive policy" ratio for explaining the heterogeneous behavior of governments is demonstrated by Alesina & Angeletos (2005) (henceforth AA). The theoretical framework developed by AA posits that not only do the different perceptions of injustice influence redistributive policies, but that they steer economies towards multiple equilibria. In other words, if a society believes that individual effort determines income, it will choose low redistribution and low taxes. Another society which believes that luck, connections, and/or corruption determines wealth, will choose high taxes.

Two characteristics of this model are: the goal of the central planner to maximize the median voter's welfare and the presence of a social fairness weighting component, based on the effort-luck association, in the utility function of individuals. In other words, societies have a well-established perception about the role of merit. This assumption is summarized by the afore-mentioned "conflict" between U.S. and European judgments.

Nevertheless, what happens when the association between merit and fairness fails? In a recent paper, Sen (2000) states that the social demand for merit chiefly depends: i) on non-personification of actions, i.e., most of the results arising from merit are not associated with specific social groups; ii) on the good performance of incentives, i.e., greater effort effectively produces a larger reward, and; iii) on social aversion to inequality, indicating that the mechanisms based on merit can be set aside if they cause larger income inequality.

By taking these factors into account, it is possible to postulate that a merit-based fairness rule might not suit an environment with large income inequality, poor economic mobility and social unrest, for instance. In other words, although it efficiently explains the behavior of developed countries, the theoretical model of AA might not suit the reality of developing countries.

The empirical literature shows the difference across inequality, mobility and important social discrepancies of Latin American countries compared to developed ones (cf. Fields, 2001, Barros et al., 2009, among others). Hence, the association between merit and fairness could be impaired, as pointed out by Sen (2000), which would invalidate the theoretical explanation provided in AA.

Therefore, this paper proposes a theoretical framework that is closer to the reality of Latin American countries, suggesting a change in the theoretical model of AA, with the inclusion of a new fairness rule.

The paper is organized into four sections, in addition to this introduction. Section 2 presents empirical elements that justify the adoption of a new

World Values Survey. Further information on the datasets is shown in Appendix A1.

fairness rule. Section 3 suggests a change in the original model of AA. Section 4 discusses the economic and political behaviors that support the demand for social protection. Finally, Section 5 concludes.

2 Empirical Justification

The aim of this section is to provide some empirical evidence that contests a merit-based fairness rule. A dataset for Latin American countries obtained from the *World Values Survey* and from the *LatinoBarómetro* will be used.

2.1 Behavior of Latin American Countries

Several are the reasons for the difference in welfare across developed and Latin American countries. For economic historians like La Escosura (2004, 2005), an important factor can be found in the colonial past of Latin America. On the other hand, Coatsworth (1993, 1998) draws attention to the institutional role and to an environment that facilitates structuralist, ECLAC's, and marxist views, among others, in the post-World War II period. Moreover, most of these countries remained under protectionist governmental actions for a long time, with a low level of economic integration. In the political arena, military dictatorships, arising from the cold war, and caudillo governments, mainly in Argentina, Brazil, Chile, and Uruguay are noteworthy.[6]

In summary, the association of these factors with inequality and mobility indicators is not believed to prompt the establishment of an effort-based fairness rule. That is, it is postulated that Latin American countries have their own fairness rule, unlike the effort-luck weighting component observed in the U.S. and European societies.

A way to check this hypothesis is by assuming that an individual has a welfare loss associated with inequality. This argument is based on Bénabou & Tirole (2006) and can be captured through a regression, in which the welfare arising from income redistribution is explained by a series of individual covariables, including the afore-mentioned belief that luck determines income.

As individual welfare is a latent variable (Y^*), the following structure is suggested: $Y^* = X'\theta + u$, where X represents the covariables, θ is the vector of parameters and $u \sim N(0,1)$. Let us consider an indicator variable $Y = \mathbb{I}_{\{Y^*>0\}}$, which assumes value 1 if the redistribution has a positive influence on welfare ($Y^* > 0$), i.e., $-u < X'\theta$ and 0 otherwise.

[6]Detailed information about the Latin American economic history can be found in Bulmer-Thomas (2003).

In this case, the variable Y, which stands for the interest in a broader level of fairness, is represented by individual political orientation. Just as in Alesina et al. (2001), individuals who view themselves as leftists tend to be more prone to redistributive policies and to governmental intervention; therefore, they are designated by $Y = 1$. In other words, their welfare functions are negatively affected by inequality. Again, the information was obtained from the *World Values Survey*. The results for the *Probit* regression for Brazil, Chile, Uruguay, Mexico, the USA and Germany are displayed in Table 1.

