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## THE IMPACT OF FISCAL POLICY ON INEQUALITY AND POVERTY IN CHILE\*

*Sandra Martínez-Aguilar, Alan Fuchs, Eduardo Ortiz-Juarez  
and Giselle Del Carmen†*

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### ABSTRACT

This paper applies a comprehensive tax-benefit incidence analysis to estimate the distributional effects of fiscal policy in Chile in 2013. Four results are indicative of an overall positive net effect of fiscal interventions on poverty and inequality. First, subsidies exert a positive, yet modest effect on poverty and inequality, whereas direct transfers are progressive, equalizing, and reduce the poverty headcount by 4 to 5 percentage points, depending on the poverty line used. Second, although social contributions are unequalizing and poverty-increasing, direct taxes on personal income are equalizing and poverty-neutral, whereas indirect taxes are poverty-increasing but exert a counterintuitive, yet feasible equalizing effect known as Lambert's conundrum. Third, social spending on tertiary education is slightly equalizing but it is not pro-poor, contrary to the effects of social spending on basic and secondary education and health, which are not only equalizing but also pro-poor. Finally, the net effect of Chile's tax/transfer system leaves fewer individuals impoverished relative to the number of fiscal gainers, and the magnitude of monetary fiscal gains is significantly higher than that of fiscal impoverishment.

**JEL Codes:** D31, I32

**Keywords:** Fiscal Policy and Inequality, Income Inequality, Poverty, Social Assistance, Taxation

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## 1. Introduction

Since the early 2000s, Chile adopted an integral approach to social policy to gradually incorporate a set of multi-sectorial programs and interventions that sought to serve as a buffer to negative shocks. The introduction in 2002 of *Chile Solidario* as a strategy to overcome extreme poverty, the health reform of 2004 that created the *Plan AUGE/GES* to reduce horizontal inequalities in the access to health care,<sup>1</sup> the social security reform of 2008 that introduced a non-contributory component of the pension system (*Pensiones Solidarias*), the creation of the subsystem for comprehensive early childhood protection (*Chile Crece Contigo*), and the launch of the subsystem of social protection and opportunities (*Ingreso Ético Familiar*)<sup>2</sup> have shaped a social protection system with a life-cycle perspective, combining universal and targeted coverage for specific groups with certain degrees of vulnerability. Through 295 social programs; 130 actions related to scholarships, pensions and subsidies; and a budget of around 10 percent of the GDP by end-2015, Chile's social policy delivers direct and in-kind transfers, family allowances, non-contributory pensions, and other types of social spending, including psychosocial support, technical advice, training, and credit and funding for productive projects.

The significance given to social policy is evidenced by the increase of per capita public social expenditure during the last decade, which occurred at an annual rate of 6.8 percent in real terms.<sup>3</sup> During this period, the incidence of income-based poverty in Chile has significantly declined.<sup>4</sup> The headcount for extreme poverty reduced from 12.6 percent in 2006 to 3.5 percent in 2015, equivalent to an average decline of 1 percentage point yearly, whereas the incidence of moderate poverty changed from 29.1 to 11.7 percent for an annual average decline of 1.9 percentage points. In the case of income inequality, changes in the Gini coefficient show a declining trend, although they were not statistically significant between 2006 (0.499) and 2013 (0.491), and it was until 2015 that inequality registered a significant reduction (0.482).<sup>5</sup>

In such context, this paper applies a comprehensive tax-benefit incidence analysis to estimate the effects that public social spending, hand in hand with the tax system, exert on poverty and inequality indicators in Chile using household-level data and administrative records for 2013. Specifically, the analysis presented in the next sections evaluates the concentration and incidence of several fiscal instruments in Chile—including direct and indirect taxes,

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<sup>1</sup> The Plan AUGE (Universal Access to Explicit Guarantees), now called GES (Explicit Guarantees in Health), guarantees the coverage of 80 diseases by the public National Health Fund (FONASA) and the private health system (ISAPRE).

<sup>2</sup> This program was introduced to replace and extend the benefits of *Chile Solidario*.

<sup>3</sup> This rate of change was calculated using the OECD social expenditure database (OECD, 2016a).

<sup>4</sup> In 2015, a multi-dimensional poverty measure was officially introduced to assess non-monetary deprivations of households. This measure considers four equally-weighted dimensions, each measured through three indicators: education (school attendance, years of schooling and underachievement), health (child malnutrition, access to the health system, and medical care), labor and social security (access to social security, employment status, and retirement), and housing (overcrowding, dwelling conditions and access to basic services).

<sup>5</sup> Official figures on poverty incidence and income inequality are taken from Ministerio de Desarrollo Social (2016).

contributory and non-contributory pensions, direct transfers, indirect subsidies, and in-kind government transfers in the form of health and education— to address five questions. First, who bears the tax burden and receives the benefits from social spending? Second, are fiscal interventions in Chile equalizing? Third, are they poverty-reducing? Fourth, does Chile’s fiscal system either hurt or benefit the poor, and in what magnitude? And finally, how do Chile’s redistributive effects compare to other countries?

The contribution of this paper to the empirical fiscal incidence literature and public debate in Chile is threefold. Firstly, it focuses on the redistributive effects of fiscal policy using a standardized approach that allows the results to be compared across countries using the same methodology. For that purpose, the effects are computed not only at the national level and among the poor according to national official standards, but also across predefined income groups by international standards, namely poor, vulnerable, middle class, and wealthy individuals.<sup>6</sup> Secondly, the paper presents results for innovative measures related to income-based poverty and inequality, namely “fiscal impoverishment” and “fiscal gains to the poor” (Higgins and Lustig, 2016), and “marginal contributions” to poverty and inequality (Enami, Lustig and Aranda, 2017). Finally, the paper offers evidence of a counterintuitive but possible (and frequently overlooked) result: Chile’s fiscal system features regressive, yet equalizing indirect taxes. This conundrum in the redistributive effects of indirect taxes in Chile highlights that sound and robust fiscal incidence analyses should assess the redistributive impacts of fiscal interventions as part of a whole system, and not as isolated tools which in turn could lead to misleading policy conclusions.

The remaining part of this paper is structured as follows. Section 2 provides a brief description of Chile’s social spending and tax systems and the main interventions included in the incidence analysis. Section 3 describes the methodology, the data sources exploited and the assumptions made in estimating the benefits received and the taxes paid by individuals. Section 4 presents the main results and, finally, the concluding remarks are presented in Section 5.

## **2. A Primer on Social Spending and Taxes in Chile**

In 2013, the year for which the incidence analysis is carried out, public social spending defined as the sum of social protection, education, health and housing accounted for 10.7 percent of the country’s GDP, and for 13.7 percent if contributory pensions are included in the definition, as is often done (Table 1). Education, health and social assistance are the three core concepts of social spending analyzed in this and 27 other assessments applying the same fiscal incidence methodology. The three concepts account, respectively, for 4.3, 3.8 and 1.6 percent of Chile’s GDP, which comparatively are around the average levels of the other 27 countries, but well below the comparable averages for the OECD: 5.3, 6.2 and 4.4 percent, respectively (Lustig, 2017a). Contributory pensions have a special treatment in the analysis, which is a matter on which there is no agreement in the fiscal incidence literature. Contributory pensions can be treated either as a government transfer, or as deferred income —i.e., treated as part of

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<sup>6</sup> For a definition of these income groups, see the end of Section 3.

the market income. The analysis for Chile takes a neutral stance on such treatment by carrying out the fiscal incidence analysis for both scenarios. The results using either option, however, do not affect the conclusions derived because of the small size of the pay-as-you-go system, and this paper presents the analysis considering contributory pensions as deferred income.

