Economics Bulletin

Volume 34, Issue 2

Note on Fairness and Income Redistribution in the Latin American Countries

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Abstract

This paper assesses the effects of income redistribution policies on "responsibility-sensitive" fairness levels in major Latin American countries. We consider a justice criterion and analyses the redistribution mechanism (taxation policy) used by countries. The results indicate that taxation does not have a significant effect on Latin American fairness indicators. This behavior can be explained, among other factors, by the fiscal design used, which utilizes high rates associated with the effort variables and fails to equalize unequal opportunities.

The authors would like to thank the anonymous referee for their valuable comments and suggestions to improve the quality of the paper. They are also grateful to Stéphane Mussard for her comments. The usual disclaimer applies.
Citation: Erik Figueiredo and Cleiton R. Silva, (2014) "Note on Fairness and Income Redistribution in the Latin American Countries", *Economics Bulletin*, Vol. 34 No. 2 pp. 1259-1267.
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Submitted: February 10, 2014. **Published:** June 18, 2014.

1 Introduction

Although the recent literature indicates a close relationship between wealth distribution and economic efficiency,[1] this argument is hardly taken into consideration by public policymakers. Usually, in democratic societies, redistribution and social security policies are formulated to meet the ethical claim for justice, often represented by a more equal income distribution.[2]

Following this reasoning, the effectiveness of a redistribution policy could be verified by the comparison of inequality levels before and after tax and transfers (henceforth pretax and post-tax). However, Goñi et al. (2008) shows that tax and government transfer systems significantly reduce the concentration levels in developed countries (40%, on average), but this pattern is not observed in Latin American countries.

A possible conclusion of this analysis is that, at least in developed countries, these public policies enhance social justice. It is assumed that the social norm of justice, used as a parameter for the design of the redistribution policy, is the strict equality. Nevertheless, recent developments show that individual and social perceptions about inequality are much more relevant for the central planner's decision-making process than is the income concentration level.

In fact, as pointed out in Alesina & Angeletos (2005), the magnitude of the government's social action does not depend only on the level of inequality, as suggested by the models of Mirrlees (1971), but on the composition of this inequality. In brief, as suggested by Roemer (1998), inequality can presumably be decomposed into "responsibility" (effort) and "circumstance" (luck) factors, in a such a way that redistribution policies will be larger, the larger the social belief that income derives from luck.

In this respect, the comparison of pretax and post-tax Gini coefficients does not necessarily mean that redistribution policies are fairer or less fair. That is, in the case of developed countries, the reduction in inequality observed after government intervention could possibly maintain or even increase the level of injustice. The case of Latin American countries is more noteworthy as redistribution does not even affect income concentration. Hence, it can be unfair both in the strict equality and responsibility-sensitive perspectives.

An indicative sign of the actual impact of the redistribution policy of developed countries on the level of justice is available in Ooghe & Peichl (2014). In sum, those authors demonstrate that in countries where effort is seen as key to the definition of individual income, the perception about inequality (and, therefore, the redistributive design used) differs from that of countries where luck is believed to play a central role. Thus, it is possible to identify sets of countries with clear-cut definitions of fair taxation.

Therefore, the aim of the present study is to assess the impact of redistribution policies on the responsibility-sensitive fairness level of major Latin American countries. The investigation includes Argentina, Brazil, Chile, Colombia, Mexico and Uruguay. The analysis will be carried out as follows:

[1] See Galor & Zeira (1993), among others.

[2] See Mirrlees (1971).

1) pretax and post-tax fairness indicators will be calculated for each country;

2) the design of fiscal policy will then be evaluated based on a mechanism that takes into consideration individual differences in effort and circumstances.

Finally, the paper is organized into two parts. Section 2 presents the results for pretax and post-tax fairness measures. Section 3 asseses the fiscal policy of the selected countries. Section 4 concludes.

