Assessing the Effects of Fiscal Policies on Poverty and Inequality

The Case of Uruguay

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Abstract

This study looks at the redistributive effects of fiscal policy —in particular of direct taxation and expenditures—in Uruguay. This fiscal incidence analysis applies a widely recognized methodology to household survey data and government data for fiscal year 2017 and compares the results with the policies seen in 2009 to study the evolution of the distributional impacts of fiscal policy in the country. The study finds evidence that Uruguayan fiscal policy continues to reduce inequality, with government expenditures in the form of in-kind transfers leading to the largest decreases. While expenditures in basic education are benefitting the poorest, expenditures in tertiary education remain largely regressive. The personal income tax is found to be largely progressive, with the top quintile paying more than four-fifths of this tax. Uruguay's fiscal policies also lead to a reduction in poverty, mainly due to well-targeted direct transfers.

Assessing the Effects of Fiscal Policies on Poverty and Inequality: The Case of Uruguay[+]

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I.   Introduction

Uruguay is an upper-middle income country with a population of 3.45 million located in the Southern Cone of South America. Based largely on agricultural and service exports and a strong internal market, it has a resilient economy that was able to weather the latest global downturn of 2008/09 better than any other country in the region. The Government of Uruguay (GoU) has in recent years put efforts into building a strong social compact that provides support to the most vulnerable populations. In fact, the poverty rate has declined from 32.5 in 2006 to 8.1 in 2018. Meanwhile, inequality also decreased in the period: the Gini coefficient went down from 0.455 to 0.38.[1]

The evolution of the well-being indicators is certainly related to the GoU's targeted fiscal policies with a redistributive component. In 2009, Uruguay's fiscal policies were shown to achieve a nontrivial reduction in inequality and poverty (Bucheli et al 2012). Direct taxes were found to be progressive, as was social spending on direct transfers, contributory pensions, education and health.[2] These effects more than compensated the regressive nature of indirect taxes.

The following years saw a continuation of those policies, as well as the expansion of some of the flagship programs. For instance, in 2017, the personal income tax rate before deductions in the highest income bracket was 36 percent, while in 2009, the highest rate was 25 percent.[3] Social spending has also increased. In 2009, health and education expenditures accounted for 4.6 and 3.6 percentage points as a share of the GDP, respectively. The corresponding shares in 2017 were 6.41 and 3.78.

This study has two main objectives. First, it provides an update of the main fiscal policies that are in place in Uruguay as of 2017 and documents their impacts on households' welfare and its distribution. Second, it presents a comparison – to the extent possible – with previous estimates. Given the upcoming electoral season, it is a timely topic to study as these findings can provide further evidence to the design of the interventions the government should consider expanding of reviewing, whenever the focus is to reduce poverty or inequality.

The analysis presented here follows a broadly used methodology called Commitment to Equity (CEQ)[4] that has been applied in a wide variety of contexts for both developed and developing countries. In short, the method consists on studying the changes in the value of well-being indicators under two scenarios: one which assigns households an income that would be available in the complete absence of fiscal interventions, while a second scenario assigns households an income after the government's fiscal policies have been applied such that all taxes have been paid and all benefits have been received. These scenarios are constructed following an accounting

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[1] Instituto Nacional de Estadística (INE) http://www.ine.gub.uy/linea-de-pobreza [accessed on June 27th 2019].
[2] The exception was expenditure on tertiary education.
[3] Source: BPS https://www.bps.gub.uy/bps/file/12071/2/2017---comunicado-04-r----valores-escalas-irpf-2017.pdf and https://www.bps.gub.uy/bps/file/15651/1/valores_escalas_a_partir_de_01_2009._vers.1.pdf [accessed on July 2nd, 2019].
[4] Lustig (2018).

approach and thus do not consider behavioral responses, second-round effects, dynamic issues, or macroeconomic balances.

Using information from the *Continuous Household Survey* (Encuesta Continua de Hogares - *ECH*) from 2017, the study documents that both income inequality and poverty decline as a result of Uruguay's fiscal policy, with the highest reduction of the Gini coefficient due to in-kind transfers (i.e. the monetary valuation of public spending in health and education). In addition, the paper finds that the reduction in inequality from fiscal policies seen in 2017 is similar to the one from 2009 for most policies, although in-kind transfers have a stronger effect in 2009.

Immervoll et al. (2006) analyze the redistributive properties of tax benefit systems in countries of the EU-15 and find that the different sizes and structures of the systems are major determinants of differences in income inequality among countries. Higher reductions in inequality are achieved through non means-tested benefits (unemployment benefits, pensions to non-elderly, and universal benefits) and taxes. Newer work (De Agostini et al., 2016; Euromod, 2019) compares the effects of policy changes in several European states, with varying results depending on policies, periods and countries. Fiscal policy studies in Latin America highlight the importance of cash and in-kind transfers for reducing inequality, and of both transfers and taxes for reducing poverty (Arancibia Romero et al., 2019; Goñi et al., 2008; Lustig et al., 2014).

Uruguay stands out in regional comparisons as among the most egalitarian economies, and fiscal policies contribute to that result as it is the most redistributive country of those analyzed by Arancibia Romero et al. (2019) and among the top performers according to Bucheli, et al. (2013). The latter also find that the country´s taxes and transfers reduce inequality and poverty when considered as a whole. In addition, direct taxes are progressive while indirect taxes are regressive, and social spending is quite progressive. Nevertheless, in-kind transfers *via* higher education are found to be pro-rich in the country (Lustig et al., 2014). None of these have worked with data newer than 2014, which is the main reason for the current update in the analysis.

The paper is structured as follows. Section II presents a summary of the fiscal policies in place in Uruguay for the year 2017, with particular attention to those that are included in this note. Section III presents the methodology applied, as well as the data sources used. Section IV presents the results and the last section concludes and suggests policy implications. The appendix includes more detail on the application of the methodology to the Uruguayan case.

II.   Taxes and Social Spending
In this section we present a description of the taxes and public benefits comprised in this analysis.

A.   Taxes and contributions

In 2017, taxes and contributions added up to 30 percent of GDP (Table 1).[5] The lion's share of these revenues came from indirect taxes (such as the value added tax or VAT). In that year, they were equivalent to about 10 percent of GDP, or more than a third of the GoU revenues. Contributions to social security account for about a fifth of the revenue, while direct taxes on personal income and contributions to the National Health Fund (*Fondo National de Salud* - FONASA) account for about 10 percent each. Due to limitations in data availability, we are not able to cover the full extent of these revenue-generating policies.

In this paper we utilize an accounting approach, where the starting point takes income *before* taxes and public benefits, while including contributory pensions and subtracting contributions to the social security system. Therefore, our analysis covers the effect of direct taxes and contributions to the health system, which altogether amounted to 22.7 percent of total revenues in 2017. In contrast, we do not have information to analyze the distributive effect of indirect taxes, which represented 35.1 percent of total revenues in 2017. Additionally, we do not incorporate other taxes such as property taxes and corporate taxes, that amount to 10 percent of the total. Finally, we also do not analyze the effect of contributions to the social security system.[6] These contributions were 19.4 percent of total revenues.

Direct taxes

The direct tax system comprises three taxes: IRPF (*Impuesto a la Renta de las Personas Físicas*), IASS (*Impuesto a la Asistencia de la Seguridad Social*) and FRL (*Fondo de Reconversión Laboral*).

IRPF and IASS constitute personal income taxes. IRPF is applied to labor and income, while IASS applies to contributory pensions. Both were designed to achieve an equalizing effect. Altogether they represented 3.4 percent of GDP in 2017. IRPF taxes are also applied to capital income. Labor is taxed at marginal progressive rates (the highest one was 36% in 2017) and allows deductions based on contributions to the social security system, children, rent and mortgages. Capital income is taxed at a flat rate, but different rates are considered for different capital concepts, ranging from 3 percent to 12 percent. The IASS taxes contributory pensions at progressive rates and does not allow deductions. Finally, the purpose of FRL is to support a fund for programs aimed at enhancing labor productivity. In 2017, FRL was applied through a tax on labor income at a rate of 0.125 percent, paid by employees (including self-employed), plus a rate of 0.125 percent paid by

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[5] GDP was estimated at 56.157 billion USD, equivalent to 16,245 USD per capita in 2017 (WDI accessed on June 27, 2019).

[6] Indirect taxes such as the value added tax can be typically observed in household consumption expenditure surveys. In Uruguay, the latest survey of this kind was conducted in 2016, but the microdata and reports have not been made public. Similarly, property taxes are not available. Corporate taxes cannot be directly imputed into households and thus are not part of the fiscal incidence analysis. Finally, contributions to the social security system are not analyzed separately because behavioral responses to changes would be strong, and these cannot be accurately captured within the current accounting approach. Additionally, contributory pensions represent a large portion of government revenues, and any adjustment would also lead to changes in macroeconomic and public accounts, which are not considered here.

employers in the case of wage earners. The magnitude of this tax was relatively minor: only 0.2 percent of GDP in 2017.