**Table 1: Structure of Chile's government spending, 2013**

Government spending	% of total expenditure	% of GDP	Included in analysis
<b>Total expenditure</b>	<b>100.00%</b>	<b>21.65%</b>	
<b>Social spending</b>	<b>63.14%</b>	<b>13.67%</b>	
Social protection	21.10%	4.57%	
Social assistance, of which:	7.59%	1.64%	
Conditional/unconditional cash transfers	1.96%	0.42%	Yes
Non-contributory pensions	4.05%	0.88%	Yes
Near-cash transfers	1.47%	0.32%	Yes
Other	0.11%	0.02%	No
Social security, of which:	13.51%	2.93%	
Old-age pensions	10.15%	2.20%	Yes
<i>Bonos de reconocimiento</i>	3.36%	0.73%	No
Education, of which:	19.80%	4.29%	
Pre-school	2.38%	0.51%	Yes
Primary	7.05%	1.53%	Yes
Secondary	4.03%	0.87%	Yes
Adults	0.31%	0.07%	Yes
<i>Diferencial</i>	1.23%	0.27%	Yes
Tertiary	4.11%	0.89%	Yes
Non-separable by level	0.69%	0.15%	Yes
Health, of which:	17.59%	3.81%	
Primary FONASA	3.36%	0.73%	Yes
Secondary/tertiary FONASA, MLE, FF.AA.	10.32%	2.23%	Yes
Sectoral investment	0.81%	0.18%	Yes
Supply of the national health system	0.04%	0.01%	Yes
Other	3.06%	0.66%	No
Housing and urban services of which:	4.65%	1.01%	No
<b>Subsidies, of which:</b>	<b>2.26%</b>	<b>0.49%</b>	
Energy	0.00%	0.00%	No
Water	0.20%	0.04%	Yes
Gas in the Magallanes region	0.09%	0.02%	Yes
Public transportation	1.96%	0.42%	Yes
<b>Infrastructure, of which:</b>	<b>1.46%</b>	<b>0.32%</b>	
Water and sanitation	0.55%	0.12%	No
Rural roads	0.92%	0.20%	No
<b>Defense spending</b>	<b>4.72%</b>	<b>1.02%</b>	<b>No</b>
<b>Other spending</b>	<b>28.41%</b>	<b>6.15%</b>	<b>No</b>

*Source:* Author's elaboration based on the 2013 executed budget published by Chile's Budget Office (Dirección de Presupuestos, DIPRES). *Notes:* Other spending includes, for instance, legislative spending, or expenditures on culture and sports. MLE = *Modalidad Libre Elección* (free-choice modality). FF.AA. = armed forces. The figures shown do not necessarily coincide with those published by multilateral organizations due to differences in concepts and definitions.

The first concept of social spending comprises all public expenditure on all levels of education, including government spending on both public and private educational institutions. Expenditure on health considers all public spending on primary, secondary and tertiary health care of the three systems: the National Health Fund (FONASA),<sup>7</sup> and the health care for the armed forces (CAPREDENA) and the police (DIPRECA).

The third concept, social assistance, is composed of unconditional and conditional cash transfers, non-contributory pensions, and near-cash transfers. Cash transfers include the cash benefits from Chile's flagship program (*Chile Solidario/Ingreso Ético Familiar*), the family allowances scheme of the subsystem for comprehensive early childhood protection (*Chile Crece Contigo*), non-contributory pensions (*Pensiones Solidarias*), and other allowances and special scholarships.<sup>8</sup> Near-cash transfers include complementary support for food and school texts, clothes and supplies.<sup>9</sup> An additional concept of public spending that is taken into account, but not as part of social spending, is that of subsidies, particularly for water, public transportation and gas in the Magallanes region, which account for 0.49 percent of the GDP. The water subsidy is targeted to low-income families who face difficulties to pay for running water services; that for public transportation is a generalized subsidy, benefiting all the user population; and that for gas is applied to all families living in the aforementioned region of the country.

Regarding Chile's income structure, in 2013 total government revenues represented 21 percent of the GDP, of which tax revenues accounted for about 80 percent (or 16.7 percent of the country's GDP) with a relatively higher dependence on indirect taxes on sales of goods and services (9.8 percent), than on direct taxes on income (6.6 percent)<sup>10</sup> (Table 2). For direct taxes, the incidence analysis considers only those on personal income: i) Second Category Tax (SCT), which is a monthly tax levied on income derived from dependent employment, such as salaries, contributory pensions and other remuneration; and ii) Complementary Global Tax (CGT), which is levied on annual total income obtained by an individual and any SCT paid or First

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<sup>7</sup> This considers the two modalities of FONASA: institutional and free-choice

<sup>8</sup> The following allowances of the flagship cash transfers program —related to social protection, child health, school attendance, school achievement, and female work— are considered in the analysis: *Bono de protección social y egreso*, *Bono base familiar*, *Bono por control del niño sano*, *Bono por asistencia escolar*, *Bono por logro escolar*, and *Bono al trabajo de la mujer*. In the case of *Chile Crece Contigo*, the following child, maternity, disability, and mental disability allowances are included: *Subsidio familiar al menor o recién nacido*, *Subsidio de asistencia maternal*, *Subsidio familiar a la madre*, *Subsidio familiar por invalidez*, and *Subsidio discapacidad mental*. Cash transfers for old-age and disabled population (*Pensiones Solidarias*) include: *Pensión Básica Solidaria de Vejez e Invalidez*, *Aporte Previsional Solidario de Vejez e Invalidez*, and *Pensiones de Leyes Especiales de Reparación*. Other benefits in cash include: *Bono bodas de oro*, *Bono de invierno*, *Bono marzo*, *Asignación Familiar*, *Subsidio empleo joven*, *Aporte estatal Fondo de Censatía Solidario*, *Descuento Cotizaciones de Salud*, *Beca Indígena*, *Beca Retención Escolar*, and *Beca Presidente de la República*.

<sup>9</sup> The near-cash transfers included in the analysis are: Programa Nacional de Alimentación Complementaria, Programa Nacional de Alimentación Complementaria para el Adulto Mayor, Programa de Alimentación Escolar, Yo elijo mi PC, and Útiles Escolares.

<sup>10</sup> Chile's tax burden of 16.7 percent of GDP, as reported by administrative data, does not necessarily coincide with the figures published by multilateral organizations due to differences in concepts and definitions. Using revenue statistics of the OECD (2016b), the tax burden in Chile in 2013 is placed close to the Latin American average, but well below (by about 12 percentage points) the tax burden of Argentina, Brazil and the OECD average.

Category Tax (FCT)<sup>11</sup> related to dividends received is creditable against it. The rates for both SCT and CGT range from 0 to 40 percent.

For indirect taxes, the analysis includes: i) the value added tax (VAT), which is levied at a rate of 19% on sales of goods and services; ii) special taxes on non-alcoholic and alcoholic beverages, which are charged in addition to the VAT and on the same tax base as that for VAT with varying rates depending on the alcohol content; iii) excise taxes levied on tobacco, which are charged on the value of the sale to the final consumer with varying rates depending on the product —i.e., cigars, processed tobacco, and cigarettes—; and iv) excise taxes on fuels, with a base determined by the amount of fuel expressed in cubic meters. Finally, social contributions from employees to health care, unemployment insurance, and contributory pensions are also included in the analysis. Contributions to health include FONASA, and the health systems of the armed forces (CAPREDENA) and police (DIPRECA).

**Table 2: Structure of Chile's government revenues, 2013**

Government revenues, contributions to social security and grants	% of total	% of GDP	Included in analysis
<b>Total</b>	<b>100.0%</b>	<b>21.0%</b>	
<b>Revenues</b>	<b>92.9%</b>	<b>19.5%</b>	
Tax revenues	79.6%	16.7%	
Direct taxes, of which:	31.5%	6.6%	
Personal income tax	6.3%	1.3%	Yes
Corporate income tax	17.6%	3.7%	No
<i>Adicional</i>	5.4%	1.1%	No
Others	2.2%	0.5%	No
Indirect taxes, of which:	46.7%	9.8%	
VAT	37.8%	7.9%	Yes
Sales tax (alcoholic/non-alcoholic beverages)	0.9%	0.2%	Yes
Sales tax (luxury goods, cars and others)	0.1%	0.0%	No
Excise taxes	6.9%	1.4%	Yes
Foreign trade taxes	1.1%	0.2%	No
Others	1.5%	0.3%	No
Non-tax accounts	-0.1%	0.0%	No
Non-tax revenues	13.3%	2.8%	No
<b>Contributions to social security</b>	<b>6.8%</b>	<b>1.4%</b>	
From employees	6.6%	1.4%	Yes
From employers	0.2%	0.0%	No
<b>Grants</b>	<b>0.2%</b>	<b>0.1%</b>	No

*Source:* Author's elaboration based on Dirección de Presupuestos (2014) and the 2009-2015 data on annual tax revenue published by Chile's Internal Revenue Service (Servicio de Impuestos Internos, SII).