Table 1: Political Orientation and the Effect of Belief in Luck on Income: Selected Countries

	Brazil	Chile	Uruguay	Mexico	USA	Germany
Belief in Luck	0.0762	0.0008	-0.1318	-0.0461	**0.1845***	**0.2626***
Income	-0.0280	-0.0006	-0.0177	-0.0583*	0.0113	-0.0022
Schooling	0.0581*	0.0334	0.1060*	-0.0080	$0.0127^{\#}$	0.1066*
City size	0.0678*	0.1809	0.0878*	0.0811*	0.0012	0.0326*
Married	0.0789	0.0324	-0.0074	-0.2088*	-0.1680	0.0417
Number of children	0.0116	-0.0312	$0.0613^{\#}$	0.0118	$-0.0552^{\dagger}$	0.0265
Sex	0.0792	$0.2276^{\#}$	0.0523	0.0123	0.0114	-0.1011
Age group 18-24	0.6564*	0.0031	0.6789*	0.3715	$0.3630^{\dagger}$	-0.1365
Age group 25-34	0.5470*	0.1575	0.5961*	0.2847	0.2516	-0.1757
Age group 35-44	0.4882*	0.0144	0.5385*	0.2942	0.5776*	-0.0358
Age group 45-54	0.4012*	0.1479	$0.3094^{\#}$	0.2132	0.5358*	0.0527
Age group 55-64	$0.3564^{\#}$	-0.1813	-0.0203	-0.0073	0.4727*	0.0252
Constant	-1.9640*	$-2.1460^{\#}$	-2.1330*	-1.1034*	-1.2753*	-1.1186*
Pseudo R^2	0.0276	0.0216	0.0828	0.0385	0.0364	0.0398
Observations	1.408	778	896	1.434	1.129	1.830

Note: $^{*}p < 0.01$, $^{\#}p < 0.05$ e $^{\dagger}p < 0.10$.

In contrast with the results obtained by Alesina et al. (2001) and with the inferences for the U.S. and Germany, the estimates for Latin American countries indicate that the perception of unfairness based on merit does not have an impact on individual welfare. That is, although most inhabitants of these countries regard luck as a key factor for individual economic results (average of 48%), it does not interfere with their preferences for redistribution.

After these considerations, the study can follow two paths. The first one consists in assuming that the weight of injustice of these societies is null, reducing the model of AA to that of Meltzer & Richard (1981). That is, by assuming that the existing asymmetry between the income of mean and median voters is the single relevant factor for an optimal policy. The second one consists in contesting the adopted fairness rule since, based on the theoretical arguments advocated by Bénabou & Tirole (2006), the hypothesis of the absence of fairness rules in these societies is too unrealistic.

Following the second path, we should ask: how do Latin Americans view merit? The first evidence is provided by *LatinoBarómetro* data (shown in detail in Appendix A1), which is similar to the *World Values Survey*, but applied only to Latin American countries. The selected question asks about wage differences between two workers:

> "Two individuals, of the same age, work as computer programmers and carry out the same activities. One of them earns better than the other, but he is faster, more efficient and more reliable. In your opinion, do you think it is fair that one programmer earns better than the other?"

Note that the situation clearly involves a rational choice as to the level of effort. Put differently, the wage difference seen according to the fairness rule established by AA is perfectly justifiable. However, Latin Americans do not think like that, given that 47% of respondents consider this difference to be unfair. In Venezuela, for example, this rate is as high as 60%. The lowest rate is observed in Paraguay, 32%. while in Brazil and Mexico this rate is 46% and 49%, respectively.

A second question, about the level of poverty, was asked:

> "There are different opinions about the causes of poverty in your country. Some say that the poor exist because they do not strive enough to improve their living conditions; some say that the poor exist owing to circumstances beyond their control. Which of these opinions is closest to yours"

The answers are even more startling. For 64% of Latin Americans, poverty stems from circumstances rather than from "laziness." This belief is less common in Honduras (47%), but more prevalent in Brazil (81%), Argentina (81%) and Uruguay (77%).

As the measure of inequality in AA divides income into two components, effort and luck, these rates should correspond to the effect of luck on income. Nonetheless, *World Values Survey* data indicate that luck as a determining factor for income among Latin American countries is much less common than the belief that poverty is circumstantial.