Table 1. Taxes and contributions. Uruguay, 2017

Concept	Percentage of total revenues	Percentage of GDP	Included in analysis
Taxes	**60.22**	**17.94**	
Indirect taxes	37.89	11.28	No
Direct taxes on personal income	12.27	3.65	Yes
IRPF	10.42	3.10	Yes
IASS	1.66	0.49	Yes
FRL	0.19	0.06	Yes
Other taxes	10.06	3.00	No
Contributions to FONASA	**12.32**	**3.67**	
Employees	5.93	1.76	Yes
Employers	4.78	1.42	Yes
Retirees	1.62	0.48	Yes
Contributions to Social Security System	**20.99**	**6.25**	
Employees	9.51	2.83	No
Employers	11.48	3.42	No
Non-tax revenues	**6.47**	**1.93**	No
Total	**100.00**	**29.78**	

Sources: Banco de Previsión Social, Ministerio de Economía y Finanzas, Instituto Nacional de Empleo y Formación Profesional.

Contributions to the health system fund FONASA[7] and are applied to both labor income and pensions. The maximum rate of 8% is applied to contributors with a spouse and children, while the minimum rate applies to contributors with a very low income, and who are living alone. In the case of wage earners, employers must pay an additional 5%. An important feature of these contributions is that the amount paid by workers must be related to the benefit because of legal dispositions. To instrument this norm, at the end of the year the government estimates the maximum amount (equal for all contributors) to be paid by dependent workers; contributors who paid above the maximum receive the surplus back the following year. There is no maximum for contributions paid by employers.

About 10 percent of the total tax revenues in Uruguay come from taxes on business revenues, taxes on property of individuals and legal entities. Given data limitations, as well as the focus on the household as a unit of analysis, these taxes are not part of the current analysis.

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[7] Its benefits are explained in the next section.

B.   Social Spending

Social spending, defined as the sum of contributory pensions, direct transfers, education and health care, accounted for 20.3 percent of GDP (**Table 2**). Direct transfers were 11.7 percent of social spending and 2.4 percent of GDP. They include non-contributory pensions, the *Plan de Equidad* program,[8] food transfers and other direct transfers. The non-contributory pensions program (*Pension de Asistencia a la Vejez e Invalidez*) was 0.5 percent of GDP and accounted for 2.6 percent of social spending. It targets the low-income elder or people with disabilities that do not meet the requirements to obtain a contributory pension (mostly, the non-fulfillment of the minimum period of contributions).

Direct transfers

The *Plan de Equidad* (or *Asignaciones Familiares del Plan de Equidad* - AFAM-PE) is a means-tested conditional cash transfer program directed to households with children under 18 years old or pregnant women. Established in 2008, the program reached almost 400,000 beneficiaries[9] in 2017. The benefit requires school attendance for school-aged children and health checkups for pregnant women and babies. The transfer is higher for secondary than primary level students, and it increases at a decreasing rate with the number of siblings.

Food transfers are the sum of two different programs. On one hand, there is a means-tested program that is managed by the Ministry of Development (MIDES) called *Tarjeta Uruguay Social* (TUS) that is focused on the 60,000 most vulnerable households.[10] It consists on a pre-paid card that is refilled monthly with an amount that increases with the number of children in the household. Half of the beneficiary households deemed to be in worse socioeconomic conditions receive twice the amount. The card may only be used to buy food and other basic goods. On the other hand, INDA (*Instituto Nacional De Alimentación*) supplies food baskets to vulnerable population with chronic diseases.

The other direct transfers considered are the benefits of the social security system that require some conditions to be eligible. These transfers are managed by BPS and include unemployment insurance, maternity and family benefits, disability and sickness allowances.

In-kind transfers

Educational public transfers comprise GoU's spending in all educational levels, and it does not consider investments in infrastructure. In Uruguay, attendance to school is mandatory from age 4 (preschool level) and until completion of the lower secondary level (roughly when the child is 15 years old). Information is available at the national level for each educational level: preschool,

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[8] The *Plan de Equidad* was implemented in 2008. Transfers are given to households with children under 18 and deemed to be "vulnerable" based on a score (Failache et al 2016).

[9] Source: https://www.gub.uy/ministerio-desarrollo-social/datos-y-estadisticas/datos/cantidad-de-beneficiarios-de-asignaciones-familiares-plan-de-equidad

[10] In 2017, there were about 1.2 million households in Uruguay. According to calculations with ECH (2017), 60,787 households were recipient of TUS.

primary and lower secondary. Besides, we include public spending related to a child care program (*Centro de Atención Integral a la Familia* - CAIF) that targets children of up to three years of age in low-income households. Overall, it adds up to 18.6 percent of total social spending and represents 3.8 percent of GDP.

Table 2. Social Spending. Uruguay, 2017

Concept	Percentage of social spending	Percentage of GDP	Included in analysis
Direct transfers	**11.81**	**2.54**	
Plan de equidad	1.74	0.37	Yes
Non contributory pensions	2.62	0.57	Yes
Food	0.84	0.18	Yes
Other direct transfers	6.60	1.42	Yes
Education	**18.84**	**4.06**	
Child care	0.78	0.17	Yes
Preschool and Primary level	7.07	1.52	Yes
Secondary level	7.09	1.53	Yes
Tertiary level	3.90	0.84	Yes
Health	**30.71**	**6.61**	
Contributory - Public	3.98	0.86	Yes
Contributory - IAMC	15.21	3.28	Yes
Contributory - Private insurance	0.41	0.09	Yes
Noncontributory[11]	9.27	2.00	Yes
FNR (high risk sickness)	1.84	0.40	No
Contributory pensions	**38.64**	**8.32**	**No**
Total social spending	**100.00**	**21.54**	

Sources: BPS, MEF, Junta Nacional de Salud (JUNASA)
Note: Public health services include funding from general public budget and FONASA.

Heath care public transfers accounted for 6.4 percent of GDP and, as educational transfers, excludes investment. Part of these transfers are funded by the general public budget and correspond to spending related to direct provision of health care services for poor people (noncontributory). Another portion of health care spending is funded by contributions to FONASA. Contributors to FONASA must choose an institution in which to take care of their and their families' health. The health care institutions receive a transfer per beneficiary that varies with beneficiary's age and sex. These institutions may be public institutions (the same that are also funded by general public budget), private enterprises in the mutual system (*Instituciones de Asistencia Médica Colectiva* - IAMC) and private insurance companies.

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[11] Includes ASSE (non-FONASA), Clinicas hospital, Military and Police hospitals.

Contributory pensions

In our analysis we do not include the study of contributory pensions, which represented 38.2 percent of total social spending in 2017, due to the complexity of accurately capturing effects of their elimination under an accounting framework. Contributory pensions are the main support for most of the retired. Thus, changes in the system would surely trigger strong individual behavioral responses, such as changes in labor market decisions and private savings, that cannot be accounted for when using the CEQ approach.

III.   Methodology and data

Fiscal policy contains several instruments that can help alleviate deprivation and close the gaps between different groups of the population. Certain policies can also promote economic mobility and break the intergenerational transmission of poverty through investments in public education and health that boost human capital accumulation and increase opportunities for all. An important piece of assessing how able governments are in achieving these goals is to look at how key well-being indicators of poverty and inequality behave in the application or absence of these fiscal instruments. Here we present an estimate of the impact of fiscal policy by allocating the elements of fiscal policy (such as programs, revenues collection and expenditures) to individuals and households for whom we can observe in the *Encuesta Continua de Hogares* (ECH) 2017. The framework for the allocations and post-allocation analysis follows the methodology developed by the CEQ Institute to assess fiscal policy (Lustig, 2018).

A.   Methodology

The impact that fiscal policies have on income (or purchasing power or welfare) is quantified as follows. First, we estimate, a gross income without public transfers for each household (an income that would be experienced *before* any transfers or payments generated by the fiscal system are received or imposed). This state, estimated through the concept of *pre-fiscal income* (I_h), is obtained as the cumulative income received from wages and salaries (that is, from labor market transactions including direct taxes and contributions to the Health System) plus the market value of consumption of own production; from capital (including direct taxes); and from private transfers (such as remittances from family members working abroad); and finally from pensions (whether private or public).[12]

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[12] One notable limitation of the current analysis is that it only incorporates the current contributions to the pension system, as well as the receipts from the pension system, but they are not part of the distributional analysis. Contributory pensions are only considered part of the market income. Contributory pensions are the main support for most of the retired individuals in Uruguay. Thus, we should expect an individual behavioral response if the contributory pensions program did not exist, such as an increase of private savings. Besides, given the important weight of contributory pensions, the assumption that they do not exist should lead to adjustments in macroeconomic and public accounts. Finally, the contributory pensions

The second step is to define the set of taxes and transfers T_i to be examined. For each household h found in the microdata *shares* (S_{ih}) of each program, $i = 1,....I$ in T_i are allocated. With the estimated shares, an estimate of *post-fiscal income* is created at the household level Y_h such that

$$Y_h = I_h - \Sigma_i T_i S_{ih} \qquad\qquad (1)$$

Next, to determine the impact of the fiscal system[13] on either poverty or inequality, we estimate the difference between a determined measure of poverty or inequality over the different stages of policies. Specifically, direct taxes and contributions are analyzed using pre-fiscal income, direct transfers are analyzed with net market income and in-kind transfers are analyzed using disposable income.