<sup>11</sup> The FCT is levied on income from capital and from enterprises that undertake commercial, industrial, and other activities. The FCT paid by an enterprise can be used as a credit against the CGT to which its owners, shareholders, partners or managers are liable when they receive dividends.

### 3. Methodology, Data and Assumptions

The analysis follows the so-called CEQ methodology (Lustig and Higgins, 2013; Lustig, 2017b) to assess the distributional impact of taxes, transfers and subsidies across income groups in Chile in 2013 based on household-level data and administrative records on taxes and social spending. Basically, the methodology consists of defining income concepts first, and then allocating taxes, social contributions, subsidies and public social spending to individuals included in the household survey in a consistent and methodologically sound way, so that it is possible to compare incomes and income-based measures of wellbeing before and after taxes and public transfers.

The methodology comprises two standard scenarios depending on how contributory pensions are treated: as deferred income or as government transfers. In the analysis for Chile, each of both scenarios can be constructed by using two definitions of income that are employed in the estimation of official figures of income inequality and income-based poverty. The measurement of inequality in Chile uses a *monetary income* definition, which is composed of wages and salaries (monetary and in-kind), earnings from self-employment, self-provision of goods produced by the household, rents, interest, dividends, retirements, pensions, private transfers, and public monetary transfers. In the case of poverty, the measurement is based on a *total income* definition, which is equivalent to monetary income plus imputed rent. It is important to highlight that the methodology for measuring income changed in 2013 and that such new approach is the one employed in this paper. Specifically, household income is no longer adjusted to national accounts, and the new estimation of the imputed rent considers not only owner-occupied dwellings, but also dwellings which were donated, given as work benefit, or dwellings in usufruct.<sup>12</sup>

This paper exploits the 2013 National Socioeconomic Characterization Survey (CASEN) carried out by the Ministry of Social Development, which is a nationally representative sample collecting detailed information on household incomes, as well as on individual and dwelling characteristics. This survey is employed as the primary source of data in the incidence analysis as it is the official data set to measure the levels of poverty and income inequality in Chile. Since the CASEN does not collect information on household spending, the Family Budget Survey (EPF) 2011-2012 is employed as a secondary source to estimate indirect taxes on household consumption. This survey was carried out by the National Institute of Statistics and is aimed at identifying the structure and characteristics of final consumption of urban households in the regional capitals of the country. In addition, the analysis exploits official data on government revenues and expenditures from the 2013 executed budgets reports published by the Ministry of Finance's Budget Office, the Ministry of Social Development, the National Institute of Statistics, and the National Audit Office.

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<sup>12</sup> The official methodology for the measurement of poverty also changed. The new method incorporated new poverty lines based on updated values of both basic-food and basic non-food baskets, equated the value of the poverty lines between urban and rural areas, and adjusted the poverty lines based on equivalence scales.

In order to assess the distributional effects of fiscal interventions, the core building block of the fiscal incidence analysis is the definition and construction of the income concepts using the previous data sources (Figure 1). The allocation of fiscal interventions to individuals in the CASEN, depending on the income concept, is based on the following methods: *direct identification*, when the survey contains information on who receives (pays) benefits (taxes), as well as the amount received (paid); *imputation*, when the survey informs who receives (pays) benefits (taxes), but the amount received (paid) is retrieved from administrative records or program (tax) rules; *simulation*, when neither direct identification nor imputation can be used, so that the beneficiaries (taxpayers) and the amount received (paid) is simulated based on the program (tax) rules; and imputation based on *secondary sources*.<sup>13</sup>

The income reported in the CASEN is the income after direct taxes and social contributions, which is equivalent to the *net market income* concept—composed of wages and salaries from the formal and informal sectors, income from capital, private transfers such as remittances and alimonies, pensions, and imputed rent—and therefore the baseline for constructing the other income concepts. In order to construct *market income*, a “reverse engineering” process from net market income is implemented by simulating and adding direct taxes and social contributions based on fiscal rules.

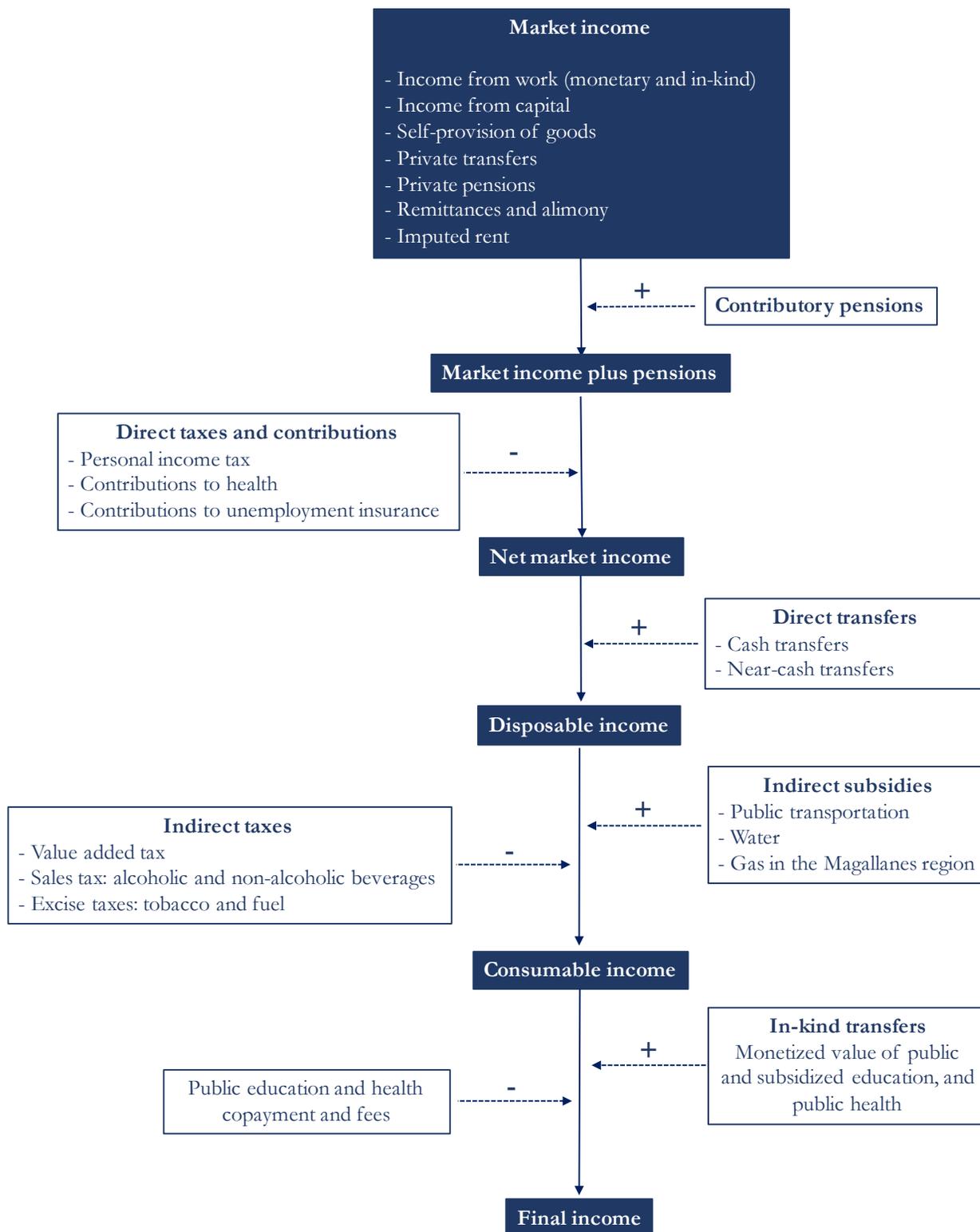
For direct taxes paid by each individual, taxes on salaries and remunerations (Second Category Tax, SCT) and taxes on other personal income (Complementary Global Tax, CGT) are allocated using simulation. This method applies the statutory rate and discount of each taxable income bracket defined by the Internal Revenue Service (IRS) to the taxable income reported by each individual in the CASEN. The taxable income for salaried workers is gross income minus bonuses for Christmas and national festivities and social security contributions, while for independent workers who report issuing invoices or receipts the taxable income is 70 percent of total annual gross income. For all the individuals, all rents before taxes are added up to calculate the CGT. Finally, given that the CASEN contains information of who receives income from profits withdrawal as well as the amount received, the tax paid on business income (First Category Tax, FCT) is calculated and used as a tax credit to the CGT. It is important to highlight that the following concepts are not included in the taxable income: tips, per diems, in-kind income, and auto-consumption. In addition, it is assumed that incomes from rental of non-agricultural properties,<sup>14</sup> vacation rentals, and self-employment in the informal sector do not pay income taxes. In the case of social contributions, the CASEN identifies who contributes to health care and to what system, and the amount of the contribution is allocated using simulation based on the level of income before taxes, the stipulated rates of each system, and the maximum and minimum taxable limits.