2 Measuring Fairness Levels

Two concepts of income, pretax and post-tax, are used. Each concept of income has one fairness rule, defined folow: each individual i is characterized by a pair (y_i, z_i), where y_i is the observed income and z_i is the fair income. Assume the current income of individual i as a function of the responsibility, r_i, and circumstance (or environment), e_i: $y_i = f(e_i, r_i)$ factors (Roemer, 1998). Empirically, $f(e_i, r_i)$ will be estimated by the log-linear equation:

$$\log y_i = \beta r_i + \gamma e_i + \epsilon_i. \tag{1}$$

However, we must do some caveats. Firstly, it is not always possible to have some circumstance variables, in particular, information of family background. Thus, the error term that theoretically represent gross luck, shall absolve responsibility and environment variables. At this point, a normative choice must be made. Devooght (2008) includes (ϵ_i) in the set of environment variables (e_i). That is,

$$\log f(r_i, e_i) = \beta r_i + \xi_i,$$

with

$$\xi_i = \gamma e_i + \epsilon_i.$$

Then, in order to prevents the mistake of putting circumstance factors among those that can be changed by agents efforts, the fair income is defined as folows:

$$z_i = \frac{\exp(\beta r_i)}{\sum_j \exp(\beta r_j)} \sum_j y. \tag{2}$$

Equation (2) is built upon the following concept of fairness: population groups are defined according to their responsibility variables, and any within-group inequality is deemed unfair. Thus, if considered hours worked as a single responsability variable, all individuals who work the same number of hours should receive the same level of income. Out of this pattern, all income inequality is unfair (c.f. Devooght (2008) and Almås (2008)).

The proportion of total postax income ($\sum_j y$) that the individual should get is dependent on individual responsability characteristics but independent of individual circumstance

characteristics (Almås (2008)). More specifically, depends on the proportion of their effort ($\exp(\beta r_i)$) compared of other efforts ($\exp(\beta r_j)$), for a given set of responsibility characteristics.

The distances between these distributions, y_i and z_i, will be formally quantified using the metric entropy measure developed by Granger et al. (2004).[3] The metric entropy measure is normalized between 0 and 1. Where 0 indicates that the distributions are identical.

Therefore, the analysis is be carried out as follows: 1) the distances between pretax and post-tax incomes and their respective fairness rules are calculated (S_ρ) and; 2) the statistical significance of the distances is determined using a hypothesis test, where $H_0 : S_\rho = 0$.

The statistical significance of the distances indicators is summarized in Table 1. In the comparison across countries, Colombia and Brazil are those with the largest distance between observed and fair incomes. As to the results for pretax and post-tax incomes, which provide an insight into the impact of redistribution policies. All distances are significant at 1%.

Table 1: Unfairness Levels: $\hat{S}_\rho$ Entropy

	Pretax	**Post-tax**
	$\hat{S}_\rho$	$\hat{S}_\rho$
Argentina	0.1348*	0.1311*
Brazil	0.3245*	0.3151*
Chile	0.2989*	0.2933*
Colombia	0.3456*	0.3398*
Mexico	0.1256*	0.1213*
Uruguay	0.1209*	0.1176*

Note: $^*p-$value< 0.01.

In sum, the results indicate that redistribution policies do not have a significant effect on responsibility-sensitive inequality indicators. Therefore, the study seeks to investigate the fiscal mechanism of these countries. The analysis is conducted in the next section.

3 Fair Taxation

This section is devoted to the application of Ooghe & Peichl (2014) model. In summary, the model leads to two basic propositions: **(I)** the tax rate associated with circumstance characteristics must be higher compared to those in which control is partial; **(II)** the overall effect of the circumstance characteristics on post-tax income must be zero. That is, the redistribution mechanism should be such that, once redistribution takes place, circumstance characteristics have no relationship at all with net income. This one should thus vary due only to different effort levels or to the other characteristics controlled by the agents.

[3]The Appendix summarize the data sources.

