



Departamento de Economía
Facultad de Ciencias Sociales
Universidad de la República

Documentos de Trabajo

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Documento No. 03/14
Febrero 2014

ISSN 0797-7484

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Abstract

According to the standard indicators of distributive effect, Uruguayan fiscal policy (in particular, social spending) is progressive. The aim of this paper is to compare this result with the conclusions derived from the perspective of equality of opportunity. Under this view, fiscal policy should equalize not the overall income but eliminate the effect of factors beyond the responsibility of individuals (circumstances).

To assess the distributive effect of fiscal policy we calculate the Gini index for different income concepts which take into account different programs of the tax-benefit system. Then, we calculate the equality of opportunity for each income concept. Circumstances identified in this paper are the level of education attained by parents and self-reported ethnicity. To analyze the robustness of the results, we calculate several measures used in the empirical literature of equality of opportunities. Though according to the welfarist analysis we conclude that the tax-benefit system has an equalizing effect, we cannot conclude that it compensates the disadvantages due to circumstances.

Keywords: equality of opportunity, distributive effect, fiscal policy

JEL Classification: D3, D63, H5

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Resumen

Según los indicadores estándar de efectos distributivos, la política fiscal uruguaya (en particular el gasto social) es progresiva. El objetivo de este trabajo es comparar este resultado con las conclusiones que se derivan de la perspectiva de la igualdad de oportunidades. Bajo este enfoque, la política fiscal debería igualar no el ingreso en su conjunto, sino eliminar el efecto de los factores que están más allá de la responsabilidad de los individuos (circunstancias).

Para evaluar el efecto distributivo de la política fiscal, calculamos el índice de Gini para diferentes conceptos de ingreso que toman en cuenta diferentes programas del sistema de impuestos y beneficios. Luego, calculamos la igualdad de oportunidades para cada concepto de ingreso. Las circunstancias identificadas en este trabajo son el nivel de educación alcanzado por los padres y la auto-reportada etnicidad. Para analizar la robustez de los resultados, calculamos varias medidas usadas en la literatura empírica de igualdad de oportunidades. A pesar de que de acuerdo al análisis del bienestar concluimos que el sistema de impuestos y beneficios tiene un efecto igualador, no podemos concluir que compensa las desventajas debidas a las circunstancias.

Palabras clave: igualdad de oportunidades, efecto distributivo, política fiscal.

1. Introduction

Uruguay has low levels of inequality compared to Latin American standards. Part of this performance is due to the equalizing effect of its taxation and benefit system (Amarante et al, 2012; Bucheli et al, 2013). This redistributive effect of fiscal policy may be considered positive because welfare disparities are considered offensive per se. However, to what extent does it reduce inequality of opportunities? The aim of this paper is to address this question and compare the conclusions derived from the traditional incidence analysis and from the equality of opportunity theory.

The perspective of inequality of opportunity is concerned with the ethical aspects of inequality. The starting point consists of distinguishing that part of the differences in individual outputs is the result of factors beyond their responsibility (circumstances) and that part stems from factors within their responsibility (effort). The principle of justice embedded in this theory is that inequality is undesirable when it is due to circumstances: If the opportunities to reach an outcome are equal among individuals, the outcome distribution is the result of choice and is beyond the scope of justice.

In the attempt to disentangle fair from undesirable inequality, this theory provides a framework to assess policies. Indeed, any distributive instrument should be evaluated according to its effect on the unfair part of inequality and not on overall inequality. Policy should equalize the access to advantages, eliminating the effect of circumstances, that is, it should “balance the playing field” (Roemer 1998, 2002). Thus, it makes sense that the distributive effect of fiscal policy is evaluated according to its capacity to equalize opportunities.

As it is usual in the studies of impact on inequality, we studied income before and after fiscal policy. We used a dataset that provides estimates for 2009 of five income concepts associated with different stages of fiscal intervention. In addition, for a sub-sample of this dataset, we obtained information about the individuals’ race and the educational attainment of their parents. Based on these variables, we constructed six types, that is, six groups of individuals who share the same circumstances.

To assess fiscal policy, we estimated a two-dimensional measure proposed by Roemer and Trannoy (2013) to rank development levels of different countries. One component of the

measure refers to the income level of the most disadvantaged type. The other component indicates the proportion of inequality due to factors under individual control. In Roemer's proposal, if both components of the measure are higher for a country than for others, that country dominates the others in terms of development. We adopted this proposal in the analysis of fiscal policy: if the double measure is higher after policies, we interpret that fiscal policy equalizes opportunities.