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<sup>13</sup> For a detailed description of these and other allocation methods, see Higgins and Lustig (2017).

<sup>14</sup> Either properties under the Decree-Law No. 2, or for the use of the owner and her/his family, or whose rents are less than 11 percent of the property valuation.

**Figure 1: Definition of income concepts in Chile's incidence analysis**



Source: Author's elaboration based on Higgins and Lustig (2017).

The construction of the *market income plus pensions* concept requires to add contributory pensions to market income. In Chile different contributory pension systems coexist: an individual capitalization system, and two pay-as-you-go schemes, namely the police and armed forces system and the old pension system of the former *Cajas de Previsión Social*. The individual capitalization is a system with compulsory, forced savings, and it is part of the market income concept—since the pension is the product of the individual’s savings—, while the two pay-as-you-go systems can be treated either as deferred income or as government transfer—since the share contributed by both the individual and the government is unknown. For the market income plus pensions concept, contributory pensions from the two pay-as-you-go schemes are treated as deferred income, and the allocation method is direct identification.

The *disposable income* concept is constructed by adding direct cash and near-cash transfers to net market income. For all cash transfers the allocation method is direct identification, while for all near-cash transfers the allocation method is imputation since although the CASEN identifies who receives the benefit, the amount is taken from administrative accounts.<sup>15</sup> The addition of subsidies and the discount of indirect taxes to/from disposable income yields the *consumable income* concept. In the first case, the analysis considers subsidies to water consumption, public transportation, and gas for the Magallanes Region. The allocation method for water subsidies is direct identification, whereas public transportation and gas subsidies are allocated using simulation. For each of the two latter subsidies, the total executed expenditure is divided by the total targeted population and the result is then scaled down to prevent overestimation bias.<sup>16</sup> Regarding indirect taxes, it is assumed that they are paid entirely by the consumers, and their estimation is based on the EPF which is used to calculate, by consumption decile, the shares of consumption spent on indirect taxes. Since these shares must be imputed to each individual’s disposable income in the corresponding consumption decile, it is necessary to rank individuals in the CASEN by consumption decile which requires both the CASEN and EPF surveys to interlock.

The estimation of indirect taxes in the EPF and the survey-to-survey imputation follows the hot-deck procedure used by Larrañaga et al. (2012) in their tax-benefit microsimulation model for Chile. In order to avoid a potential overestimation of the actual VAT rate paid and to be consistent with the CEQ methodology, a distinct feature in the treatment of the VAT between that microsimulation model and the incidence analysis presented in this paper is that the latter does not use the statutory rate (19 percent), but the effective rate (14.3 percent) which is based on the estimate of evasion (24.5 percent) in 2013.<sup>17</sup> For the estimation of the VAT, the analysis considers fiscal exemptions, being the most important those on health, education, insurance and financial operations, gambling, and cultural services. It also considers special sale taxes

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<sup>15</sup> In the case of the scholarships *Beca Indígena*, *Beca Retención Escolar*, and *Beca Presidente de la República*, although they are considered as cash transfers, the allocation method is imputation.

<sup>16</sup> For a detailed description of the scaling down procedure, see Higgins and Lustig (2017).

<sup>17</sup> The magnitude of VAT evasion was estimated by Chile’s Internal Revenue Service (Servicio de Impuestos Internos, 2015).

such as those on alcoholic and nonalcoholic beverages, and excise taxes such as those on tobacco and fuel.

The last income concept, *final income*, is constructed by adding the monetized value of in-kind transfers on education and health and by subtracting the corresponding copayments and fees for the use of such services to/from consumable income. For both education and health, the allocation method is imputation. In the first case, the CASEN allows to identify who attends an educational institution, the educational level attended, and the financing scheme of the institution —i.e., public, subsidized or private—, so that it is possible to impute the average cost of education disaggregated by level of education, financing scheme and, in the case of tertiary education, if the benefit is either received by the institution or the student. If the student is the recipient, the imputation is disaggregated by benefit, scholarship or credit, with the latter considering only the fee paid for the credits bought by the government under the *Crédito con garantía estatal* scheme (credit guaranteed scheme). In the case of health, the CASEN identifies who is affiliated to FONASA, DIPRECA or CAPREDENA systems, so that the analysis imputes the average cost based on the use of health services.

The assessment presented in this paper offers the most comprehensive tax-benefit incidence analysis available for Chile to date, and allows for the results to be comparable with other developing countries applying the same methodology. Yet, the results presented are point-in-time and do not account for behavioral, general equilibrium, or lifecycle effects, therefore overlooking the long-term effects of fiscal policy on wellbeing indicators. In addition, the analysis acknowledges the potential presence of measurement errors due to under-reporting of certain income categories and under-sampling of the top incomes in the household surveys.

The evidence presented in the next section, as mentioned before, corresponds to the scenario that considers contributory pensions as deferred income instead of as government transfer, and for comparability purposes with other countries the analysis uses the total income definition, instead of the monetary income definition, to account for the imputed rent. In pursuance of a better understanding of the incidence of fiscal policy in Chile, the following income groups are defined: *poor*, as those individuals with per capita income below the \$4 a day poverty line —distinguishing within this group the “ultra-poor” (living with less than \$1.25/day), the “extreme poor” (living on \$1.25-2.5/day), and the “moderate poor” (living on \$2.5-4/day)—; *vulnerable*, as those with per capita income between \$4 and \$10 a day; *middle class*, as those living on \$10-50/day; and *wealthy*, as those with per capita income above \$50/day.<sup>18</sup> The analysis also considers the incidence on the extreme and moderate poor as defined using the official poverty lines in Chile, as well as on income deciles.

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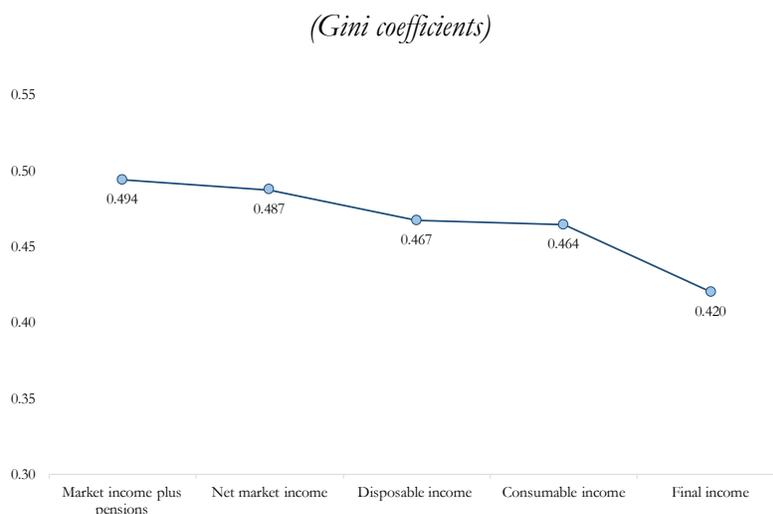
<sup>18</sup> The poverty line of \$1.25/day is the standard used by the World Bank to measure the incidence of poverty globally; its value corresponds to the average of the poverty lines of some of the poorest countries in the world. The \$2.5/day and \$4/day poverty lines are equivalent to the conditional mean of the national extreme and moderate poverty lines, respectively, across Latin American countries (conditional on GDP per capita). The thresholds to define the vulnerable, middle class, and upper class groups are those proposed by Lopez-Calva and Ortiz-Juarez (2014). All these figures are expressed in 2005 PPP prices.