Apparently, Latin Americans are worried about inequality as a whole and not only about luck or circumstances (composition). This conclusion is corroborated by the weighting of factors related to social conflicts. *Latino-Barómetro* data show that among possible social conflicts such as between men and women, employed and unemployed, employers and employees, young and old, among others, the major conflict seems to be between "the poor and the rich." Eighty-five percent of the respondents believe in the existence of such conflict.

Therefore, the purpose here is to verify the relationship between social spending and a merit-free fairness measure. To do that, recent data on social spending in Latin America.[7] in addition to *LatinoBarómetro* data. The selected fairness indicator should answer the following question:

> "There are different opinions about equal opportunities in this country. Some people say that the economic system provides **everyone** with equal opportunities; while some say that not **everyone** is given the same opportunities to climb the ladder out of poverty. Which of these opinions is closest to yours?"

The percentage of people who believe in the second hypothesis is used as *proxy* for the new fairness rule. Note that the individual is asked about the opportunities given to **everyone** and not only to a group of people who deserve them. Figure 1 shows a positive relationship across the variables of interest. The fitted straight line (full line) describes the linear relationship for all sampled countries. The dotted line describes the same relationship, but Venezuela is left out, as it is an *outlier*. The regression in Table 2 confirms these results.[8]

[7]Information obtained from the *Economic Commission for Latin America and the Caribbean* (ECLAC). The mean expenditure values for the 2000s were taken into account.

[8]The regression is robust against *outliers*, heteroskedasticity and autocorrelation.

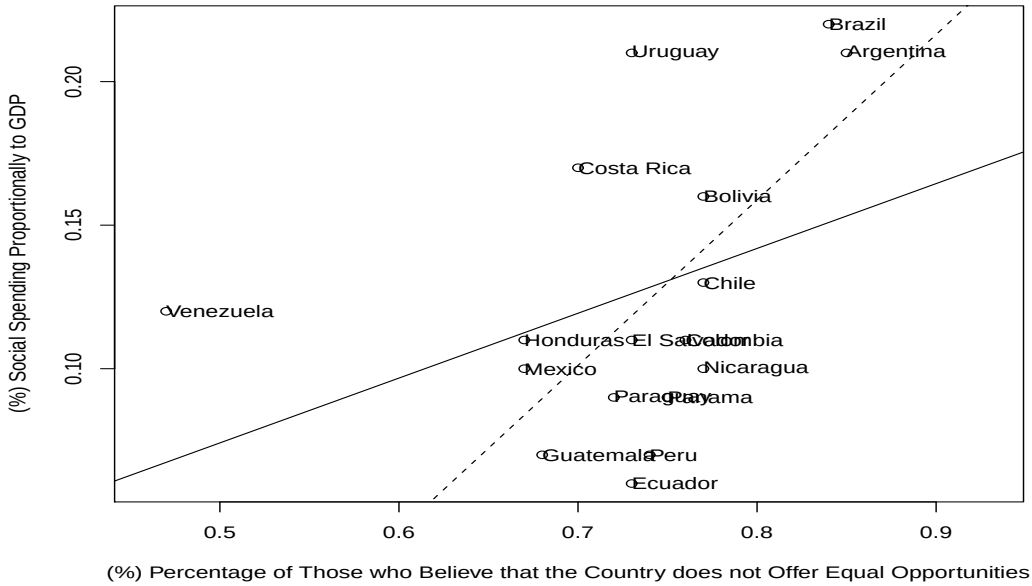

Figure 1: Relationship between Social Spending in % of GDP and the Percentage of Those who Believe that the Country does not Offer Equal Opportunities.

Following the logic of the empirical model in Table 1, regressions are performed and the redistributive desire (political orientation) is explained by the new fairness rule and by a set of covariates.[9] Regressions for Brazil, Chile, Uruguay and Mexico are shown.

Table 3 results indicate that the relationship between the belief in the existence of unequal opportunities and redistributive desire is relevant for the group of Latin American countries. Income, Schooling, Sex and Age Group covariates turned out to be significant. The dummies for Civil Servants and for Married individuals were not significant. The regressions for the selected countries demonstrate that the new fairness rule has a direct relationship with redistributive desire (individual welfare). However, the rule is not valid for Mexico.[10]

This evidence leads to an important challenge: to devise a theoretical model that explains the particular behavior of developing countries. There-

[9]There is a difference between the covariates of Tables 1 and 2. This is due to the fact that the regressions were estimated based on two different datasets.