So, let w denote the vector of covariables, which can be decomposed into $w = (w_j)_{j \in J}$, where w_j is the covariable for characteristic j in J. If "$\cdot$" represents the vectorial product, $\beta_0 := b_0$, $\beta := 1$ (a row vector of ones) and $x := ((b_j w_j)_{j \in J}, \epsilon)$ the vector of characteristics, including the unobservable ones, then the pretax income regression will be, empirically

$$\begin{aligned} y &= b_0 + b \cdot w + \epsilon \\ y &= b_0 + \sum_{j \in J} b_j w_j + \epsilon \\ y &= \beta w \end{aligned} \tag{3}$$

The tax (or subsidy, if negative) is

$$\tau = y - c = t_0 + tx \tag{4}$$

Where c is the net outcome and t_0 and t are parameters. Note the necessity for a two-step strategy to estimate t_0 and t. First one estimates (3), obtaining prediction $\hat{x} = ((\hat{b}_j w_j)_{j \in J}, \hat{\epsilon})$. Afterwards, one estimates (4), replacing x with $\hat{x}$ and correcting standard errors.

In this case, one obtains the estimates for the implicit rates so as to test prediction **(I)**. To test prediction **(II)**, consider the categorization of the set of observable characteristics into circumstance (N) and partially controllable (P) characteristics. Admit the unobservable error term as a separate and independent characteristic (U). Consider (3), now decomposing x into

$$(x_N, x_P, x_U) = \left(\sum_{j \in N} b_j w_j, \sum_{j \in P} b_j w_j, \epsilon \right).$$

In this case, considerer

$$x_P = a_0 + a_1 x_N + \eta. \tag{5}$$

One can also define

$$FM = (1 - t_N) + (a_1) \times (1 - t_P), \tag{6}$$

as a fairness measure. In this case, t_N and t_P is the implicit tax rate for the no-control composite and partial control composite, respectively. Calculated through (4) for each set of features. In a fair fiscal design, the fairness measure is equal to zero.

Two hypotheses are then obtained:

(i) Weak hypothesis: If $a_1 \approx -1$, then $t_N = t_P$;

That is, if a_1 is greater than -1, the rate associated with non-controllable characteristics is higher than that which is associated with partially controllable characteristics.

(ii) Strong hypothesis: $FM = 0$.

To estimate the fairness measure, consider

$$c = (\beta_0 - t_0) + (1 - t_P)a_0 + [(1 - t_P)a_1 + (1 - t_N)]x_N + (1 - t_U)x_U + (1 - t_P)\eta. \qquad (7)$$

Where the term associated with x_N (brackets), is the fairness measure. Again, note the necessity for a two-step procedure. First, one estimates (3). Afterwards, one estimates (7) using $(\hat{x}_N, \hat{x}_U)$.

3.1 Results

The first step to the empirical analysis is the estimation of implicit rates related to each characteristic. Equations (3) and (4) were inferred from a two-stage OLS strategy. The dependent variable is the equivalent family income.[4] The following are regarded as partially controllable characteristics: hours worked, education, being married and employment. The set of non-controllable variables includes age and sex.

The results in Figure 1 represent the implicit rates associated with each characteristic. A visual inspection indicates that **Prediction I** is not observed in any of the investigated countries.

In general, one perceives that the implicit rates associated with non-controllable characteristics are always higher than the others. To confirm the results suggested in Figure 1, a hypothesis test based on the $F\hat{M}$ hypotesis. The results in Table 2 indicate that H_0 cannot be rejected in any of the selected Latin American countries.

Table 2: Testing the Weak Hypothesis: $H_0 : \hat{a}_1 < -1$.

	$\hat{a}_1$	p-value
Argentina	-1.6570	0.4320
Brazil	-1.2660	0.3782
Chile	-1.5250	0.3964
Colombia	-1.1111	0.2457
Mexico	-1.1853	0.2599
Uruguay	-1.3541	0.3948

To confirm the non-equalization of circumstances in these countries, the study uses a test for the second prediction. Table 3 shows the fairness indicator based on the taxation system.

[4]Detailed information about the construction of variables can be obtained in Appendix.