It might also be interesting to determine the impact of a single tax or transfer (or a subset of these). To do this, we take the difference in a given well-being indicator (inequality or poverty) at the corresponding income concept *excluding* the item in question (but including everything else in the fiscal system) and the same income concept *including* the item in question (and also including everything else in the fiscal system).

A single tax or transfer (or a fiscal system) can be characterized as follows:

- *Inequality reducing* when the addition of the fiscal item in question to an income concept reduces measured inequality;
- a transfer is *absolutely progressive* if, when households are ranked by pre-fiscal income levels, the cumulative household shares of the transfer are greater than cumulative population shares. In a Lorenz curve figure, an absolutely progressive transfer's concentration curve would lie above and to the left of the 45-degree line (Figure 1);
- a transfer (tax) is *relatively progressive* if, when households are ranked by pre-fiscal income levels, the cumulative household shares of the transfer (tax) are greater (less) than the cumulative household shares of pre-fiscal income. In a Lorenz curve figure, a relatively progressive transfer's (tax's) concentration curve would lie above and to the left (below and to the right) of the Lorenz curve for pre-fiscal income.

A graphical representation of these characterizations is presented in Figure 1, where panel A represents transfers and panel B represents taxes.

The methodology provides two indicators that help understand the extent to which a fiscal policy is progressive or regressive. First, concentration shares show the share of the value of fiscal policy captured by (or imposed on) a subset of the population such as the poorest 10 percent of individuals or the richest 10 percent of individuals. Second, the incidence of a fiscal policy element

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program consists on a flow of contributions at present and benefit receipts in future, that is, a dynamic process.

[13] It should be highlighted here that "fiscal system" refers to the policies that the study is able to incorporate and analyze, which may not be a full characterization of the country's fiscal system.

calculates the value of a benefit captured (or a tax imposed) *relative* to the value of income *before* the benefit was received or before the tax was imposed.

Figure 1. Diagram Representing the Progressivity of Taxes and Transfers

A. Government Transfers

B. Government Taxes

Cumulative proportion of taxes or income (y-axis)

Cumulative proportion of population (ordered by pre-tax income) (x-axis)

- – – Relatively progressive
- .... Pre-tax Income Lorenz curve. Neutral in relative terms if on this line
- - · – Regressive
- ——— 45 degree line; population share. Upper bound of regressive
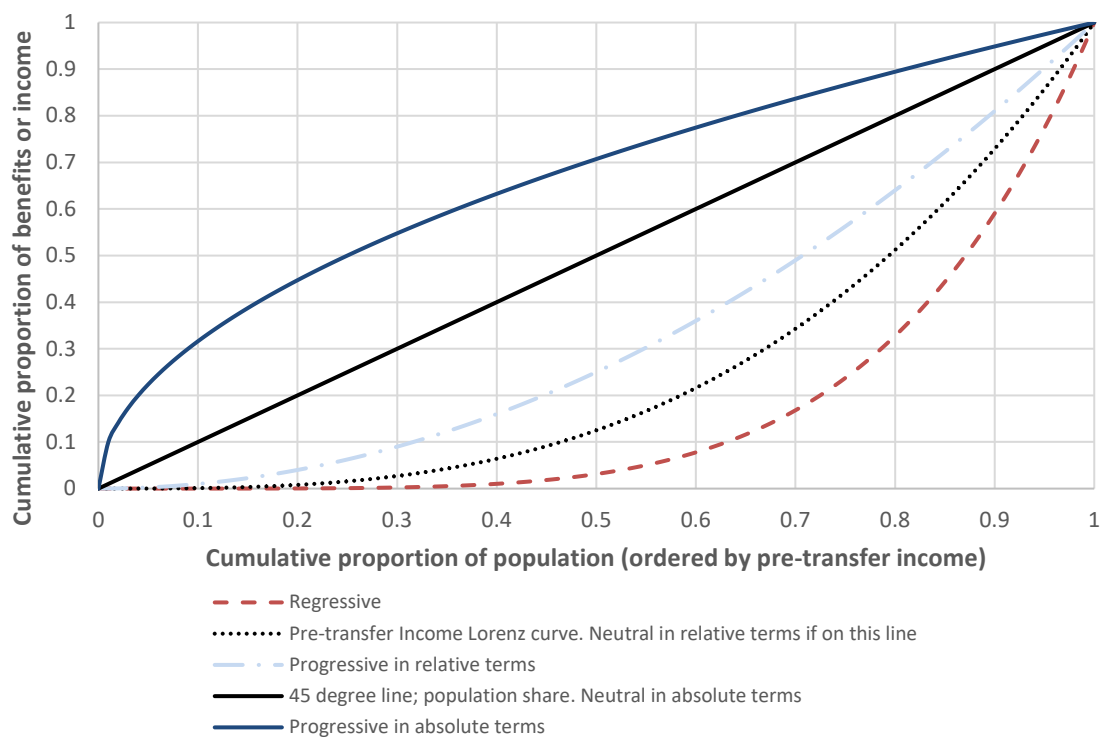
Source: Adapted from Lusting (2018).

One final note on the starting point of the methodology is worth making. Pre-fiscal income reflects income before any transfers (including public spending on health and education, and cash transfers) or taxes (including personal income taxes) have been added. In analyzing contributory pensions, we treat pension contributions as deferred income and pension income received as market income. Thus, the team's pre-fiscal income includes both pensions and contributions (top box in Figure 2).

B.   Data

We use three main data sources: the *Encuesta Continua de Hogares* (ECH) 2017, administrative data obtained from public programs, and other sources for aggregate data.
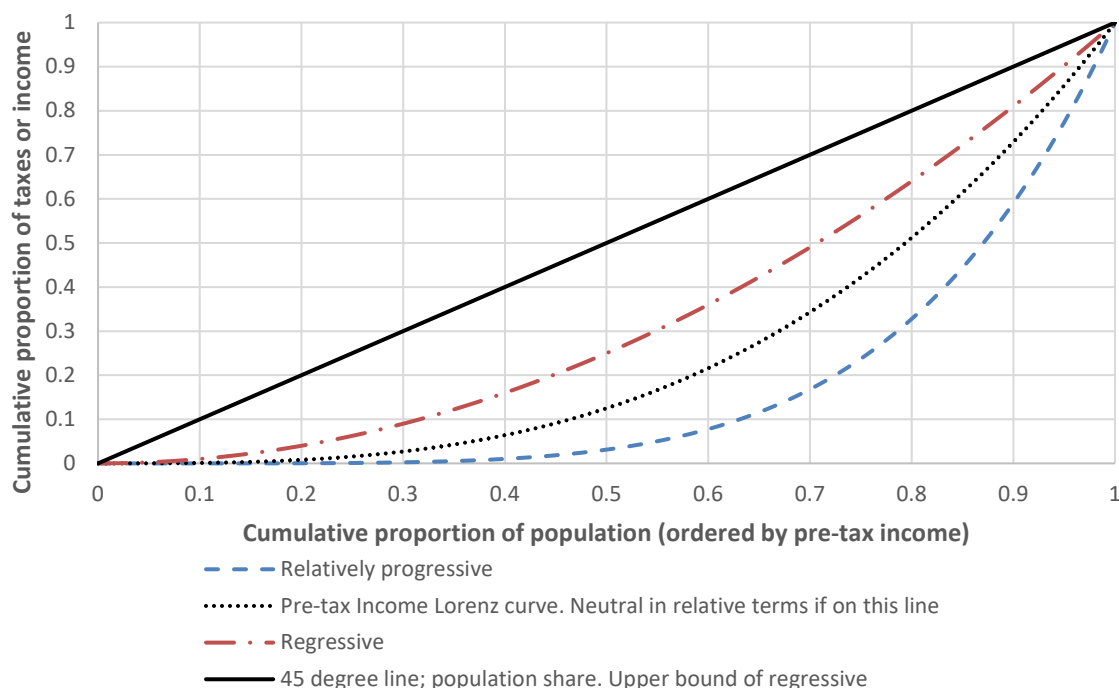
The ECH is Uruguay´s household survey conducted by the country´s National Institute for Statistics (*Instituto Nacional de Estadistica* - INE). Running since 1968, the survey is representative at national and departmental levels. In 2017, the ECH sample included over 118,200 individuals and 45,300 households. ECH reports information on several topics, including labor market participation, income, housing, health, education, and others. Crucially, the ECH collects detailed information on the characteristics of individuals' occupation, including income after taxes and contributions (such as net wages, bonuses, tips, capital income, private and public transfers), whether workers contribute to a pension system or not and whether workers and pensioners are covered by FONASA.

Together, this information allows obtaining a reliable estimate of taxes and contributions to FONASA paid by workers, capital earners and pensioners using the schedular rates. In this estimation we assume that workers who do not contribute to the social security system do not pay direct taxes and do not contribute to the Health System Fund. Besides, we assume that workers who contribute do not evade taxes and contributions. Finally, we assume no evasion in the case of capital income and pensions. We estimate the individual's pre-fiscal income adding taxes and contributions to reported income. [14],[15] Pre-fiscal income also contains contributions to the health system paid by employees, private transfers and imputed rent (see Figure 1).