[10]Actually, 5 of 17 countries do not fit into the new fairness rule, namely Bolivia, Costa Rica, Guatemala, Mexico and Paraguay.

Table 2: Effect of the Belief in Unequal Opportunities on Social Spending

	Coefficients	Standard Deviations
Belief in Unequal Opportunities	**0.3207**†	0.1579
Gini	-0.4506	0.3580
GDP *per capita*	0.0036	0.0030
Constant	0.0916	0.1670
R^2 Adjusted	0.2719	
F-Test	2.992†	

Note: $^{\dagger}p < 0.10$.

fore, a change in the fairness rule introduced in the theoretical model of AA is proposed: individual welfare will be affected by the perception of fairness involving inequality as a whole rather than its composition. The resultant optimal policy, as well as the equilibrium relationships of the new model, are presented in the subsequent section.

Table 3: Political Orientation and Belief in Unequal Opportunities: Selected Countries

	All	Brazil	Chile	Uruguay	Mexico
Belief in Unequal Opportunities	**0.1695***	**0.2535**$^{\#}$	**0.3073**$^{\#}$	**0.4739***	-0.0764
Income	0.0825*	0.1054	-0.2148*	-0.0473	0.1075$^{\#}$
Schooling	0.0444*	0.1060*	0.0031	0.0127$^{\#}$	0.0085
Civil Servants	0.0190	0.2431	0.2897	0.0395	0.2242
Married	0.0034	0.0138	-0.1492	0.1062	-0.2272$^{\#}$
Sex	0.0402†	0.1264	0.1617	0.1288	0.0094
Age group 18-24	0.2235*	0.6273*	-0.3394	0.5771*	0.0569
Age group 25-34	0.2153*	0.4860*	-0.0707	0.4967*	0.1009
Age group 35-44	0.1493*	0.4618*	0.1593	0.3964*	-0.1447
Age group 45-54	0.1236*	0.2136	0.1191	0.3988*	-0.0826
Constant	-0.2978*	-0.9913*	-0.2179	-0.7823*	-0.0477
Pseudo R^2	0.0100	0.0551	0.0332	0.0714	0.0184
Observations	14.556	824	457	1.129	943

Note: $^{*}p < 0.01$. $^{\#}p < 0.05$ e $^{\dagger}p < 0.10$.

3 Theoretical Model

Base. Let us consider a static economy with a large number of agents indexed by $i \in [0, 1]$. Individuals live in two periods and, in each one, they engage in some productive activity, such as physical or human capital accumulation, labor supply, entrepreunership, among others. Tax and redistributive policies are set in the middle of their lives.

Income, redistributive policy and budgeting. Pre-tax life-cycle income, y_i (henceforth, *pretax* income), is defined by a combination of talent (A_i), of investment during the first period of life (k_i), of effort during the second period of life (e_i) and of "noise" (η_i):

$$y_i = A_i[\alpha k_i + (1 - \alpha)e_i] + \eta_i. \quad [3.1]$$

Where $\alpha \in (0, 1)$ is a constant that represents income loss from the distortionary effect of taxes. A_i and η_i are i.i.d. (independently and identically distributed) variables across $i's$. The noise variable represents luck and unworthy activities such as corruption, *rent seeking*, political subversion, among others.

The government levies a fixed tax on income (*flat-rate tax*), and adopts a redistributive policy *lump-sum*, such that the budget of individual i is given by:[11]

$$c_i = (1 - \tau)y_i + G, \quad [3.2]$$

where $G = \tau\bar{y}$, is $\bar{y} \equiv \int_i y_i$, i.e., the average income of the population. Thus, c_i can be interpreted as consumption or as the income available after the adoption of tax (τ) and redistribution (G) policies.

Preferences. Individual preferences are represented by

$$U_i = u_i - \gamma\Omega, \quad [3.3]$$

where u_i is the utility derived from the choices related to consumption, investment and effort, that is:

$$u_i = V_i(c_i, k_i, e_i) = c_i - \frac{1}{2\beta_i}[\alpha k_i^2 + (1 - \alpha)e_i^2]. \quad [3.4]$$

[11] A linear structure is assumed, as the government does not have any information about individual variables related to talent, effort and human and fixed capital investments.

In this case, β_i is an i.i.d. variable that represents delayed consumption. Low β_i values denote impatience or laziness. On the other hand, high values denote love for work.