## 4. Main Results

### 4.1 Redistributive effects of Chile's fiscal system

Are fiscal interventions in Chile equalizing? Figure 2 shows that income inequality in Chile, as measured by the Gini coefficient, declines from 0.494 to 0.467 when moving from market income plus pensions to disposable income<sup>19</sup>—i.e., after the intervention of direct taxes, social contributions to health and unemployment insurance, and direct transfers—.

**Figure 2: Effects of fiscal interventions on income inequality**



*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

When analyzed independently, social contributions to health and unemployment insurance are found to be regressive with respect to market income plus pensions, with a Kakwani's progressivity index of -0.17, whereas both direct taxes and direct transfers are progressive with a Kakwani index of 0.45 and 0.82, respectively<sup>20</sup>. This is not a surprising result given the design of the two latter interventions. As Figure 3 shows, the lion's share of total direct taxes (89 percent) is paid by the wealthy (composed by 6.7 percent of Chile's population), and the remaining 11 percent is paid almost entirely by the middle-class group that accounts for more than half of the country's population. The share of direct taxes paid is negligible (0.02 percent) for the third of the population identified as vulnerable, whereas the 7.5 percent of the poor population likely do not pay this kind of taxes.<sup>21</sup> Regarding the concentration of direct

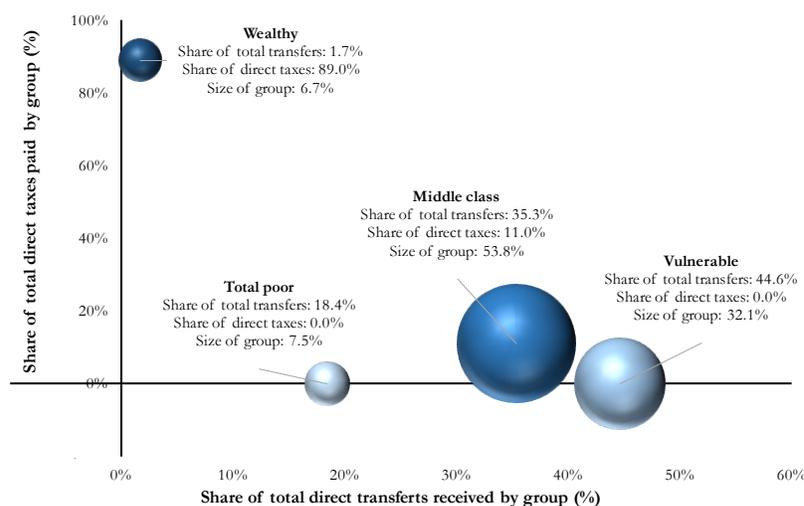
<sup>19</sup> The Gini coefficients shown in Figure 2 are different from the official estimates because the latter uses the monetary income definition which excludes the imputed rent, whereas this paper uses the total income definition to include it therefore allowing for cross-country comparisons. If the imputed rent is excluded from the analysis, for instance, the Gini coefficient for disposable income would be 0.490 instead of 0.467, which is virtually the same value as that reported by the Ministry of Social Development (2016): 0.491.

<sup>20</sup> The Kakawani index for all fiscal interventions analyzed is shown in the appendix Table A1.

<sup>21</sup> If the concentration of direct taxes is analyzed by income deciles instead of income groups, the results are strongly consistent with the findings by Engel, Galetovic and Raddatz (1999), and Castelletti (2013).

transfers —i.e., who receives the benefits—, the same Figure 3 shows that almost two-thirds of the total amount is received by the poor (18.4 percent) and the vulnerable (44.6 percent), whereas the middle-class accounts for most of the remaining share (35.3 percent).

**Figure 3: Concentration of total direct taxes paid on personal income and total direct transfers received, by income group**



*Source:* Author’s elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016). *Notes:* The “Total poor” group includes the share of the population living in ultra (0.8 percent), extreme (2 percent) and moderate (4.7 percent) poverty, based on the total market income plus pensions concept. The income thresholds to define the groups are the following: less than \$1.25/day for the ultra-poor, \$1.25-2.5/day for the extreme poor, \$2.5-4/day for the moderate poor, \$4-10/day for the vulnerable, \$10-50/day for the middle class, and above \$50/day for the wealthy. The size of the bubbles is relative to the size of each group as measured with total market income plus pensions.

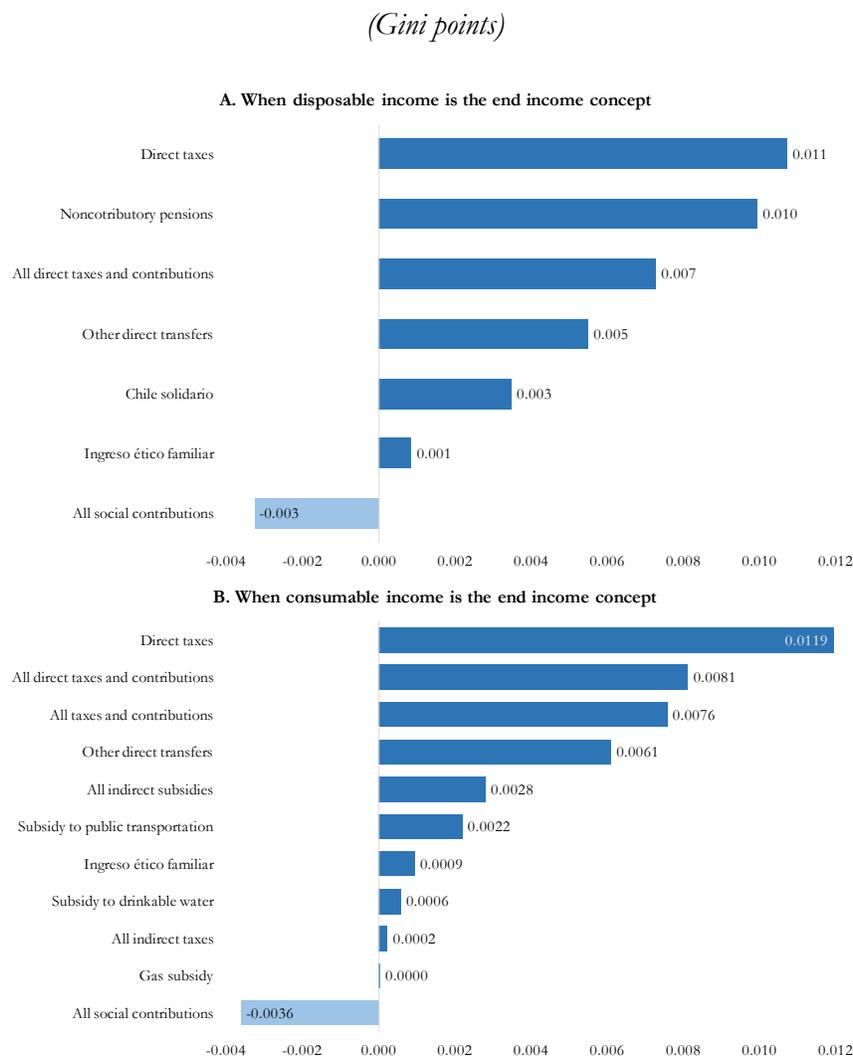
The Kakwani index, however, cannot tell if these and other fiscal interventions make the whole fiscal system more (un)equal,<sup>22</sup> because the effect of a tax or transfer is not independent from the effect of other interventions. Therefore, in order to answer the initial question marginal contributions are used, which are equivalent to calculate the difference in inequality without and with a specific tax or transfer.<sup>23</sup> Taking disposable income as the relevant end income concept, the marginal contributions of most of the previous fiscal interventions are equalizing, with the only exception of social contributions to health and unemployment insurance that show an unequalizing effect. Specifically, direct taxes and non-contributory

<sup>22</sup> When taxes or transfers are seen as single, independent interventions the Kakwani index is sufficient to unambiguously establish that a progressive (regressive) tax or transfer is equalizing (unequalizing). In a multi tax/transfer setting, however, this direct relationship does not necessarily hold (Lambert, 2001). The Kakwani (1977) index for taxes is defined as the difference between the concentration coefficient of a tax and the Gini coefficient of pre-tax income. The index for transfers is defined as the difference between the Gini coefficient of pre-transfer income and the concentration coefficient of a transfer.