Figure 2 provides a schematic of the different income concepts. It shows pre-fiscal income (market income plus pensions), disposable income, consumable income (although it is not used in this analysis), and adjusted income.

We define Net Market Income as Pre-Fiscal Income less direct taxes and contributions to the health system. Next, we estimate Disposable Income as the sum of Net Market Income and public direct transfers. Information of the ECH on social programs receipt and household composition allows the direct identification of public transfers' beneficiaries. Besides, the survey also provides the amount of the benefit. Finally, we define Adjusted Income as the sum of Disposable Income and public educational and health transfers. As for in-kind benefits, school attendance, type of school and access to health services allow for the imputation of monetary benefits of public spending into these services. Specifically, administrative data provide total costs by level (for education), and by provider (for health), are first scaled-down using the ratio between disposable income from aggregate sources[16] and the disposable income constructed from the ECH microdata. Finally, the scaled-down costs are divided between the users of the in-kind benefits.

In addition, administrative data and indicators from public programs were publicly available and used as sources to model how each fiscal policy would be affecting individuals and households. This information includes tax brackets, tax refunds, rules on contributions to Social Security, and the functioning of direct and in-kind transfers. As for the aggregate data, it mostly comes from *Rendicion de Cuentas* (Ministry of Economy and Finance), although some specific information was drawn from each individual source (INEFOP, BPS and MIDES).

Before turning to the results, a few points are worth highlighting. The methodology allows to make very detailed assignments of different policies. For instance, it provides a framework to map the income, type of occupation and family structure in calculating an individual's personal income tax and deductions. However, the results only reflect a static effect of adding (subtracting) taxes

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[14] Nevertheless, this is still an estimation, and might differ from other calculations. Please refer to Appendix II.

[15] The estimation of taxes and contributions made by workers are based on the procedure followed by OPP (Simulador de Políticas Públicas versión 2016.0.0, Oficina de Planeamiento y Presupuesto, Presidencia de la República) for 2016. The estimation was adapted to 2017, and this was made with invaluable support from the OPP team.

[16] Income aggregates for 2017 were estimated by the authors using an extrapolation from macro indicators published by the Uruguayan Central Bank.

(transfers). In addition, data for VAT expenditures is not available and is not part of the analysis. INE's ENGIH 2006 is the most recent source for data on expenditures.[17] The 2016 round of the ENGIH has not been released yet. Finally, evaluating the quality of the policies studies or their effectiveness with respect to other fiscal alternatives with an income-redistributive objective is outside the scope of this study. The effects described here aim to inform about the poverty and inequality impacts of a set of fiscal policies in place in Uruguay in 2017.

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[17] This was used in Bucheli et al (2013).

Figure 2. Definition of CEQ Income Concepts

Pre-fiscal income
- Income from work (wages/salary + in-kind benefits)
- Income from capital
- Self-provision of goods/services
- Private transfers/remittances/alimony
- Private pensions
- Imputed rent
- *Include* Contributory social insurance old-age pensions, *exclude* contributions to social insurance old-age pensions

Direct taxes and contributions
- Personal income tax (IRPF)
- IASS, FRL
- Contributions to FONASA

- (−)

Net market income

Direct transfers
- *Plan de equidad* (AFAM-PE)
- Non-contributory pensions
- Food (TUS and INDA)
- Other direct transfers***

- (+)

Disposable income

- (+)

Subsidies**

Indirect taxes*

- (−)

Consumable income

In-kind transfers
- Monetized value of education and health services

- (+)

- Copayments and user fees for education and health services ****

- (−)

Adjusted income

Source: Adapted from Lustig 2018. * No information on household consumption was available for 2017. Thus, none of the indirect taxes such as the Value Added Tax are incorporated in this exercise. ** In Uruguay, subsidies per se are nonexistent. However, some products have fixed prices (such as a specific kind of milk, fuels, and others), which could have welfare effects. Since there is no information on purchases for 2017, these are also not considered. *** These are benefits of the social security system that require some conditions to be eligible: unemployment insurance, maternity and family benefits, disability and sickness allowances. **** In some cases, FONASA services require the payment of an "orden" or "ticket" that varies depending on the service. However, there is no information available on this expenditure for 2017.

IV.   Main Results

A.   Incidence of key programs across the population

Figure 3 shows the expenditure/revenue distribution of selected programs across quintile of pre-fiscal income.[18] Direct taxes are mostly paid by the richest individuals, since the upper 20 percent of the distribution pays over 80 percent of the total, while the other quintiles pay less than their share of total population. As for direct transfers, they are directed to the bottom quintile. These transfers show a higher incidence among the poorest households: households in the bottom 20 percent of the distribution receive almost 50 percent of the total amount spent by the GoU in direct transfers. Richer quintiles receive lower shares, with the richest quintile receiving 7 percent of this type of outlays. Within the direct transfers, authors' calculations show that AFAM-PE mostly reaches the first and second quintiles, as the first one receives over 70 percent of the benefit, and the second one receives over 20 percent. Non-contributory pensions are similarly distributed as AFAM-PE, but with a slightly higher participation of the third income quintile. Additionally, food and other direct transfers are more evenly distributed among quintiles although almost 40 percent of the total is directed towards the first quintile. As for health, its contributions are covered mostly by the two top quintiles (reaching over 70 percent of the total) while its benefits are almost evenly distributed among quintiles. Education is mostly directed at poorer quintile, but it contains disparities depending on the level. The lower the level, the more its benefits are directed to the lower quintiles, with almost 75 percent of "Child Care" spending going into the bottom 2 quintiles, and almost half going into the poorer quintile. On the other hand, tertiary education spending is mostly captured by the highest quintiles, with more than 60 percent of expenditure going into the top 40 percent of the distribution.

Figure 3. Incidence of public programs by quintile. Uruguay, 2017.

Panel A. Direct taxes and transfers

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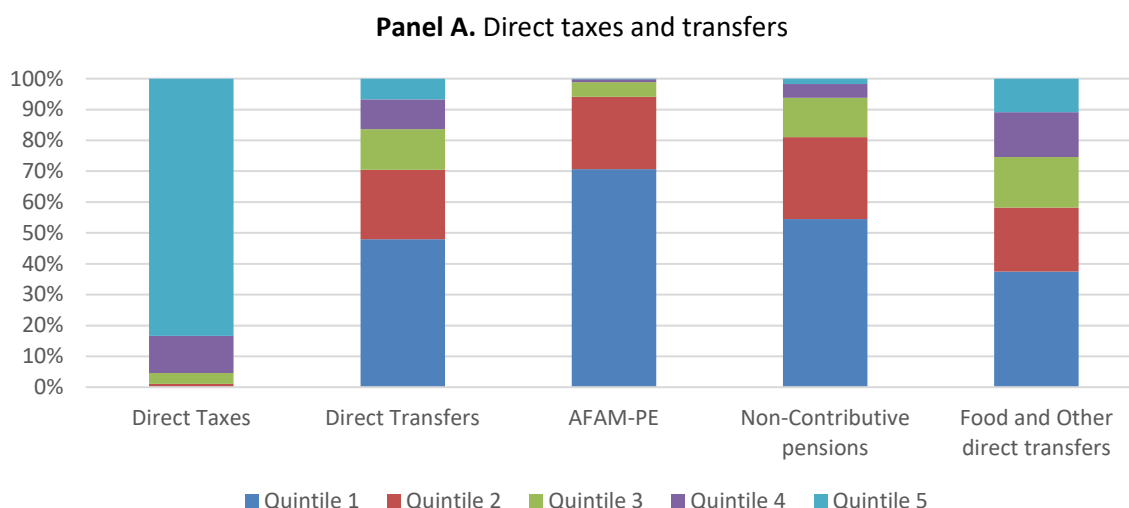
[18] We create quintiles based on the distribution of pre-fiscal income to obtain a better understanding of households' relative standing and absent of any government intervention.
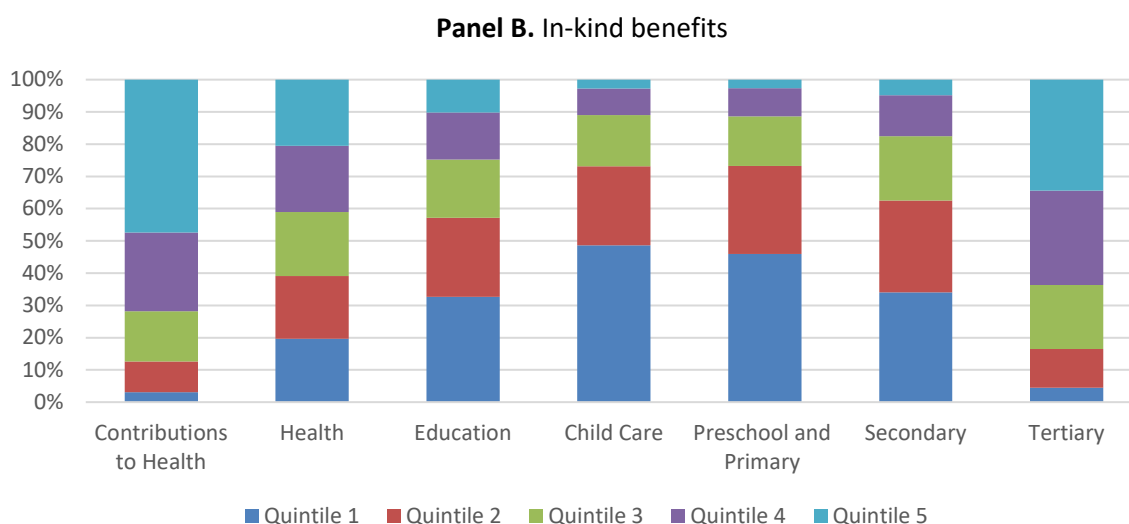
Panel B. In-kind benefits

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology
Notes: Quintiles are defined by per capita Pre-fiscal Income

It is also relevant to consider groupings other than income to analyze public programs. This allows for a complementary scope on public policies, especially when it comes to identifying the focused support provided to the most vulnerable sectors of the population in a relatively egalitarian country. In this case, we consider both geographic regions and types of households. Since the groups comprise varying shares of the Uruguayan population, it is important to normalize the results. To keep things simple, we calculate the difference between the share (paid or received) of the observed policy and the population share of the group, divided by the population share. Thus, this population-adjusted incidence will be positive whenever a group pays (or receives) more than what a uniform distribution would imply.