Fairness. The second part of equation (3.3) denotes the disutility caused by the level of social unfairness (Ω), captured by parameter $\gamma \geq 0$. In brief, γ represents the demand for social justice. Therefore, the original model of AA is modified. Instead of contemplating only effort and luck, the level of unfairness is given by:

$$\Omega = [\phi\Omega_1 + (1-\phi)\Omega_2].$$

If $\phi = 1$, the model will be identical with that developed by AA. In other words, society has a fairness rule based on the effort-luck component. If $\phi = 0$, then the fairness rule will be:

$$\Omega_2 = \int_i (u_i - \bar{u})^2, \qquad [3.5]$$

where $\bar{u}$ represents the average level of utility, i.e., that which results from the mean values of c_i, k_i and e_i.

The results for a $\phi = 1$ are well-known in the literature. AA demonstrated that, in this parameterization, the model has multiple equilibria, two of which are stable. The first one denotes the U.S. reality, with low taxes, and the second one, with a larger tax burden, represents the European reality. In what follows we present the results for $\phi = 0$. That is, those which will be in place if the fairness rule based on the effort-luck perception fails.

Policy and equilibrium. Even though the modeling of individual preferences assumes a prominent role, the decisions concerning the optimal level of redistribution, i.e., government preference, only takes into consideration the profile of the median voter.

Definition: An equilibrium is represented by a τ rate and a collection of individual plans $\{k_i, e_i\}_{i\subset[0,1]}$, such that (a) plan (k_i, e_i) maximizes the utility of individual i $\forall i$, and; (b) the τ rate maximizes the utility of the median agent.

Due to the quasi-linearity of (3.4), $u_i - \bar{u} = c_i - \bar{c}$, where $\bar{c}$ is the average consumption, will be:

$$\bar{c}_i = \bar{y}_i = \bar{A}_i[\alpha\bar{k}_i + (1-\alpha)\bar{e}_i]. \qquad [3.6]$$

Since $\bar{c}$ is a constant $\Omega_2 = \text{var}(c_i)$, where var denotes the population variance of cross-sectional data. Considering (3.2), (3.6) $\Omega_2 = (1-\tau)^2\text{var}(y_i)$.

Note that, under this new structure, the signal-noise ratio found in AA does not hold. If the single objective of the government is to minimize unfairness, the optimal rate will equal 1.

In addition, we define $\delta \equiv A_i^2\beta_i$, $\sigma_{\bar{\eta}}^2 \equiv \text{var}(y_i)$ and $\Delta \equiv \bar{\delta} - \delta_m \geq 0$, where $\bar{\delta}$ and δ_m are the mean and median of δ. Thus, the economy is parameterized by $\mathcal{E} \equiv (\Delta, \gamma, \alpha, \phi, \sigma_{\bar{\eta}})$. Parameters Δ and γ support the redistributive policies. $\sigma_{\bar{\eta}}$ will be the fairness rule and Δ will be the "selfish" redistribution, i.e., that which redistributes from the mean i to the median i.

One should highlight that the optimal redistributive policy is only adjusted in the middle of individuals' lives. Until then an (*ex ante*) rate, τ_e, is in force. Hence, the agents will accumulate capital under the ex-ante rate regime and will choose their effort levels under the optimal regime, i.e.:

$$k_i = (1-\tau_e)\beta_i A_i \quad \text{e} \quad e_i = (1-\tau)\beta_i A_i. \tag{3.7}$$

Note that there exists an inverse relation between the *ex ante* and *ex post* rates and the levels of physical and human capital accumulation. In the model of AA, high rates interfere with the fair income level, that is, that which originates from effort and talent alone.

Optimal policy. The choice of the optimal rate depends on the maximization of the utility function of the median voter which, after some simplifications, is given by:

$$U_m = \underbrace{(1-\alpha\tau_e^2)}_{1^o} - \underbrace{(1-\alpha)\tau^2}_{2^o} + \underbrace{[1-\alpha\tau_e-(1-\alpha)\tau]\tau\Delta}_{3^o} - \underbrace{\gamma\Omega_2}_{4^o}. \tag{3.8}$$

The first and second terms of equation (3.8) represent welfare losses associated, respectively, with capital accumulation in the first period and with the effort made in the second period. The third term denotes the redistribution from the median to the mean individual, as described in the model of Meltzer & Richard (1981). Finally, the fourth term represents the altruism of society, under $\phi = 0$.