The empirical literature provides multiple ways for measuring the proportion of inequality due to factors under individual control.

The paper is organized as follows: Section 2 presents the methodology used to compute the above-mentioned two-dimensional measure; Section 3, describes the data set, the estimates of the outcomes under study, and the circumstances set; Section 4 discusses the results; and Section 5 concludes.

2. Methodological issues

In a survey of the literature, Roemer and Trannoy (2013) propose a two-dimensional measure to rank countries according to their development level: the average income of the most disadvantaged in terms of circumstances and the proportion of income inequality stemming from differences in effort (W, η). We adopted this proposal to analyze the per-capita income of the households before and after taxes and benefits. Indeed, we estimated and compared the measure (W, η) for five income concepts that represent different stages of fiscal policy involvement. Fiscal policy improves opportunity equalization if both W and η are higher when calculated using post-fiscal policy income than when using pre-fiscal policy income.

To obtain an estimation of η , we identified two different approaches in the empirical literature: the ex-ante and ex-post approaches (for a broad review of empirical literature, see Ramos and Van der Gaer, 2012). In both cases, the measures attempt to respect the principle of compensation according to which inequalities due to circumstances should be eliminated. However, each approximation to the measures relies on different strategies that may lead to different results; moreover, Fleurbaey and Peragine (2013) show that they are incompatible.

As reviewed by Brunori et al. (2013), most of the empirical literature followed the ex-ante approach. Examples are the works of Peragine (2004), Pae de Barros et al (2009), and Ferreira and Guignou (2011). The ex-post approach was followed, for example, by Roemer et al (2003) and Pistoiesi (2009). Other studies such as those by Checchi and Peragine (2010) and Aaberge et al, (2011) explore both approaches. In this paper, we computed estimations of η following both approaches.

In the ex-ante approach, equality of opportunities means that the set of opportunities is the same for all individuals, and so it is independent from their circumstances. The strategy consists of identifying inequality using only information about types, and ignoring the level of effort. This approach is neutral with respect to inequality beyond circumstances (i.e. due to effort). The measurement focuses on the differences between types as defined by circumstances. Thus, between-type inequality is a measure of the inequality of opportunities, whereas within-type inequality would be the responsibility of individuals. A strong criterion definition imposes comparison of conditional distributions across types. With a weaker criterion, equality of opportunities is defined by equality of mean outcomes across types; this is the criterion that we followed.

Formally, we defined T types ($t=1, \dots, T$), each one consisting of the set of individuals ($N_t = N_1, \dots, N_T$) subject to the same circumstances. The set of income levels that can be obtained from different efforts within type t (the opportunity set) is represented by the income distribution $y_t = [y_t^1, \dots, y_t^{N_t}] \in \mathbb{R}_+^{N_t}$. The income profile for the overall population can be written as $Y = [y_1, \dots, y_t, \dots, y_T] \in \mathbb{R}_+^N$. We followed two strategies to obtain a measure of the proportion of income inequality stemming from differences in effort (η).

On the one hand, a strategy to eliminate within-type differences is to replace each income by the average income of its type: $y_t^h \rightarrow \bar{y}_t$, where h is the individual. Thus, we obtained the income profile $Y_B = [\bar{y}_1 1_{N_1}, \dots, \bar{y}_t 1_{N_t}, \dots, \bar{y}_T 1_{N_T}] \in \mathbb{R}_+^N$. As equality of opportunities means equality between types, inequality in Y_B captures inequality of opportunities. Given a measure of inequality $I: \mathbb{R}_+^N \rightarrow \mathbb{R}_+$, $I(Y_B)$ is an absolute measure of opportunity inequality whereas $1 - I(Y_B)$ is an absolute measure of effort inequality. Thus, the part of inequality due to opportunities is $OI_B = I(Y_B)/I(Y)$. The proportion of income inequality stemming from differences in effort according to the first strategy of the ex-ante approach may be estimated as:

$$\eta_1^a = 1 - \frac{I(Y_B)}{I(Y)} \quad (1)$$

Another strategy within the ex-ante approach is to attempt to eliminate the differences between types and to retain only differences due to effort. Thus, we estimated the income profile $Y_W = [\tilde{y}_1, \dots, \tilde{y}_t, \dots, \tilde{y}_T] \in \mathbb{R}_+^N$ where \tilde{y}_t represents the income value after the following transformation for each individual h in type t: $y_t^h \rightarrow y_t^h \frac{\bar{y}}{y_t}$. In other words, we re-scaled each income to equalize the average income across types. Thus, the proportion of inequality due to effort may be calculated as:

$$\eta_2^a = \frac{I(Y_W)}{I(Y)} \quad (2)$$

As developed by Ferreira and Guignoux (2011), the indexes from the Generalized Entropy family are good candidates to be used as measures $I(\cdot)$, because they do not only satisfy the desired properties of inequality measures but are also additively decomposable. However, only the Generalized Entropy index with parameter zero E_0 (the mean logarithmic deviation) is path-independent decomposable and produces the same result for the two strategies, meaning that $I(Y) = I(Y_W) + I(Y_b)$. Our base estimation of η corresponds to the calculation of the proportion of inequality due to effort using E_0 , thus:

$$\eta = \eta_1^a = \eta_2^a \quad (3)$$

We also estimated the proportion of inequality due to effort using the Generalized Entropy index with parameters 1 and 2, and following the two strategies, to check the robustness of our conclusions.

In the ex-post approach, equality of opportunities is defined as the equality of the outcomes of those who exert the same degree of effort. Thus, inequality of opportunity decreases when the outcome inequality declines among individuals who put the same effort. The measure of inequality of opportunity requires a measure of effort. Note that circumstances may influence effort and then the distribution of effort is a characteristic of the type. So a measure other than the raw effort level is needed. Roemer proposes to measure the degree of effect exerted by the individual as the rank of the individual in the distribution of the outcome of interest of the individual's type. Therefore, the rank in the income distribution

of people of the same type depends on effort, and incomes in the same position of different types correspond to individuals who exert the same degree of effort. Consequently, the strategy to measure inequality of opportunity consists in defining tranches that group people of different types who exert the same degree of effort and measuring the inequality beyond the differences between tranches.

To rank individuals, we used the percentile to which they belong, given their type. Note that we want to group individuals who exert the same effort and are affected by the same circumstances, but there is some degree of income inequality within each percentile/type (that decreases as the number of percentiles rises). To eliminate this inequality, we substituted each income by the average of its type/percentile. The set of income levels obtained with the same effort (the tranche) is represented by $Y_p^S = [y_{1,p}^S, \dots, y_{T,p}^S]$ where $y_{t,p}^S$ is the average income of individuals of type t in percentile p . The new income profile for all the populations can be written as $Y^S = [y_1^S, \dots, y_P^S] \in \mathbb{R}_+^N$.

We followed two strategies for the estimation as we did previously. On the one hand, we can replace each income with the average income of its tranche and obtain the income profile $Y_B^S = [\bar{y}_1^S 1_{N/P}, \dots, \bar{y}_p^S 1_{N/P}, \dots, \bar{y}_P^S 1_{N/P}] \in \mathbb{R}_+^N$. The elimination of within-tranche inequality only captures inequality due to effort so the measure of its proportion is:

$$\eta_1^p = \frac{I(Y_B^S)}{I(Y^S)} \quad (4)$$

On the other hand, we can eliminate the differences between tranches. We estimated the income profile $Y_W^S = [\widetilde{y}_1^S, \dots, \widetilde{y}_p^S, \dots, \widetilde{y}_P^S] \in \mathbb{R}_+^N$ where \widetilde{y}_p^S represents the income value after the following transformation for each individual h in type t and percentile p : $y_{t,p}^S \rightarrow \frac{\bar{y}_p^S}{y_{t,p}^S} y_{t,p}^S$. We re-scale each income until the average incomes of the tranches are equal. Only the differences due to types remain. Then the proportion of inequality due to effort is:

$$\eta_2^p = 1 - \frac{Y_W^S}{Y^S} \quad (5)$$

Once again, only E_0 provides the same result with the two strategies. So we defined η' :

$$\eta' = \eta_1^p = \eta_1^p \quad (6)$$

We estimated E_0 , E_1 , and E_2 to analyze the robustness of the conclusions.

3. Data

Bucheli et al (2013) built a dataset that provides information of income before and after fiscal policy based on the Uruguay's household survey (*Encuesta Continua de Hogares* or ECH) carried out by the Instituto de Estadística (INE) of Uruguay in 2009.