When considering geographic regions, it is clear that direct taxes are being paid by the wealthier zones (Montevideo) and direct transfers are being focused at the poorer. In seen in Figure 4, Panel A, direct taxes paid in Montevideo are 65 percent higher than what they would be if they were equally distributed among the population. As for transfers, AFAM-PE and non-contributive pensions in Artigas, Rivera and Cerro Largo are 70 and 85 percent higher than their share respectively, while food and other direct transfers are more focused in the capital. Montevideo concentrates a high share of tertiary education expenditure and low shares of the other levels, while the opposite is true for the rest of the country. These results of lower economic dynamism (direct taxes), higher vulnerabilities (direct transfers and childcare education due to a slightly younger population) and lagging tertiary education and allow for a complementary view on the lag observed in the northmost region in Freire et al. (2020), for example.

Considering types of households, the weight of AFAM-PE in those with children is around three times larger than its proportion of the population, which is in line with the program's design. Within those groups, households with only adult females are the most benefited. Direct taxes, on the other hand, are paid by households without children in a larger proportion. Finally, low and

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mid-level education expenditure is focused on households with children, while the opposite is true about tertiary education.

Figure 4. Population-adjusted Incidence of public programs by geographic region. Uruguay, 2017.

Panel A. Direct taxes and transfers

Panel B. Education

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology

Notes: The shares of the population are as follows: Canelones + San Jose (20%), Montevideo (40%), North (8%), Rest (33%). Total does not add up to 100% due to rounding.

Figure 5. Population-adjusted incidence of public programs by type of household. Uruguay, 2017.
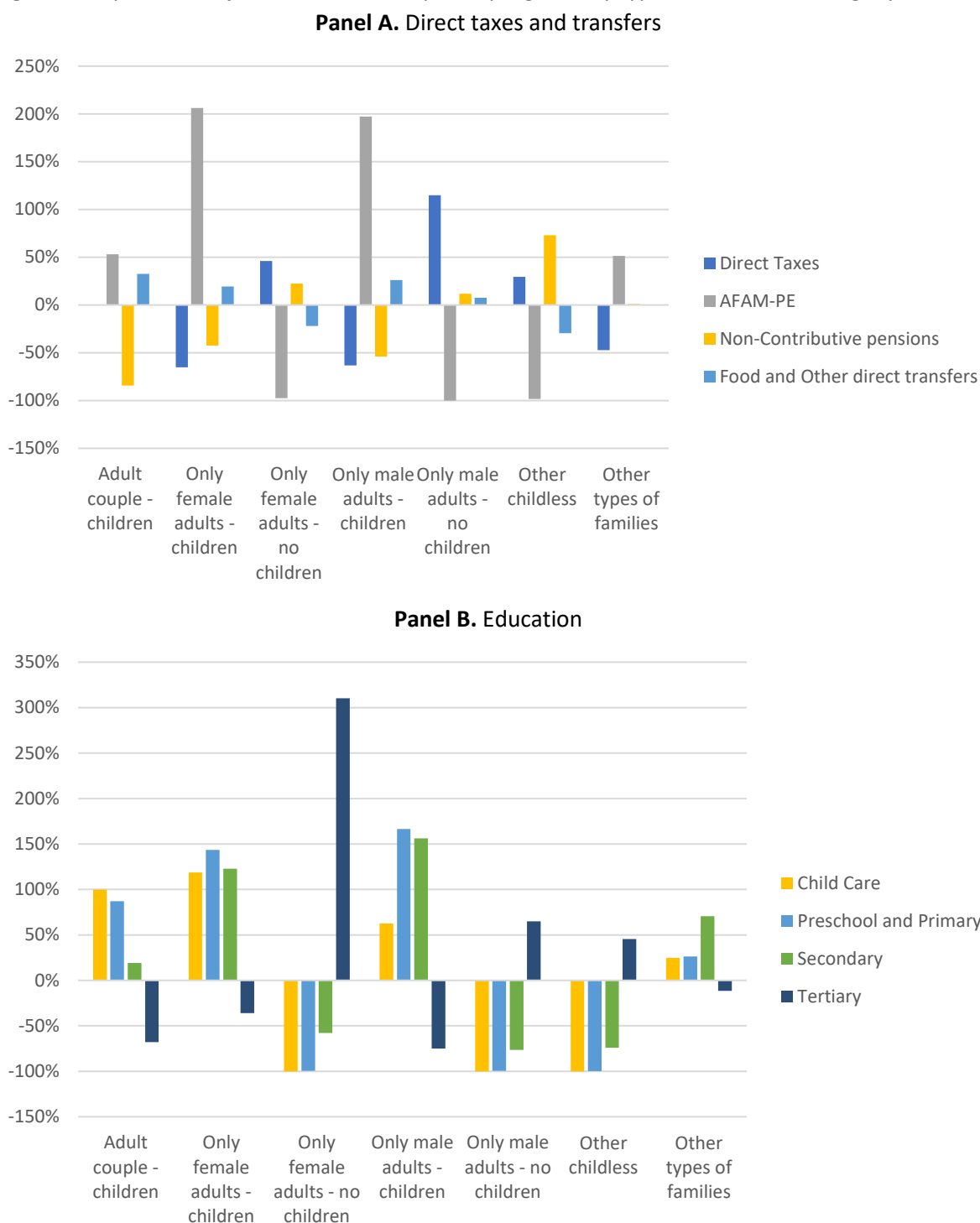
Panel A. Direct taxes and transfers

Panel B. Education

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology

Notes: The shares of the population are as follows: Adult couple - children (29%), Only female adults – children (5%), Only female adults – no children (2%), Only male adults – children (2%), Only male adults – no children (3%), Other childless (36%), Other types of families (22%). Total does not add up to 100% due to rounding.

B.   Impact of Fiscal Policy on Inequality and Poverty

As shown in Table 3, income inequality measured by the Gini index declines across the different income concepts considered. It goes from 0.461 to 0.445 when moving from Pre-Fiscal Income to Net Market Income, that is, after the intervention of direct taxes and contributions to health system. The decline is similar after direct transfers (going from Net Market Income to Disposable Income), as it goes from 0.445 to 0.429. Finally, the highest reduction of the Gini coefficient is due to in-kind transfers: the Gini coefficient of the Adjusted Income is 0.383, equivalent to 0.046 percentage points lower than Disposable income. The total reduction in the Gini coefficient amounts to 0.078 percentage points when comparing Adjusted income to income before fiscal interventions.[19]

The redistributive effect of fiscal interventions may be measured as the change in the Gini coefficient. In turn, this change can be decomposed in the reranking effect (RE) and the vertical equity (VE) measure. The latter is concerned with the principle that people with different income should be treated differently. Therefore, under vertical equity, fiscal interventions would lead to income units (households) to be closer than before the interventions. Nevertheless, these interventions might also lead to changes in positions (for example, A is richer than B before fiscal policy instruments are put in place, but B is richer than A after they are). These changes are called reranking effect.

Table 3. Evolution of inequality and poverty through different income concepts. Uruguay, 2017

	Gini Index		Headcount poverty	
			Official poverty line	
	Index	Diff.	Index.	Diff.
Pre-fiscal income	0,461		0,173	
Net market income	0,445	-0,017***	0,190	0,018***
Disposable income	0,429	-0,016***	0,158	-0,032***
Adjusted income	0,383	-0,046***		

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology. Notes: *** p<0.01, ** p<0.05, * p<0.1 for a test of means testing the null hypothesis that the difference between the income concept of the row and the income concept of the row above is zero.