Lemma 1: Given the ex-ante τ_e rate, the optimal policy will be:

$$f(\tau_e;\mathcal{E}) \equiv \text{argmim}_{\tau\subset[0,1]}\Big\{(1-\alpha)\tau^2 + \gamma[(1-\tau)^2\sigma_{\bar{\eta}}^2 - \tau[1-\alpha\tau_e-(1-\alpha)\tau]\Delta\Big\}. \tag{3.9}$$

i) If $\gamma = 0$, then $f = 0$ if $\Delta = 0$ and; $f > 0$, with $\partial f/\partial\Delta > 0 > \partial f/\partial\tau_e$, if $\Delta > 0$.

ii) If $\gamma > 0$, then, $f > 0$ e $\partial f/\partial \sigma_{\bar{\eta}} > 0$, indicating that there is a $\hat{\tau}_e > 0$, which gives $\partial f/\partial \Delta > 0$ if and only if $\tau_e < \hat{\tau}_e$, where the $\hat{\tau}_e$ threshold is increasing in $\gamma\sigma^2_{\bar{\eta}}$.

The intuition behind Lemma 1 is the following: a) if there is neither social demand for justice ($\gamma = 0$) nor any difference between the mean and median distribution ($\Delta = 0$), the optimal policy will be equal to zero; b) if the median voter is poorer than the mean one ($\Delta > 0$), the optimal rate will be positive and increasing in Δ. In this case, the only decision factor concernsthe asymmetry of the distribution, as pointed out in Meltzer & Richard (1981) and; c) in the presence of demand for justice ($\gamma > 0$), there will be further redistribution the stronger the belief that the level of opportunities is not the same for everyone. That is, (3.9) will always be increasing in $\sigma_{\bar{\eta}}$ and increasing in Δ, if $\tau < \hat{\tau}$, and decreasing otherwise.

As occurs in AA, in equilibrium, it is expected that $\tau_e = \tau$, which will then match the fixed point of f. As underlined earlier, if there is no demand for justice, the optimal rate will depend on the asymmetry between the mean and median voters. As the function contains two areas, an increasing and a decreasing one, in Δ, the equilibrium is expected to be unique. If $\gamma \neq 0$, the function will always be increasing in the fairness rule, which also indicates unique equilibrium. This is so because, unlike the function of AA, (3.9) is quadratic and strictly convex. This behavior can be seen in Figure 2, where (3.9) is parameterized with $\alpha = 0,5$, $\Delta = 1$, $\gamma = 1$ and $\sigma_{\bar{\eta}} = 1$.

Theorem 1: There is always some equilibrium, which is determined by a fixed point of f, and f is defined in (3.9). If $\gamma \geq 0$, the equilibrium will be unique. The $\tau \in [0, 1)$ rate will be increasing in $\sigma_{\bar{\eta}}$. The f will also be increasing in Δ, if $\tau < \hat{\tau}$.

The equilibrium relationship is shown in Figure 3. Note that there is an inverse relationship between the *ex ante* and *ex post* rates. The resulting straight line intersects the 45º line (dotted line) in one point only. By analyzing this equilibrium ($\tau = 0,66$), one sees that it is stable, as $f'(\tau = 0,66) = -0,03 \in (-1, 1)$. Note that the resulting τ is close to the European equilibrium in the model of AA, but at a slightly lower level. Therefore, it may be concluded that the demand for justice, based on inequality as a whole and not on its composition, leads Latin American economies to high taxes, surpassed only by the European *welfare state* policies.

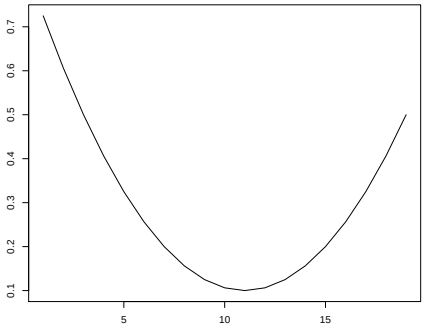

Figure 2: Values for the $W(\tau, \tau_e)$.

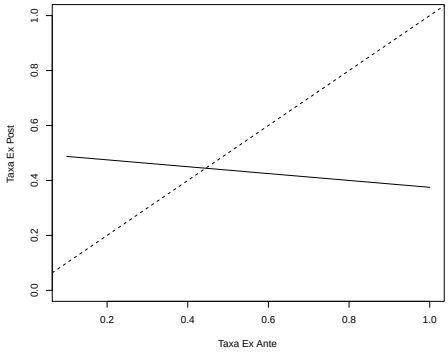

Figure 3: Ex Ante and Ex Post.