The ECH does not contain information on the childhood environment of adults. This type of information was however inquired in a unique survey, *Módulo Étnico Racial* 2009, that revisited a sample of individuals of ages 18 to 56 who had been interviewed by the ECH between January and November 2009. It was carried out only in Montevideo, where 40% of the population resides, and contains information of 2980 individuals. As the purpose of the module was to study the Afro-descendant population, the sample has a higher sampling ratio for persons declared to be of afro-descent in the ECH visit.

In the rest of this section, the income concepts used in this paper and the variables describing individual circumstances are presented.

3.1. Income concepts

The ECH reports income net of taxes and contributions by source, including government cash transfers, and in the case of food transfer beneficiaries, an estimation of their value. Additionally, it discloses whether or not the individual has access to in-kind public health and educational benefits. Following the guidelines developed by Lustig and Higgins (2012), this information was used to calculate five income concepts.

Market income – sometimes called primary income - is the total current income before direct taxes and social security contributions. It includes gross labor earnings and capital income, auto-consumption, imputed rent from owner-occupied housing, private transfers, and contributory pensions paid by the social security system. *Net market income* equals market income minus direct taxes.¹ *Disposable income* is net market income plus public cash and food transfers. Cash transfers include noncontributory pensions, family allowances, and other direct cash transfers (i.e. unemployment insurance, disability and

¹ Note that social security contributions are treated as savings.

sickness allowances, and maternal benefits). *Post-fiscal income* is disposable income less indirect taxes. *Final income* is post-fiscal income plus in-kind transfers related to education and health services.

The information provided by the ECH makes the calculation of net market and disposable income easily feasible.

To estimate the individual market income, the contributions to the social security system and the direct personal income taxes were imputed using the legal schedules. As the ECH informs whether the worker contributes or not to the social security system, the dataset assumes that informal workers pay neither contributions nor income taxes. No evasion was assumed for capital earnings. Note that these calculations imply that direct taxes and contributions are entirely paid by workers.

Post-fiscal income estimation requires to know the amount of indirect taxes paid by the households, but the ECH does not provide useful information to that end. The Expenditure Survey (*Encuesta de Gastos e Ingresos de los Hogares* or *EGIH*), collected by INE throughout November 2005 and October 2006 reports information about the characteristics of the household and its members (sex, age, relationship, etc.), labor activities, individual income by source, and household expenditure by goods and services. Therefore, a matching technique was used to impute to ECH households an amount of indirect taxes.²

The calculation of final income requires an estimation of the benefits of educational and public health services. They were estimated through administrative registers as the current spending/beneficiaries' ratio.

In the case of education, the ratio was calculated by educational level (primary, secondary, technical, and tertiary). The benefit was imputed to students attending the public educational system.

²The procedure, explained in Bucheli et al (2013), is as follows. The household expenditure of the ECH was partitioned in 52 baskets. The aggregation criterion took into account the standard classification of goods and services used by INE (that is based on the identification of their purpose) and the schedule of indirect taxes. It was assumed that the spending on basket i ($i=1, \dots, 52$) depends on household income, size of the household, average years of schooling of the adults of the household, a deprivation index, total hours worked in the labor market by all the household members, participation of age-groups in the household by gender, and a set of regional *dummies*. Expenditure on each basket was estimated using a Tobit model. As the dependent variables are also from ECH, the estimated models were used to predict expenditure on each basket of households reported by ECH. The residuals were reallocated using the "uvis" command in STATA 12. Next, the indirect taxes were calculated using the legal schedule and assuming no evasion.

For health benefits, there are two different beneficiaries: individuals covered by the National Health Insurance and individuals who avail of free public health services. Only the poor may be assisted in public institutions for free.

National Health Insurance covers (mainly) workers and their families. To have access to the benefit, the worker must pay a tax to the National Health Insurance: Such tax depends on earnings and on the number of covered children. This tax is estimated and included in the market income; it is subtracted when calculating net market income.

Beneficiaries of the National Health Insurance can choose to be assisted by private institutions (insurance enterprises or the mutual health system) or by the public system. In all cases, benefits take the form of subsidies received by institutions chosen by covered individuals, who in turn reduce their spending. In the case of individuals covered by private institutions, the benefit was calculated as the transfer made by the National Health Insurance per beneficiary.