<sup>23</sup> The marginal contribution of a tax (transfer) to inequality is calculated by taking the difference between the Gini coefficient of the relevant end income concept without the tax (transfer) and the Gini coefficient of the relevant end income concept with the tax (transfer). Because of path dependency, the sum of the marginal contributions of each fiscal intervention will not be equal to the total change in inequality (Enami, Lustig and Aranda, 2017).

pensions have the largest impact on the decline in inequality, with a marginal contribution of about 0.01 Gini points (Figure 4.A).

**Figure 4: Marginal contributions of fiscal interventions to income inequality**



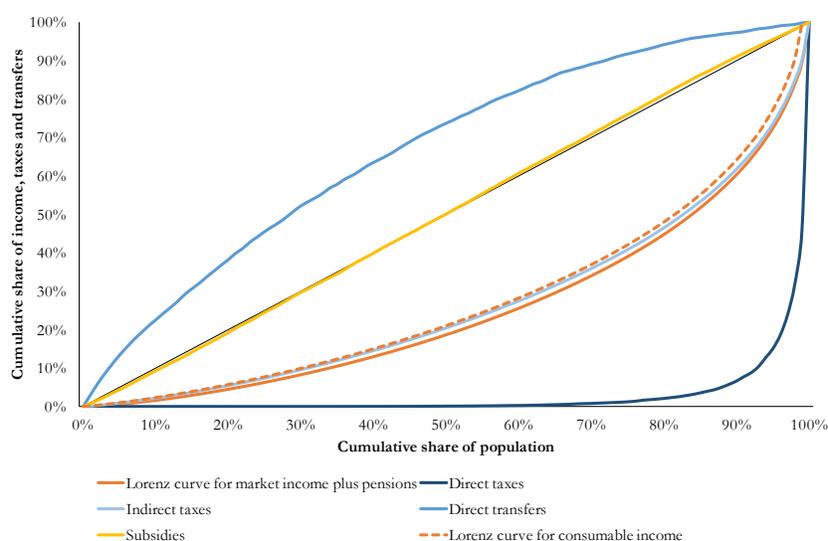
*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

Moving from disposable income to consumable income further reduces the Gini coefficient to 0.464 (Figure 2), which is indicative of a remarkable finding: the net effect of adding indirect subsidies and subtracting indirect taxes to/from disposable income is surprisingly equalizing. As Figure 4.B shows, this is not only due to the positive marginal contribution of indirect subsidies to the inequality reduction, but also because indirect taxes have a slightly positive effect despite their regressivity, as indicated by a Kakwani index of -0.03. The latter result is referred in the literature as the Lambert's Conundrum (Lambert, 2001), which states that *"If taxes are regressive in relation to the original income but progressive with respect to the less unequally distributed*

*post-transfers (and subsidies) income, regressive taxes exert an equalizing effect over and above the effect of progressive transfers” (Enami, Lustig, and Aranda, 2017).<sup>24</sup>*

As noted, indirect taxes in Chile are regressive with respect to market income plus pensions (the original income), but they are progressive with respect to disposable income (the less unequally distributed post-transfers income), as indicated by a Kakwani index of 0.09. Indirect taxes, therefore, exert an equalizing effect over and above the effect of progressive direct taxes and direct transfers. This finding evidences that the redistributive impact of fiscal interventions must be assessed by considering the whole system and not as isolated tools, which in turn could lead to misleading policy conclusions.<sup>25</sup> Overall, when taking consumable income as the end concept, only social contributions and the subsidy to gas exhibit, respectively, a negative and neutral effect on inequality, whereas both direct taxes and transfers account for the largest positive marginal contributions (Figure 4.B). The overall equalizing effect of taxes and direct transfers is unambiguous as the Lorenz curve for consumable income lies completely above the Lorenz curve for market income plus pensions (Figure 5).

**Figure 5: Concentration and Lorenz curves**



Source: Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

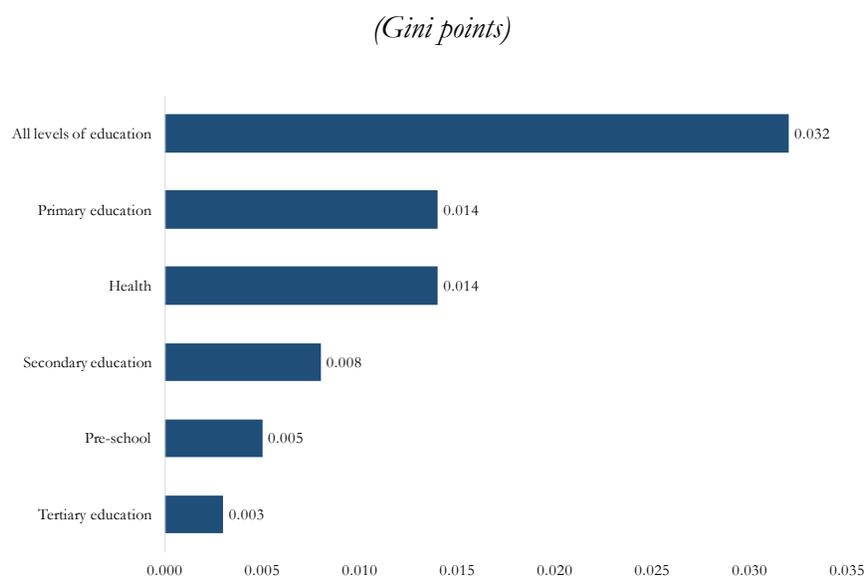
Finally, in-kind transfers in the form of education and health services have an even larger positive effect on inequality when moving from consumable income to final income: the Gini coefficient reduces to 0.420, equivalent to a 15 percent decline relative to market income plus pensions (Figure 2). The marginal contributions to inequality reach 0.032 Gini points for education, and 0.014 Gini points for health, and the equalizing effect holds for all levels of

<sup>24</sup> Enami, Lustig and Aranda (2017) offer a detailed theoretical explanation regarding this counterintuitive result.

<sup>25</sup> Recently, Eduardo Engel found the same Lambert's conundrum in the Chilean system using the same data exploited in Engel, Galetovic and Raddatz (1999).

education, as indicated by their positive marginal contribution to inequality (Figure 6)<sup>26</sup>. The large effect of in-kind transfers on inequality is not surprising given that Chile spends significantly more on education and health care (roughly 8.1 percent of the GDP) than on direct transfers and pensions (1.6 percent of the GDP). Yet, such result must be interpreted with caution because in-kind transfers are monetized at average government cost, which does not necessarily reflect the actual value of the education and health services provided and there are no adjustments for differences in quality across the distribution. The method assumes that a poor person living in rural areas receives the same benefit as an urban middle-class person, for instance.