4 Comments

Unlike the model of AA, the theoretical structure developed in this paper is characterized by a unique equilibrium. This means that inequality as a whole rather than its breakdown into luck or effort ($\phi = 0$) simplified the model, with a stable equilibrium characterized by high taxation. As a matter of fact, this equilibrium is determined by two factors, one associated with the demand for justice and one with selfish redistribution *a la* Meltzer & Richard (1981).

In this respect, in order to understand the choice of a high level of taxation, it is necessary to determine the characteristics that affect parameters γ and Δ in these societies. According to Alesina et al. (2001), the different behaviors of redistributive policies can be mainly explained by economic and political factors.

Economically, the variables of interest are static and dynamic inequalities (level and mobility, respectively). As to income inequality, World Bank documents (World Bank, 2011) reveal that Latin America and the Caribbean have the largest income inequality across all continents. Just to have an idea, the median value for the Gini coefficient of these countries, 0.52, is almost 62% higher than the median value for OECD countries, 0.32.

Besides high rates of inequality, there is low income mobility, both at the intergenerational and intragenerational levels.[12] The evidence provided by Gottschalk (1997), Birchenall (2001) and Fields (2001) indicates that income

[12]The intergenerational approach refers to the role of income (schooling) of parents on their children's income (schooling). On the other hand, the intragenerational approach assesses to what extent the income of individuals at time t can interfere in their income at $t + 1$.

mobility in countries such as Brazil, Colombia and Peru is much lower than that observed in the U.S. and Germany, for example.

The Brazilian case illustrates very well the situation of developing countries. According to the income transition matrix, described in Figueiredo & Ziegelmann (2010), the income bracket to which an individual belongs, is a determining factor for his future social status. For instance, an economic agent that belongs to the poorest 10% in Brazil is very unlikely to ascend socially over time to higher income distribution levels.

This scenario favors the greater demand for redistributive policies, either due to redistributive fairness ($\gamma \geq 0$) or due to the lack of future perspectives of individuals. That is, redistributive policies are directly related to inequality and inversely associated with mobility.[13] Seemingly, the political factors mentioned at the beginning of Section 2 also contribute to the higher demand for social protection. In sum, the behavior of economic and political variables is consistent with the equilibrium observed in Section 3. That is, developing countries tend to demand higher levels of taxation and redistribution.

5 Final Remarks

The aim of this paper was to develop a theoretical model to explain the size of Latin American governments from the perspective of redistributive policies. The paper was initially motivated by the fact that the theoretical model developed by AA did not match the reality of these countries. In other words, unlike developed countries, Latin American societies do not have a well-established view about the role of merit in economic outcome.

The suggested model proposed a fairness rule based on the perception of inequality as a whole. The new parameterization generalizes the results of AA, capturing the behavior of countries with other fairness rules. The results indicated a unique and stable equilibrium, characterized by high taxation, outrivaled only by the European *welfare state* policies.

[13] The association between redistribution and mobility is given by Alesina & La Ferrara (2005).

APPENDIX

A.1 Data

World Values Survey: This survey is conducted by the Institute for Social Research at the University of Michigan. The years 1995 and 2007 were used for data. The variable of interest is the percentage of people who believe that luck determines income. This information is obtained from a scale coded 1 to 10, where 1 stands for total agreement with the statement: "In the long run, hard work usually brings a better life." Conversely, 10 corresponds to the following statement: "Hard work doesn't generally bring success. It's more a matter of luck and connections." Based on that, a *dummy* variable was developed, which is equal to 1 if an individual has scores greater than or equal to 6. The remaining covariates of Table 1 can also be found in the *survey*. Further details are available at `http://www.worldvaluessurvey.org/`.

LatinoBarómetro: It is a non-profit, privately-owned organization based in Santiago, Chile. The aim of the survey, conducted since 1995, is to obtain similar information to that of the *World Values Survey* but focused on Latin American countries. This survey included information about Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela for years 2000 and 2007. All variables used in Subsection 2 can be easily obtained at: `http://www.latinobarometro.org`. The dependent variable of Table 3, political orientation, was built upon the following question: "In political matters, people talk of left and right." On a scale where 0 means left and 10 means right, how would you place your views ?" Those who answered with a score of 4 or below were given value 1.