The health benefit of individuals covered by the public health system for free, or beneficiaries of the National Health Insurance, was calculated as the budgetary public health cost per beneficiary. This cost only includes spending on direct attendance.

As in-kind transfers are measured by their per capita budgetary cost, the sources of income reported by the interviewees were scaled-up to their macroeconomic values.³⁴

The households that reported a null disposable income, or the cases in which the household head is declared to be a worker but did not register earnings, were dropped. These cases were less than 2% of the sample.

3.2. The circumstances set

The election of the circumstance set of variables is far from straightforward. The division between factors under or beyond self-control is difficult to be made. For example, it is broadly accepted that education is a responsibility factor and that parents' education is a circumstance, though there is evidence that the second variable affects the first one. In addition, the precision of the average income estimation by types and tranches is affected

³ The scaling-up factors were calculated as the ratio of the amount in national accounts (or analogous sources) and the aggregate value in ECH. For all labor and capital income, taxes and contributions related to this income and benefits depending on wage, we used a scaling-up factor of 1.2. The scaling-up factors for contributory and noncontributory pensions were 1.09 and 1.49, respectively.

⁴ For more details on the data and estimations, see Bucheli et al. (2013).

by the number of cases in each cell. Thus, the choice of circumstances set is the result of a compromise of dealing with an appropriate number of cases and a relevant set of circumstances.

The data set includes several variables that characterize the environment of the interviewees during their childhood. Among all this information, we used questions about main racial descent and the years of schooling of mothers and fathers.

We made a partition into eight types, in which the variables of circumstances were (a) the highest educational level attained by the interviewee's parents, split in four variables: unknown, non- or incomplete primary level, complete primary level or incomplete secondary level, at least complete secondary level; and (b) the racial category described by two variables: mainly of white descent and of other descent. The number of cases in each type is reported in Table 1.

Table 1. Description of types

Type	Racial Minority	Maximum level of education attained by parents	Number of cases	Weighted share in population (%)
1	Yes	Unknown, none or incomplete primary	141	1.3
2	Yes	Complete primary or incomplete secondary	426	3.7
3	Yes	Complete secondary or more	46	0.5
4	No	Unknown, none or incomplete primary	323	10.0
5	No	Complete primary or incomplete secondary	1,456	51.4
6	No	Complete secondary or more	588	33.3
All	All	All	2980	100.0

Source: Authors calculation based on Módulo Étnico Racial 2009, ANII-INE-UDELAR

Note that the respondents were asked to remember information about other people and that eventually relate to knowledge acquired a long time before. The probability of not remembering how much education their parents acquired turned out to be small (only 3.3% of the interviewees did not report it). However, the given or available data are not exempt from errors because the accuracy of memory or the will to provide the true values.

4. Results

The usual analysis of the distributive effect of fiscal policy focuses on studying the overall inequality before and after policy. In Table 2, we report the results obtained using the Gini index for all income concepts and the Reynolds-Smolensky net redistributive effect with their 95% confidence intervals. Direct taxes and direct transfers have a progressive impact: The Gini index decreases from 0.428 calculated with market income to 0.404 with disposable income. Indirect taxes have a slightly regressive effect whereas health and educational benefits have a positive effect. The combination of taxes and social spending reduces inequality: The Reynolds-Smolensky index is 0.0634 when passing from market to final income.

Table 2. Gini index and Reynolds-Smolensky net redistributive effect

	Market income	Net market income	Disposable income	Post-fiscal income	Final income
Gini	0.4279	0.4123	0.4039	0.4058	0.3645
Reynolds-Smolensky					
From column before		0.0156	0.0085	-0.0019	0.0412
Confidence interval (95%)		[0.0155;0.0157]	[0.0084;0.0085]	[-0.0020;-0.0019]	[0.0411;0.0414]
From market income		0.4123	0.0240	0.0221	0.0634
Confidence interval (95%)		[0.0155;0.0157]	[0.0239;0.0241]	[0.0220;0.0222]	[0.0632;0.0636]

Note: confidence interval at 95% calculated with bootstrapping technique

Source: Authors calculation based on Encuesta de Hogares 2009, INE; Encuesta de Gastos e Ingresos de los Hogares 2006, INE and Módulo Étnico Racial 2009, ANII-INE-UDELAR

On the opportunity equalization perspective, Table 3 reports the average income for all the population and types. For all the population, the differences between income concepts are consistent with the definition. From market income to net market income, the mean value decreases because of direct taxes. It rises when adding cash transfers (disposable income), decreases when subtracting indirect taxes (post-fiscal income), and increases when adding in-kind social transfers (final income). The same pattern of changes is observed for each of the six types.