We perform this decomposition and report the results in **Table 4**. The vertical equity measure indicates the change in the Gini coefficient when keeping individuals in the same order, that is, in the absence of reranking. Since reranking means a loss of horizontal equity, the reported measure of reranking effect (RE/VE) has traditionally been called horizontal inequality. The results show

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[19] Given the unavailability of indirect taxes information for this exercise, it is not straightforward to compare the effects on the Gini index found here (a drop of 0.078) with the results obtained in other countries. Studies that incorporate both direct and indirect taxes, where the latter are typically regressive, will appear to be less inequality reducing than studies that incorporate direct taxes only. With this in mind, it is worth noting that the estimated change in Gini found here is close to that found in other countries in the region: -.0813 in Mexico using data for 2010 (Scott 2013), -.074 for Chile in 2013 (Martinez-Aguilar and Ortiz-Juarez 2016), -.0739 in Ecuador 2011-12 (Llerena Pinto et al. 2017); and -.0677 in Colombia with data from 2010 (Melendez and Martinez 2015).

that VE is partially compensated by RE; indeed, horizontal inequity in the form of RE is relatively low. Therefore, most of the redistributive effect of fiscal interventions occurs through a compression of the income distribution (VE).

Table 4. Redistributive effect. Uruguay, 2017

	From Pre-Fiscal to Disposable Income	From Disposable to Adjusted Income	From Pre-Fiscal to Adjusted Income
Redistributive effect	0,0326	0,0456	0,0782
Vertical equity (VE)	0,0357	0,0469	0,0817
Reranking effect (RE)	0,0030	0,0013	0,0035
Horizontal inequality (RE/VE)	0,0840	0,0277	0,0428

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology
Notes: Redistributive effect is the change in the Gini coefficient of moving across CEQ income concepts.

In **Table 3** we also report the effect of fiscal interventions on poverty using as threshold the official poverty line as defined by INE.[20] Poverty increases slightly when moving from Pre-fiscal to Net Market Income (as a result of direct taxes and contributions to the health system). But poverty decreases from Pre-fiscal to Disposable Income, that is, after payment of direct taxes and contributions to health system and reception of direct taxes. To isolate the effect of direct transfers we can focus on the passage from Net Market Income to Disposable income: the poverty rate decreases around 3 percentage points.

We calculate four complementary indicators that measure the efficacy and efficiency of *direct transfers* in reducing poverty (**Table 5**). First, the vertical expenditure efficiency measures the percentage of transfers that go to the poor: the index is 46.5 percent when using the official poverty line. Secondly, the spillover index measures how much of the transfers received by the poor population are above the strictly necessary to cover their basic needs (i.e. bringing them out of poverty). If we use the threshold set by the official line, the spillover effect is 21.3 percent. Finally, we report the poverty reduction efficiency and the poverty gap reduction efficiency. The

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[20] Welfare and poverty analysis in Uruguay, as in most countries in Latin America, uses an income-based welfare aggregate. Official estimations of poverty are carried out by the National Institute of Statistics (*Instituto Nacional de Estadística* – INE) and updated annually with the information captured in the Continuous Household Survey (*Encuesta Continua de Hogares*). A household is considered poor if the sum of a series of income sources of all its members do not allow them to purchase a basket of basic goods and services (i.e. food and non-food items) that are deemed to be a minimum required to enjoy a decent living. The average official poverty line is roughly equivalent to US$ 10.67 (2011 PPP) per person per day and higher than the US$5.5 typically used by the World Bank for upper-middle income economies. The official poverty rate for 2017 was 7.9 percent. There are major conceptual differences between the methodology used by INE to calculate the official households' welfare measure (i.e. total household income) to measure poverty and the CEQ income concepts that will lead to differences in the estimated poverty rate. The CEQ analysis presented here is not intended to replicate the official poverty measurement methodology, but to show how government interventions affect the purchasing power of households.

results show that direct transfers are more efficient in reducing poverty among the poorest. However, there is still space for improving their effectiveness.

Table 5. Effectiveness of direct transfers. Uruguay, 2017

Indicator	Official poverty line
Vertical Expenditure Efficiency	0,465
Spillover Index	0,213
Poverty Reduction Efficiency	0,366
Poverty Gap Efficiency	0,307

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology

C.   Incidence and progressivity of taxes and public benefits

This section presents several indicators that help deepen our understanding of the effects on inequality observed in the previous tables. To analyze the incidence of social spending we calculate the ratio of the amount of benefits to Pre-fiscal income by deciles of Pre-fiscal income. We also estimate the concentration coefficient, which assesses the distribution of the benefits when people are ordered by Pre-fiscal income. A benefit is considered progressive when the concentration coefficient is lower than the Gini of Pre-fiscal income. The difference between the concentration index of transfers and the Gini index of Pre-fiscal income is the Kakwani index. Therefore, a negative Kakwani index indicates that the benefit program is progressive. The Kakwani index may be negative even when the concentration coefficient is positive. A negative concentration index suggests that the transfer is more concentrated among the poorest. All of these instruments may be also applied to the study of taxes.

Table 6 presents the incidence analysis and Kakwani index of the taxes and contributions included in the analysis. The incidence of direct taxes increases with income (or with the household's relative position in the income distribution): they represent 0.1% of Pre-fiscal income of the poorest 10% of the population and 9,9% of the richest 10%. Besides, since the Kakwani index is positive, direct taxes are progressive. This result follows the analyses from Bucheli et al. (2013) and Arancibia et al. (2019), as they also find direct taxes to be progressive when considering 2009 and 2014 data respectively.

There is some evidence that contributions to the Health System are somewhat neutral: the Kakwani index is close to 0 but negative. Besides, the incidence analysis shows that there is no clear increasing pattern when moving up in the distribution. Though we report these results, it should be noted that the methodology has limited capacity to study the contributions to Health System in isolation. Our estimations of such contributions consider the devolutions that contributors received in 2017 and we do not estimate and subtract the amount that they will receive in 2018. However, we use these estimations to assess contributions and benefits jointly. Starting from pre-fiscal income, we subtract contributions and add contributory health transfers. The Gini index decreases from 0.461 to 0.440. We may therefore conclude that the overall contributory health system has an equalizing effect. However, this is a preliminary result: a

sensitivity analysis to the methods used to estimate the contributions and benefits is required to obtain robust results.

To study the effects of government's transfers we present the incidence across pre-fiscal income deciles in columns [1] through [10] of Table 6. In addition, **Figure 6** shows the concentration coefficient of the programs analyzed in the study, as well as the Gini index of different income concepts. All programs are progressive and most of them have negative concentration coefficients.

The most progressive programs are the Food transfers, the *Plan de Equidad* and the non-contributory pensions. In fact, these programs were conceived for the lower-income population and both are mean-tested, so the results are in line with the programs' designs. The rest of direct transfers are progressive though they are not specially designed for redistributive purposes among all the population: they comprise benefits that cover risks of formal workers such as illness or unemployment.

As shown by the Kakwani index, progressivity of all *in-kind* benefits is lower to the progressivity observed of all direct transfers. However, in-kind benefits are more heterogeneous. The concentration coefficient of educational programs ranks from -0.457 for childcare to 0.316 for tertiary level. Finally, the concentration coefficient of health services is close to zero.

**Table 6.** Incidence of Taxes and Transfers on Income Distribution. Percentages. Uruguay, 2017.

Decile	Direct taxes [1]	Contributions to Health System [2]	Plan de Equidad [3]	Non contributory pensions [4]	Food transfers [5]	Other direct transfers [6]	All direct transfers [7]	Education [8]	Health [9]	All in-kind transfers [10]
1	0,1	2,7	12,2	9,0	10,2	8,6	40,0	46,9	35,1	82,1
2	0,2	5,0	3,9	2,9	1,7	3,6	12,1	20,6	17,0	37,6
3	0,4	5,9	1,6	1,5	0,5	2,8	6,4	13,1	12,3	25,4
4	0,7	6,3	0,6	0,9	0,2	1,8	3,5	8,3	9,5	17,8
5	1,0	6,5	0,2	0,4	0,1	1,5	2,2	5,9	7,9	13,7
6	1,5	6,5	0,1	0,3	0,0	1,1	1,5	4,2	6,5	10,7
7	2,3	6,6	0,0	0,1	0,0	0,8	1,0	3,2	5,4	8,6
8	3,3	6,6	0,0	0,1	0,0	0,7	0,8	2,1	4,3	6,4
9	5,3	6,4	0,0	0,0	0,0	0,4	0,5	1,4	3,1	4,5
10	9,9	4,9	0,0	0,0	0,0	0,1	0,2	0,5	1,5	1,9
All	5,2	5,8	0,4	0,4	0,2	0,9	1,9	3,8	5,0	8,8
Kakwani Index	0,331	-0,021	-1,151	-1,002	-1,231	-0,585	-0,869	-0,692	-0,451	-0,556

Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology

Notes: Deciles are defined by per capita Pre-fiscal Income; the Kakwani index uses Pre-fiscal Income