A.2 Proof of Lemma 1

Define $W(\tau, \tau_e) = (1 - \alpha\tau_e^2) - U_m$, where U_m is the utility function of the median voter (with $\eta_m = 0$ and $\Delta = \bar{\delta} - \delta_m$, with $\delta_m = 2$), thus:

$$W(\tau, \tau_e) = (1-\alpha)\tau^2 + \gamma[(1-\tau)^2\sigma_{\bar{\eta}}^2] - \tau[1 - \alpha\tau_e - (1-\alpha)\tau]\Delta.$$

The partial first- and second-order derivatives of the above function will be:

$$\frac{\partial W(\tau, \tau_e)}{\partial \tau} = 2(1-\alpha)\tau - 2\gamma(1-\tau)\sigma_{\bar{\eta}}^2 - [1 - \alpha\tau_e - 2(1-\alpha)\tau]\Delta;$$

$$\frac{\partial^2 W(\tau,\tau_e)}{\partial \tau^2} = 2(1-\alpha) + 2\gamma\sigma_{\bar{\eta}}^2 + 2\Delta(1-\alpha).$$

Note that $\frac{\partial^2 W(\tau,\tau_e)}{\partial \tau^2} > 0$, i.e., the function is strictly convex. Therefore, defining $H(\tau,\tau_e) = \frac{\partial W(\tau,\tau_e)}{\partial \tau}$ e $f(\tau_e) = \text{argmim}_{\tau\subset[0,1]} W(\tau,\tau_e)$, ne can say that the first-order condition $H(\tau,\tau_e) = 0$ is necessary and sufficient such that the optimal rate $\tau = f(\tau_e)$ is unique.

If $\gamma = \Delta = 0$, then $f(\tau_e) = 0, \forall \tau_e \in [0,1]$. If $\gamma > 0$ and/or $\Delta > 0$, $H(0,\tau_e) > 0, \forall \tau_e \in [0,1]$, i.e., $f(\tau_e) > 0, \forall \tau_e \in [0,1]$. If $\gamma = 0$ and $\Delta > 0$, the first-order condition $f(\tau_e) = (1-\alpha\tau_e)\Delta/2\tau(1-\alpha)[1+\Delta]$, indicates that $f(\tau_e)$ is increasing in Δ and decreasing in τ_e.

If $\gamma > 0$, then, $\partial f/\partial\sigma_{\bar{\eta}} = \gamma(1-\tau)^2$ and $\partial f/\partial\Delta = -1 + \alpha\tau_e + 2\tau(1-\alpha)$. From the latter expression it may be concluded that $\partial f/\partial\Delta > 0$ if:

$$\tau < \frac{(1-\alpha\tau_e)}{2(1-\alpha)}.$$

That is, a *threshold* is established for the effect of Δ sobre $f(\tau_e)$: $\hat{\tau} = (1-\alpha\tau_e)/2(1-\alpha)$. By assessing expression $H((1-\alpha\tau_e)/(1-\alpha),\tau_e)$, it should be noted that $\hat{\tau}$ is decreasing in $\gamma\sigma_{\bar{\eta}}$. ■

A.3 Proof of Theorem 1

Since f is continuous and limited, there will certainly be at least one fixed point. If $\tau_e = \tau = 1$, then $\partial W/\partial\tau = (1-\alpha)(2+\Delta)$. For $\Delta \geq 0$, $f(1) < 1$ if and only if $\alpha < 1$. Hence, $\alpha < 1$ ascertains that equilibrium $\tau = 1$ is not a fixed point. Lemma 1 establishes that f is non-decreasing when $\gamma = 0$ or $\alpha = 0$. So, it follows that f has a single fixed point when $\gamma = 0$ or $\alpha = 0$. For the sake of continuity, this result is reserved for values of γ and α that are quite close to zero. When γ and α yield values sufficiently greater than zero, the function f will have an increasing and a decreasing area, indicating the existence of a fixed point. An example of this equilibrium, when $\alpha = 0,5$, $\Delta = 1$, $\gamma = 1$ and $\sigma_{\bar{\eta}} = 1$, is shown in Figures 2 and 3. First, we have the function $W(\tau,\tau_e)$. The second illustration plots the relationship between the ex-ante rate and the current rate. Note that the inverse relationship has only one stable equilibrium. ■

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