**Figure 6: Marginal contributions of in-kind transfers to income inequality**



*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

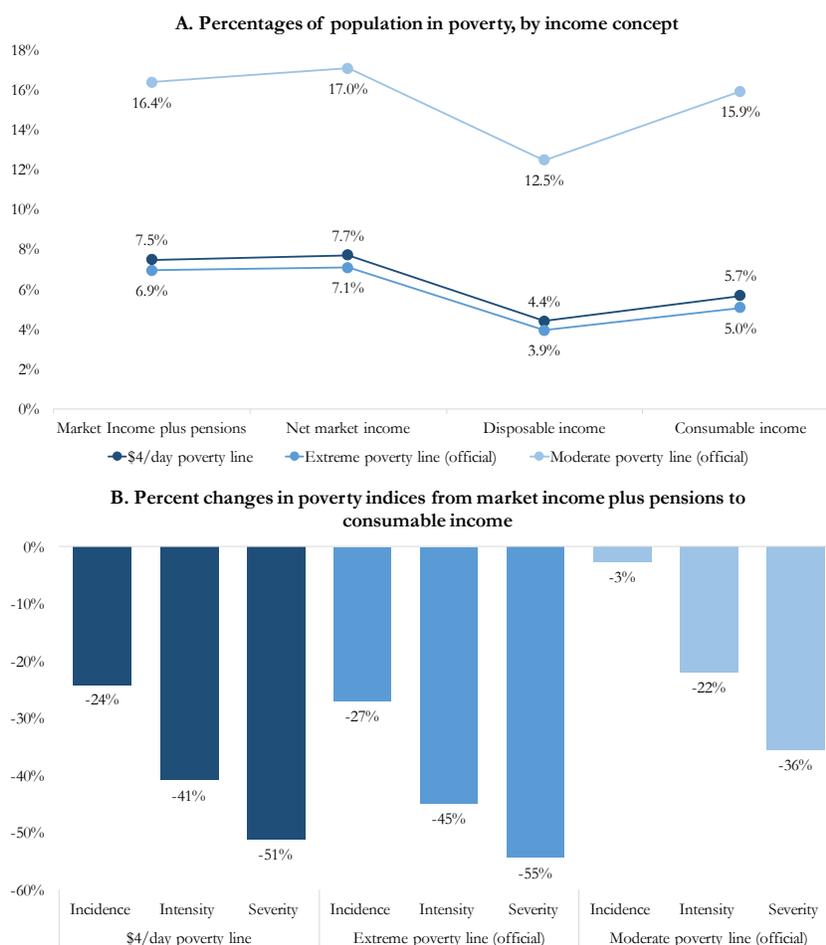
While most fiscal interventions in Chile are found to be equalizing, a second fundamental question then emerges: Are fiscal interventions also poverty-reducing? While as expected direct taxes and social contributions increase the incidence of poverty (Figure 7.A) —which is mostly driven by social contributions as the population in poverty likely does not pay direct taxes—, direct transfers more than compensate this effect. Specifically, poverty headcounts decline by nearly 3 percentage points (or around 40 percent) with respect to market income plus pensions for both the official extreme and \$4/day poverty lines, and by 4 percentage points (or 24 percent) for the official moderate poverty line.

While indirect taxes, as expected, increase the incidence of poverty when moving from disposable income to consumable income, the effect is not large enough to nullify the gains

<sup>26</sup> A summary of the marginal contributions for all fiscal interventions analyzed is shown in the appendix Table A1.

from direct transfers —and also from subsidies, which exhibit a positive marginal contribution to poverty (Figure 8)—, therefore placing the consumable income-based poverty still below the incidence measured with market income plus pensions: 1.8 percentage points (or 24 percent) below by using the \$4/day poverty line; 1.9 points (or 27 percent) below by using the official extreme line; and half a point (or 3 percent) below by using the official moderate line.<sup>27</sup> Moreover, after the intervention of taxes, subsidies and direct transfers not only the incidence of poverty declines, but also the depth of poverty (intensity) and the magnitude of inequality among the poor (severity) fall remarkably (Figure 7.B).

**Figure 7: Effects of fiscal interventions on poverty**



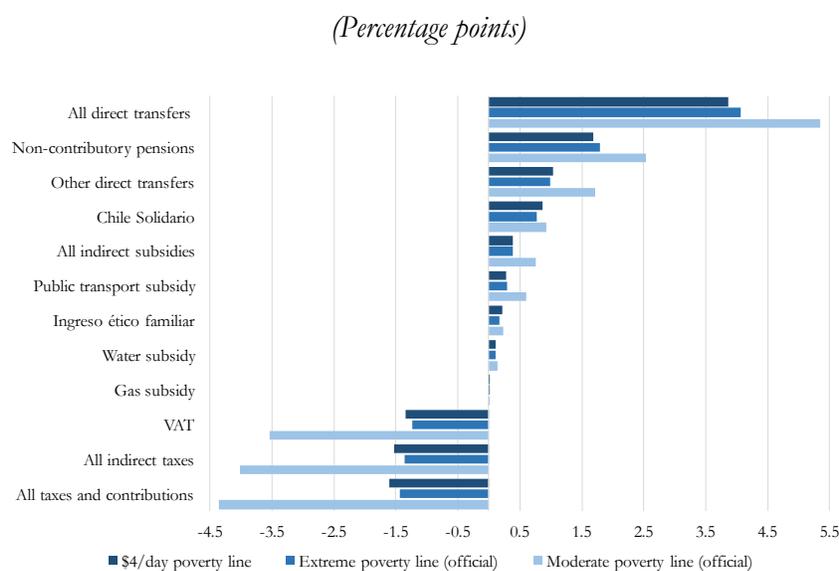
*Source:* Author’s elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016). *Notes:* The indices measuring the incidence, intensity, and severity of poverty correspond to the FGT family of poverty indices (Foster, Greer and Thorbecke, 1984). The incidence represents the percentage of population under the poverty line; the intensity index, also known as the poverty gap,

<sup>27</sup> The official extreme and moderate poverty rates in 2013 are, respectively, 4.5 and 14.4 percent, and these figures are conceptually comparable with the poverty rates resulting from the disposable income concept in this paper: 3.9 and 12.5 percent, respectively. The differences occur because the methodology implemented in this paper includes the near-cash transfers as part of direct transfers, whereas near-cash transfers are not considered in the income used by the Ministry of Social Development in the estimation of national poverty rates.

measures the shortfall from the poverty line as a share of the same poverty line; and the severity index measures the magnitude of the inequality among the poor.

A breakdown of the fiscal system after the intervention of taxes, subsidies and direct transfers reveals that the latter have the largest positive marginal contributions to the reduction of the incidence of poverty: between 3.9 and 5.3 percentage points, depending on the poverty line used. In particular, non-contributory pensions account for between 1.7 and 2.5 percentage points of the poverty decline, whereas *Chile Solidario* and *Ingreso ético familiar* are responsible for 0.9 and 0.2 percentage points, respectively (Figure 8). The contribution of indirect subsidies to the poverty decline is overall positive, yet modest for public transport and water subsidies, and virtually neutral for gas subsidies in the Magallanes region. Finally, and not surprisingly, indirect taxes exert an important adverse effect on the incidence of poverty, although in a magnitude that it is significantly lower than that of the positive contributions exerted by direct transfers.

**Figure 8: Marginal contributions of fiscal interventions to poverty**



*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

An underlying significance of previous results is that the net effect of fiscal interventions favors upward economic mobility, especially among the poorest. Of the total ultra-poor, 39 percent move to extreme poverty, 16 percent to moderate poverty, and 14 percent to vulnerability. Among those initially identified as extreme poor, 45 percent experience upward mobility to moderate poverty and 24 percent to vulnerability, whereas 53 percent of the moderate poor exit poverty. Conversely, 2 and 6 percent of those initially identified as middle class and wealthy, respectively, experience downward mobility (Table 3.A). A different way to

appreciate the overall effect of fiscal policy is that if the country's population is reduced to 100 individuals, then: the number of people living with less than \$4/day declines from 8 to 4; that of vulnerable increases from 32 to 34; that of middle class also increases, from 54 to 55; and that of the wealthy reduces from 7 to 6 individuals (Table 3.B).