Given the education of parents, income is lower for the minority group, for all income concepts. For example, the average monthly disposable income is US\$ 581 PPP for

minorities and US\$ 1177 PPP for whites, conditional on parents having completed secondary level of education. The ratio between whites and minorities, given parents' education, is around 2 for all income concepts. The racial dimension seems to be very important: The highest average income of types that include the minority group is lower than the lowest income of the other three types.

Conditional on race, the lowest average income corresponds to individuals who do not report the educational level of their parents. Income seems to be positively correlated with parents' education but the differences between groups are not always different from zero at 0.05 significance level.

Table 3. Average per capita monthly income of the households in US\$ PPP (base 2005) and confidence interval at 95%

Type	Racial Minority	Maximum level of education attained by parents	Average per capita income of the household and confidence interval at 95% (in brackets)				
			Market income	Net market income	Disposable income	Post-fiscal income	Final income
1	Yes	Unknown, none or incomplete primary	394 [332;456]	379 [322;437]	411 [356;466]	374 [323;424]	463 [412;514]
2	Yes	Complete primary or incomplete secondary	461 [410;512]	440 [394;486]	464 [420;508]	426 [386;466]	520 [478;562]
3	Yes	Complete secondary or more	604 [434;774]	581 [421;741]	591 [433;749]	545 [395;694]	678 [529;827]
4	No	Unknown, none or incomplete primary	909 [679;1.139]	853 [642;1.064]	861 [650;1.071]	797 [592;1.001]	882 [669;1.094]
5	No	Complete primary or incomplete secondary	892 [809;976]	833 [1.057;1.283]	843 [769;916]	774 [704;844]	877 [804;951]
6	No	Complete secondary or more	1264 [1.133;1.394]	1170 [1.057;1.283]	1177 [1.063;1.290]	1076 [970;1.183]	1200 [1.097;1.302]
All	All	All	994 [921;1.067]	926 [861;990]	935 [870;999]	858 [796;919]	965 [902;1.029]

Source: Author's calculation based on Encuesta de Hogares 2009, INE; Encuesta de Gastos e Ingresos de los Hogares 2006, INE and Módulo Étnico Racial 2009, ANII-INE-UDELAR

In Table 4, we present the main results of the estimation of (W, η) based on the ex-ante approach when using E_0 (Equation 3).

Table 4. (W, η) measure based on the calculation of E_0 according to the ex-ante approach

Measures	Market	Net Market	Disposable	Pos-fiscal	Final
	Income	Income	Income	Income	Income
W (US\$ PPP per day)	13	12	14	12	15
$E(0)$	0,337	0,313	0,287	0,292	0,224
Opportunity inequality	0,027	0,025	0,024	0,023	0,020
Effort inequality	0,310	0,287	0,264	0,268	0,204
H	0,920	0,919	0,918	0,921	0,911

Sources: Author's calculation based on Encuesta de Hogares 2009, INE; Encuesta de Gastos e Ingresos de los Hogares 2006, INE and Módulo Étnico Racial 2009, ANII-INE-UDELAR

For all income concepts, W is the average income of type 1, that is, the type that includes the individuals who belong to a racial minority and do not report the level of education of their parents (see Table 3). W declines when taxes are introduced (from market to net income and from disposable to post-fiscal income) but increases when benefits are added. In sum, W increases from US\$ 13 PPP to US\$ 14 PPP per day from market to disposable income, and to US\$ 15 PPP when considering final income (Table 4). Thus, the whole fiscal policy has a positive effect on W .

The measure of overall inequality E_0 diminishes after direct taxes, cash and in-kind transfers and increases after indirect taxes. From market income to final income, E_0 decreases 33%. Both the absolute index of opportunity and the absolute index of effort inequality have the same pattern than E_0 across income concepts. However, the proportion of inequality due to effort declines from 0.920 for market income to 0.918 for disposable income and to 0.911 for final income. Thus, we cannot conclude that the measure (W, η) improves with fiscal policy.