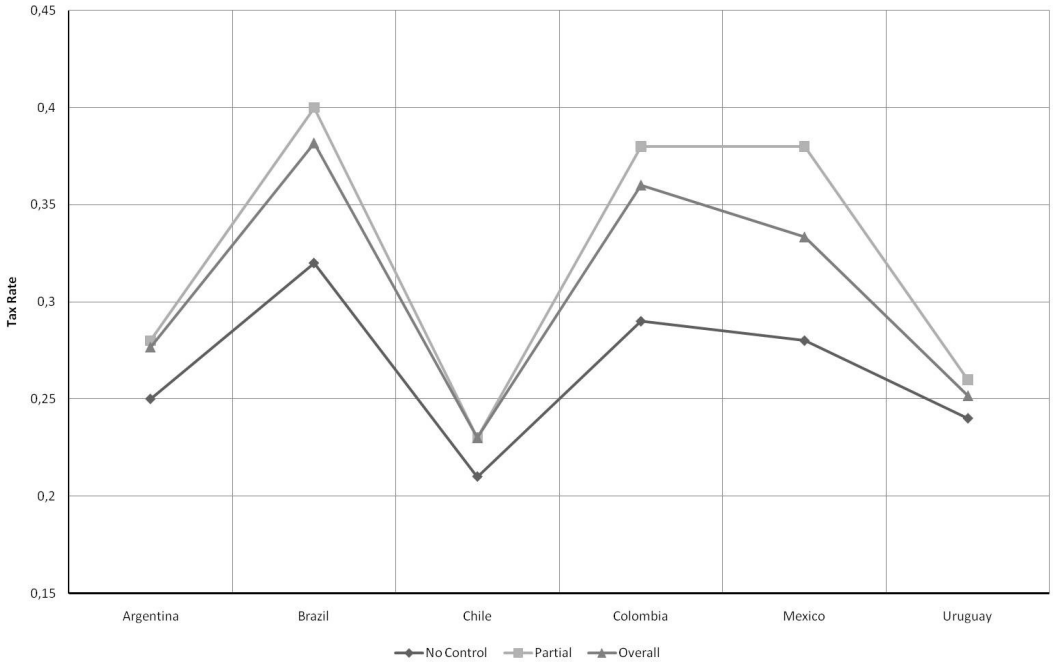

Figure 1: Implicit Tax Rate for the Different Composite Characteristics.

Bearing in mind that fair taxation corresponds to $F\hat{M} = 0$ (H_0 of this new test). That is, the higher the $F\hat{M}$, the larger the unfairness.

Table 3: Fairness Measure

	$F\hat{M}$
Argentina	0.5950*
Brazil	1.2010*
Chile	0.4903*
Colombia	0.9832*
Mexico	0.6815*
Uruguay	0.4240*

Note: $^*p-$value< 0.01.

Just to have some idea about the magnitude of these indicators, from the evidence provided in Ooghe & Peichl (2014), using a similar estimation method, France and Luxembourg followed the theoretical predictions of model ($F\hat{M} = 0$). The highest rate was that of the USA, $F\hat{M} \approx 0.42$. The other countries had $F\hat{M}'s$ between 0.15 and 0.25.

Therefore, Latin American countries are noteworthy not only because of their high income inequalities, but also because of the remarkable unfairness of their tax systems. Of the investigated countries, only Uruguay and Chile had similar levels to those of the USA.

4 Final Remarks

The main objective of this study was to measure the impact of redistribution policies on the level of distributive fairness of a set of Latin American countries. The first results indicated a significant distance between the observed income (pretax and post-tax) and the respective fairness rule. Based on these findings, the study suggested assessing the fiscal system of these countries. Using a fair and efficient taxation model, the conclusion is that the taxation system violates two basic principles of fairness. In brief, the tax system punishes merit and does not equalize the differences in circumstances.

APPENDIX

The inferences made in Section 2 are based on the following variables: a) the real income of all jobs;[5] b) years of s chooling; c) hours worked and; d) age, summarized by six dummy variables. Household heads are those men or women older than 26 years. The available income, post-tax, is obtained from the following rule: gross income – income tax rate – social security payments + government transfers.

The model used in Section 3 considers the equivalent income , y_i: $y_i^E = y_i/\sqrt{n}$. Where y_i is the gross income, and n is the household size. The microdata were obtained from their official websites.

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[5]The income was deflated by the consumer price index of each country and converted to U.S. dollars, from the purchasing power parity.

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