Figure 6. Concentration coefficient by public program. Uruguay, 2017.
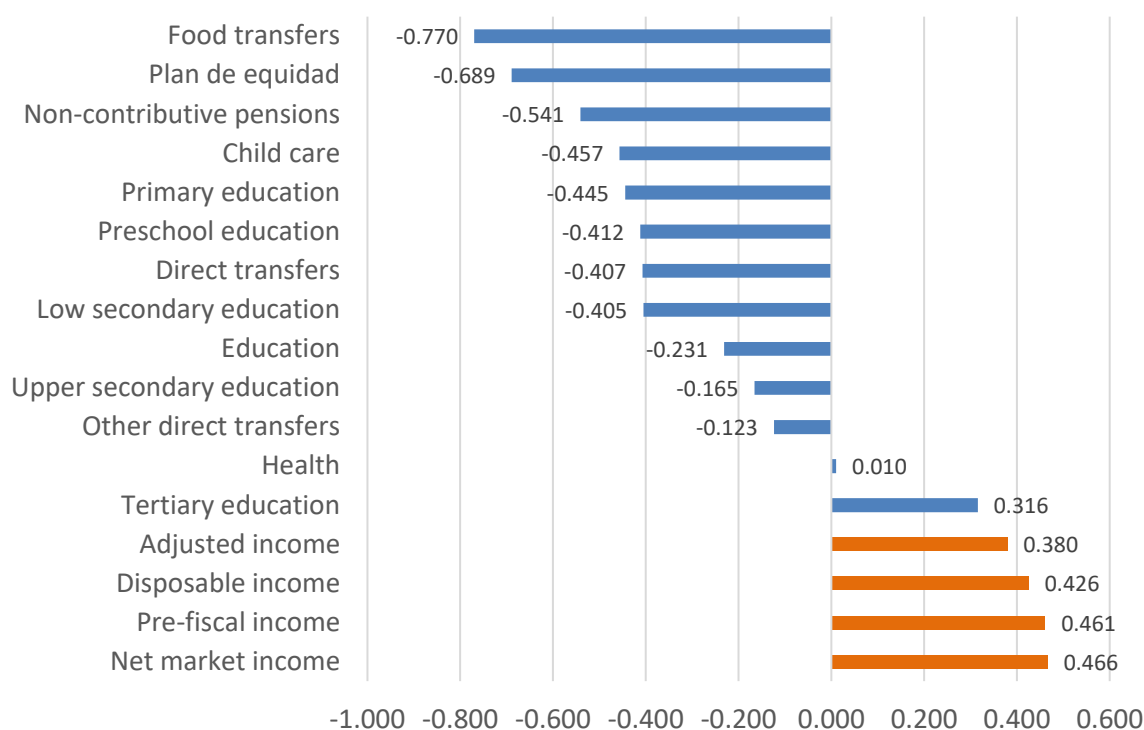
Source: Authors' estimates based on ECH (2017), INE and Fiscal Accounts and CEQ Methodology. Note: the concentration coefficient is calculated after ordering population according Pre-fiscal income.

D.   Comparing findings from 2009 and 2017

This is not the first study perform an incidence analysis in Uruguay. In fact, Bucheli et al. (2013) benefit from the availability of data in 2009 and look into several policies. Specifically, they consider direct taxes and transfers, in-kind education and health, and indirect taxes. The authors conclude that direct taxes are progressive, indirect taxes are neutral, and the rest of the policies are progressive (except for spending in tertiary education). We revisit the 2009 data with the updated CEQ methodology in an effort to produce estimates for income concepts that are as comparable as possible and to the extent allowed by the data available. A notable difference with respect to the methodology used in previous analyses is that our approach scales the in-kind transfers *down* instead of scaling-up income and monetary interventions (as was suggested in previous versions of the methodology) (CEQ 2018). We present results comparing the two years, but raise caution about potential limitations to the comparability with earlier results.

Official data report that inequality and poverty decreased between 2009 and 2017. As we have access to estimations for all defined income concepts for 2009, in this section we explore whether there is a role of on fiscal interventions in explaining the observed evolution of well-being indicators.

As shown in **Figure 7**, the Gini index for Pre-fiscal income was higher in 2009 than in 2017 as depicted in Panel A. In both years, the Gini index decreased through income concepts. In Panel B we show that the magnitude of the reductions is similar, but it was slightly higher in 2009. Indeed, in 2009 the reduction from Pre-Fiscal to Adjusted fiscal was 8.3 percentage points, while in 2017 it was 7.8.

Figure 7. Evolution of the Gini index through different concepts. 2009 and 2017.
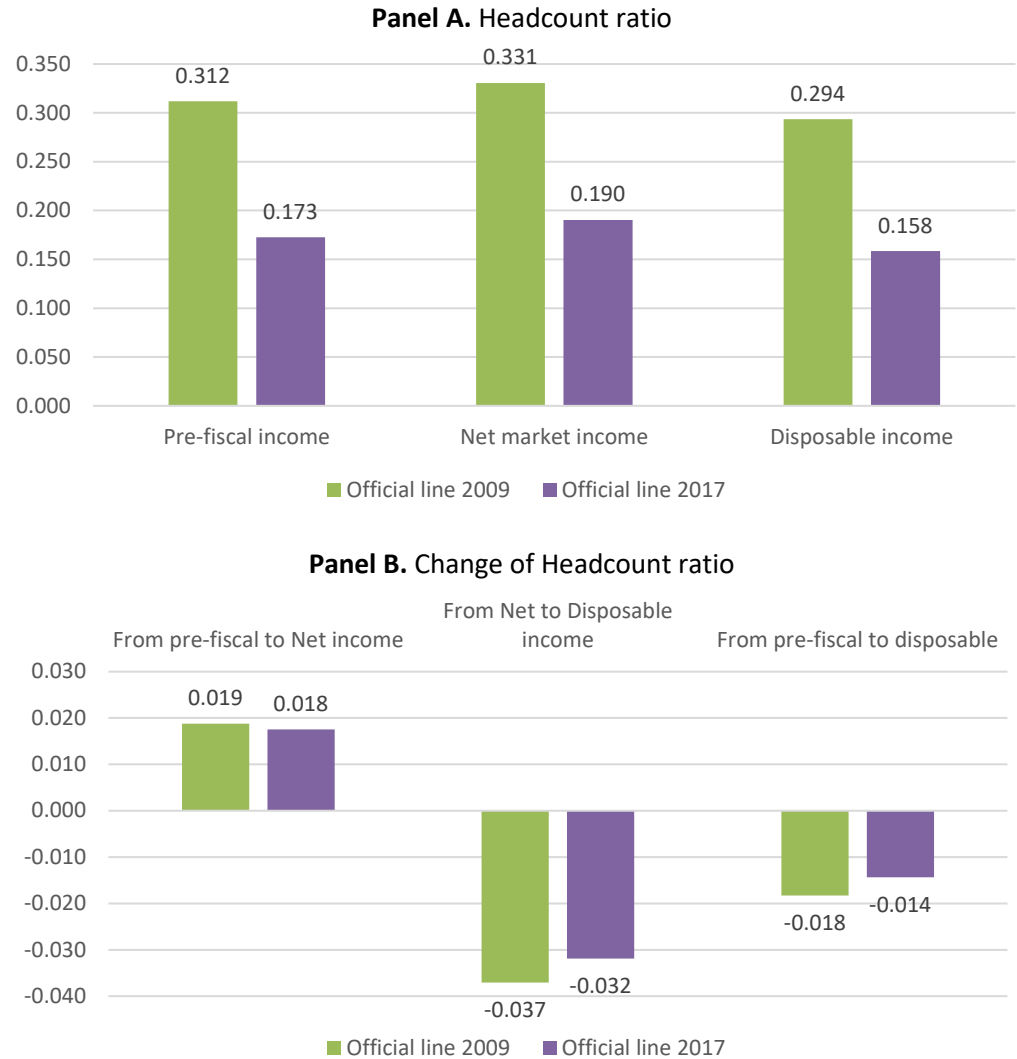**Panel A.** Gini index

Panel B. Change of Gini index

Source: Authors' estimates based on ECH (2017, 2009), INE and Fiscal Accounts and CEQ Methodology. Note: This paper scales-down the in-kind transfers, but Bucheli et al. (2013) did not because they used a previous version of the methodology, so the 2009 figures were recalculated using the updated methodology for comparability. Therefore, figures presented here for 2009 might not coincide with those from Bucheli et al. (2013).

In turn, poverty before fiscal interventions was higher in 2009 than in 2017 (**Figure 8**). And in both years, fiscal interventions (particularly direct transfers) have a reducing effect on poverty for either

line. In Panel B of Figure 7, the reduction (measured in percentage points) is higher in 2009 when considering both the international and the official poverty lines. But if we measure these differences as a proportion of poverty, the reduction is higher in 2017 under both lines. It is difficult to assess the effect using these indicators, so we also estimated the effectiveness index and we have similar results for both lines. Vertical efficiency was higher in 2009 whereas the spillover effect was lower. As a result, the poverty reduction efficiency decreased between 2009 and 2017. However, the poverty gap efficiency increased.

Figure 8. Evolution of Poverty rate through different concepts. 2009 and 2017.

Panel A. Headcount ratio

Panel B. Change of Headcount ratio

Source: Authors' estimates based on ECH (2017, 2009), INE and Fiscal Accounts and CEQ Methodology.

V.   Conclusions

This paper attempted to update the impact analysis of fiscal policies in Uruguay for 2017, as well as compare those results with previous studies. Uruguay shows a strong social compact, at least

partly due to fiscal policies that focus on redistribution and that support the bottom of the distribution.