In Table 5, we present alternative measures of η using the ex-ante approach. In the first rows, we report the Generalized Entropy Index with parameters 1 and 2. Both measures

follow the same pattern across income concepts than E_0 and the Gini index. In the two following rows, we report the estimation of the proportion of inequality due to effort according to Equation (1) – i.e. η^a_{1-} – and the last two rows, the estimation according to Equation (2) – i.e. η^a_{2-} –. From market to disposable income, the proportion of inequality due to effort declines in three of the four estimations. From market to final income, it declines for all them.

Table 5. Alternative measures of the proportion of inequality due to effort (η) under the ex-ante approach

Measures	Market Income	Net Market Income	Disposable Income	Pos-fiscal Income	Final Income
E(1)	0.322	0.297	0.285	0.289	0.233
E(2)	0.460	0.410	0.397	0.410	0.324
$\eta^a_{1-}(E_1)$	0,924	0,922	0,923	0,926	0,919
$\eta^a_{1-}(E_2)$	0,950	0,946	0,947	0,950	0,944
$\eta^a_{2-}(E_1)$	0,940	0,940	0,936	0,936	0,927
$\eta^a_{2-}(E_2)$	0,939	0,946	0,941	0,935	0,930

Source: Author's calculation based on Encuesta de Hogares 2009, INE; Encuesta de Gastos e Ingresos de los Hogares 2006, INE and Módulo Étnico Racial 2009, ANII-INE-UDELAR

In Table 6, we report the results obtained under the ex-post approach. In the first 3 rows, we show the Generalized Entropy index with parameters 0, 1 and 2 when we eliminate the inequality within-type/tranche. Unsurprisingly, the indexes are lower than the original, but they follow the same pattern across income concepts.

Table 6. Alternative measures of the proportion of inequality due to effort (η) under the ex-post approach

Measures	Market Income	Net Market Income	Disposable Income	Pos-fiscal Income	Final Income
E(0)	0.317	0.294	0.273	0.277	0.213
E(1)	0.294	0.271	0.260	0.263	0.211
E(2)	0.347	0.315	0.304	0.308	0.245
η'	0.881	0.875	0.889	0.892	0.889
$\eta^p_1(E_1)$	0.912	0.908	0.912	0.914	0.905
$\eta^p_1(E_2)$	0.905	0.904	0.904	0.905	0.900
$\eta^p_2(E_1)$	0.879	0.873	0.889	0.892	0.892
$\eta^p_2(E_2)$	0.900	0.892	0.907	0.910	0.908

Source: Author's calculation based on Encuesta de Hogares 2009, INE; Encuesta de Gastos e Ingresos de los Hogares 2006, INE and Módulo Étnico Racial 2009, ANII-INE-UDELAR

In the rest of the rows in Table 6, we report η' (Equation 6), η^p_1 (Equation 4), and η^p_2 (Equation 5). We find that the proportion of inequality due to effort decreases when moving from market to disposable income in three out of five estimations, and one of them remains at the same level. The same result is obtained in two of five estimations when comparing market and final income.

5. Conclusions

We know that in Uruguay, fiscal policy has a progressive effect on income distribution. However, the philosophy of the inequality of opportunities indicates that the relevant question is at what extent the fiscal policy compensates groups that are in disadvantage due to factors beyond their control. In this paper, we sought to assess the role of fiscal policy to compensate disadvantages stemming from parents' education and racial group. Our strategy was to estimate a measure for income before and after taxes and benefits. The measure refers to two dimensions: the average income of the most disadvantaged according to their circumstances and the degree of opportunity equality. The most important limitation of the method is that fiscal policy could affect effort.

Fiscal policy improves the situation of the most disadvantaged by circumstances. Their average income increases from US\$ 13 PPP per day before taxes and benefits to US\$ 15

PPP per day after taxes and benefits (approximately from 31% to 39% of the average income of the most advantaged by circumstances).

However, the effect on the degree of opportunity equality is not successful. If we use the measures that rely on the ex-ante approach, which is the most frequently pursued in the empirical literature, we may conclude that the degree of opportunity equality declines. If we use the ex-post approach, the results are less conclusive. In summary, we cannot conclude that fiscal policy compensates the disadvantages due to circumstances.

The present study is a good example that the assessment of the effect of fiscal policy on inequality requires definition of the guiding principle of the goals. If the policy makers give priority to opportunities, the fiscal policy does not seem so successful though it is still considered progressive when analyzing overall inequality.

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