Specifically, we find that the Gini index drops in each of the considered steps, with the highest reduction observed after in-kind transfers. In addition, poverty increases with taxes and contributions to health systems, but finally decreases when comparing disposable income and pre-fiscal income. Furthermore, direct taxes are found to be progressive, as well as direct transfers (with Food Transfers, *Plan de Equidad* and non-contributory pensions being the most progressive) and education (with the exception of tertiary level). We also show the relevance of considering groupings other than income to analyze public programs to allow for a complementary scope on public policies, specifically when it comes to identifying the focused support provided to the most vulnerable sectors of the population.

When comparing with 2009, overall inequality fell in 2017. Pre-fiscal Gini was also higher in 2009 and some of the distributive improvements happened before the analyzed interventions. In fact, the reduction in inequality when considering all of the combined policies similar in both periods for most of the policies. Nevertheless, it is important to consider that the analysis of in-kind transfers does not measure quality, as it only accounts for expenditure.

As for further analyses, it would be important to include indirect taxes when data on consumption become available, since they represent a significant portion of total revenues. In addition, contributory transfers should be accounted for given their importance both for individuals and for aggregate measurements, as well as the quality of in-kind transfers since expenditure might not accurately reflect the welfare gains. Finally, comparing the results with analyses from other countries might also be useful as it could point to potential improvements in the country's policies.

Finally, as for policy implications, the analysis highlights the importance of direct transfers for Uruguay's social protection system, making it clear that these instruments are to be maintained to support the goal of decreasing poverty. The country's broad coverage combined with a quick reaction can also make them very effective in the presence of adverse shocks. The regional and household-type analysis also highlight the importance of focused policies as they help shorten gender and regional gaps.

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Acronyms

English

CEQ – Commitment to Equity

GDP – Gross Domestic Product

GoU – Government of Uruguay

PIT – Personal Income Tax

RE – Reranking Effect

VAT – Value Added Tax

VE – Vertical Equity

Spanish

AFAM-PE – Asignaciones Familiares del Plan de Equidad

BPS – Banco de Previsión Social

ECH – Encuesta Continua de Hogares

FONASA – Fondo Nacional de Salud

FRL – Fondo de Reconversión Laboral

IAMC – Instituciones de Asistencia Médica Colectiva

IASS – Impuesto de Asistencia a la Seguridad Social

INDA – Instituto Nacional De Alimentación

INEFOP – Instituto Nacional de Empleo y Formación Profesional

IRPF – Impuesto a la Renta de las Personas Físicas

JUNASA – Junta Nacional de Salud

MEF – Ministerio de Economía y Finanzas

MIDES – Ministerio de Desarrollo Social

TUS – Tarjeta Uruguay Social

Appendix I. Applying the CEQ methodology to the Uruguayan case

INCOME CONCEPTS USED IN INCIDENCE ANALYSIS (ECH 2017)	
Pre-incidence Analysis Income	Market income
INCOME CONCEPTS: DEFINITIONS, METHODS AND SOURCES	
MARKET INCOME	
Earned and Unearned Incomes of All Possible Sources and Excluding Government	Included
Social Security Pensions	Included
Gifts, Proceeds from sale of durables	Included
Autoconsumption	Included
Imputed rent for owner-occupied housing	Included
NET MARKET INCOME = MARKET INCOME – (DIRECT TAXES AND EMPLOYEE CONTRIBUTIONS TO SOCIAL SECURITY)	
Direct Taxes	<u>Simulation Method</u>: Subtracted from Market Income to generate Net Market Income. Taxes are not reported in the survey. For wages/salary, "Impuesto a la Renta de las Personas Físicas", for capital "Impuesto a la Renta de las Personas Físicas". Estimates based on official estimates by the finance ministry, imputed by applying the updated law to the ECH data. Methodology used is consistent with imputations made for spending in present study.
Employee contributions to social security	<u>Simulation Method</u>: Estimates based on reported income and contributions rate rules. The survey inquires whether the worker contributes to social security. We substract contibutions to pensions and other contributions.
DISPOSABLE INCOME = NET MARKET INCOME + DIRECT GOVERNMENT TRANSFERS	
Non-contributory pensions	<u>Direct Identification Method</u>: These transfers correspond to old-age and disability assistant programs ("Pensión a la vejez"). They are captured by the survey
Asignaciones Familiares del Plan de Equidad (AFAM-PE)	<u>Direct Identification Method</u>: ECH reports the beneficiaries of this program.
Food transfers	<u>Direct Identification Method</u>: The survey reports the beneficiaries from food voucher and food baskets. The program of food voucher is "Tarjeta Uruguay Social" and it is managed by the Ministry of Development (MIDES) called Tarjeta Uruguay Social (TUS) that is focused on the 60,000 most vulnerable households. It consists on a pre-paid card that is refilled monthly with an amount that increases with the number of children in the

	household. Half of the beneficiary households deemed to be in worse socioeconomic conditions receive twice the amount. The card may only be used to buy food and other basic goods. The food basket program (INDA) gives food baskets to vulnerable population with chronic diseases.
Other direct transfers	Direct Identification Method: The other direct transfers considered are the benefits of the social security system that require some conditions to be eligible. These transfers are managed by BPS and include unemployment insurance, maternity and family benefits, disability and sickness allowances.
POST-FISCAL INCOME = DISPOSABLE INCOME + INDIRECT SUBSIDIES - INDIRECT TAXES	
Indirect subsidies	Not included
Indirect taxes	Not included
ADJUSTED INCOME = POST-FISCAL INCOME + GOVERNMENT IN-KIND TRANSFERS/ADJUSTED INCOME = DISPOSABLE INCOME + GOVERNMENT IN-KIND TRANSFERS	
In-kind education	Imputation Method: The survey reports whether the individual attends school and the level of education, and whether the school is public or private. The education benefit is based on the cost per student by level. The scaled-down annual per capita cost is (calculated as the coefficient of public accounts and number of assistants to public education by ECH): CAIF: $35218, preschool: $17630; primary: $55854; secondary: lower secondary (ciclo básico): $53633; upper secondary (bachillerato) $41160; technical tertiary: $27307; university: $54688; teaching: $95051. Source: ECH (2017) and CGN (2018).
In-kind health	Imputation Method: Imputations based on average cost. The survey reports the affiliation of individuals to health care services. For those who report affiliation to non-contributory public health service the scaled-down benefit is $17718 pesos per year, if the affiliation is to the public health contributory service, the benefit is $6727, for the mutual system: $16802 pesos per year and if it is to private insurance system, $13689 pesos per year. Source: CGN (2018), Junasa (2018) and ECH (2017).

Subsidized portion of social security (social security "deficit" as a percent of total social security spending)	We did not take this phenomenon into account.
INCOMES, TAXES AND TRANSFERS FOR INCIDENCE ANALYSIS INCLUDING SCALED-DOWN GOVERNMENT IN-KIND TRANSFERS	
Scaling-down factor	The ratio between Disposable Income from macro sources and Disposable income from ECH is 0.58. We used this factor to scale-down in-kind benefits, as it is mentioned in CEQ (2018)[21]

Source: authors' calculations.

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[21] See Chapter 6, Page 46.

Appendix II. Labor income and Personal Income Tax

For the purpose of this exercise, gross labor income (my_labor_in) had to be constructed using input from both ECH (2017) and OPP (2019). That income is the result of aggregating net income reported in ECH; plus IRPF, contributions to the health system, social security contributions and FRL, which are simulated by OPP. The latter three are comprised by employee and employer contributions. Average values for my_labor_in across income concepts and according to IRPF brackets are presented below, as well as IRPF tax rates, number of observations and population sizes.

Table AII.1 Summary statistics based on gross labor income[22]

GLI in BPC	GLI in pesos	IRPF rate	Average Market Income per capita	Avg. net market income per capita	Average Disposable Income per capita	Average Adjusted Income per capita	Number of observations	Population size (using sampling weights)
0 to 7	0 to 25277	0%	189,855	173,926	180,552	206,193	17,932	535,416
7 to 12	25278 to 36111	10%	300,694	235,543	239,485	265,573	8,995	276,950
12 to 15	36112 to 54165	15%	384,896	286,461	289,773	316,115	9,374	284,745
15 to 30	54166 to 108330	24%	588,539	414,141	416,999	442,209	9,116	273,928
30 to 50	108331 to 180550	25%	975,822	664,405	667,036	689,633	2,441	71,576
50 to 75	150551 to 270825	27%	1,379,295	917,508	919,542	940,298	706	20,117
75 to 115	270826 to 415265	31%	1,989,436	1,331,075	1,332,813	1,353,904	274	7,539
115+	415266 +	36%	2,813,316	1,759,771	1,762,054	1,778,904	106	2,544

Source: own calculations. Notes : GLI denotes gross labor income.

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[22] Including all dependent and independent workers, except those that only hold a non-personal services independent job (they are not targeted by IRPF).

Finally, the IRPF income brackets used are the following:

Table AII.2 IRPF rates by gross labor income

Bracket of labor income	Rate
0 to 7	0%
7 to 12	10%
12 to 15	15%
15 to 30	24%
30 to 0	25%
50 to 75	27%
75 to 115	31%
115+	36%

Source: authors' calculations.