**Table 3: Fiscal mobility matrices from market income plus pensions to consumable income**

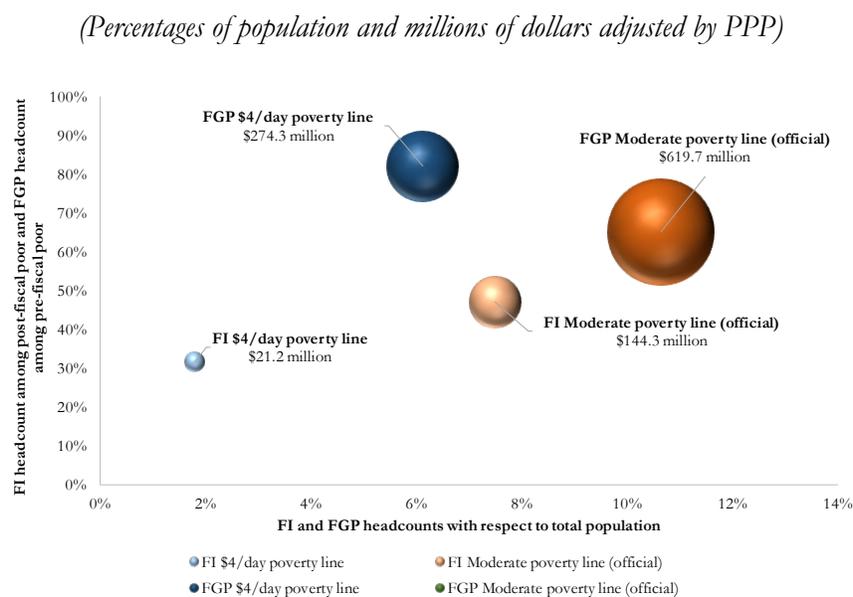
Initial/ending income concept and income groups		B. Row percentage distribution of population						
		Consumable income						
		Ultra-poor	Extreme poor	Moderate poor	Vulnerable	Middle class	Wealthy	Total
Market income plus pensions	Ultra-poor	30%	39%	16%	14%	0%	0%	100%
	Extreme poor	0%	31%	45%	24%	0%	0%	100%
	Moderate poor	0%	0%	47%	53%	0%	0%	100%
	Vulnerable	0%	0%	0%	93%	7%	0%	100%
	Middle class	0%	0%	0%	2%	98%	0%	100%
	Wealthy	0%	0%	0%	0%	6%	94%	100%
Initial/ending income concept and income groups		A. Total percentage distribution of population						
		Consumable income						
		Ultra-poor	Extreme poor	Moderate poor	Vulnerable	Middle class	Wealthy	Total
Market income plus pensions	Ultra-poor	0.2%	0.3%	0.1%	0.1%	0.0%	0.0%	0.8%
	Extreme poor	0.0%	0.6%	0.9%	0.5%	0.0%	0.0%	2.0%
	Moderate poor	0.0%	0.0%	2.2%	2.5%	0.0%	0.0%	4.7%
	Vulnerable	0.0%	0.0%	0.0%	29.8%	2.4%	0.0%	32.2%
	Middle class	0.0%	0.0%	0.0%	0.9%	52.7%	0.0%	53.6%
	Wealthy	0.0%	0.0%	0.0%	0.0%	0.4%	6.3%	6.6%
	Total	0.2%	0.9%	3.3%	33.8%	55.5%	6.3%	100.0%

Source: Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

Overall, the net effect of fiscal interventions in Chile is both equalizing and poverty-reducing, yet it is unknown the extent to which such interventions make the pre-fiscal poor either poorer or better off. In order to explore the extent to which a fiscal system like Chile's hurts and benefits the poor, Higgins and Lustig (2016) developed a set of innovative measures to capture the magnitude of the so-called fiscal impoverishment (FI) and the fiscal gains to the poor (FGP). The authors define an individual as fiscal impoverished if she/he is poor according to her/his post-fiscal income (i.e., after taxes and transfers), and such income is lower than her/his pre-fiscal income (i.e., the amount paid in taxes is higher than the amount received in transfers). On the other hand, an individual experiences fiscal gains when she/he is poor according to her/his pre-fiscal income (i.e., before taxes and transfers) and such income is lower than her/his post-fiscal income (i.e., the amount received in transfers is higher than the amount paid in taxes). In addition to the headcounts, the monetary amounts of FI and FGP can be computed. The first amount equals the sum of the fall in income for the pre-fiscal poor, plus the difference between the poverty line and the income (i.e., the poverty gap) for those pre-fiscal non-poor but post-fiscal poor. The second amount is calculated as the sum of the increase in income for the pre-fiscal poor who remain poor after taxes and transfers, plus the pre-fiscal poverty gap for the pre-fiscal poor who escaped poverty after taxes and transfers.

Using both the \$4/day and official moderate poverty lines, Figure 9 draws both the FI and FGP headcounts with respect to the country's population over the x-axis, whereas the y-axis reflects the FI headcount among the post-fiscal (consumable income) poor and the FGP headcount among the pre-fiscal (market income plus pensions) poor—the size of the bubbles is relative to the total monetary amounts of both FI and FGP—. A first result is that fewer individuals are impoverished in comparison to the number of fiscal gainers after the intervention of taxes, subsidies and direct transfers. Using the \$4/day poverty line, 1.8 percent of Chile's population (or 31.6 percent of the post-fiscal poor) are impoverished, whereas 6.1 percent of the total population (or 82 percent of the pre-fiscal poor) are fiscal gainers. If the official moderate poverty line is employed instead, the proportion of impoverished (7.5 percent of the total, or 47.1 percent of the post-fiscal poor) is lower than that of the fiscal gainers (10.6 percent of the total, or 65.1 percent of the pre-fiscal poor). A second result is that the magnitude of annual fiscal gains (274.3 million dollars) is almost 13 times larger than that of FI (21.2 million dollars) when using the \$4/day poverty line, whereas the ratio is slightly above 4 times when using the official moderate poverty line (with 619.7 million dollars of FGP and 144.3 million dollars of FI).<sup>28</sup>

**Figure 9: Headcounts and amounts of fiscal impoverishment and fiscal gains to the poor**



<sup>28</sup> When using the \$4/day poverty line, these annual amounts are equivalent in Chilean pesos to roughly 137,700 million for fiscal gains and around 10,660 million for FI. For the official moderate poverty line the amounts are nearly 311,300 and 72,470 million of Chilean pesos, respectively. The headcounts and amounts of FI and FGP for the official extreme poverty line are relatively similar to those for the \$4/day poverty line. The proportion of impoverished reaches 1.6 percent of the total population (or 31.2 percent of the post-fiscal poor), whereas that of fiscal gainers reaches 5.7 percent of the total population (or 82.9 percent of the pre-fiscal poor). Regarding the amounts, annual fiscal gains are 296.7 million dollars (or roughly 149,000 million Chilean pesos) and annual FI 19.2 million dollars (or nearly 9,600 million Chilean pesos).

*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016). *Notes:* The size of the bubbles is relative to the total monetary amounts of FI and FGP. The amounts are annual and expressed in millions of dollars adjusted by PPP at 2005 prices. The headcounts and amounts of FI and FGP for the official extreme poverty line are close to those for the \$4/day poverty line and therefore excluded from the graph in order to avoid an overlapping of the bubbles.

The previous analysis yields an additional interesting finding. The 7.5 percent of Chile's population experiencing fiscal impoverishment—equivalent to nearly 1.3 million individuals whose post-fiscal income is lower than both the official moderate poverty line and their pre-fiscal income—lives in 0.37 million households out of which the 69 percent are not recipients of any of the main direct transfers analyzed, including *Chile Solidario*, *Ingreso Ético Familiar* or non-contributory pensions. This is of significance as 84 percent of the fiscal impoverished are members of households identified as poor according to the official definition.

A last, fundamental question to resolve is who benefits more from Chile's social spending through in-kind transfers of education and health services. Figure 10.A shows that the distribution of total social spending on education and health tends to fall with market income plus pensions—that is, the share of total benefits received is higher the poorer the households—. The first decile, composed by the poor, receives 13.6 percent of total spending, whereas the tenth decile, composed mostly by wealthy individuals, receives just above 5 percent. Moreover, half of total spending is distributed among the bottom 40 percent of Chile's distribution, which is composed entirely by poor and vulnerable individuals.<sup>29</sup> That pattern holds when total spending is disaggregated by component, with the only exception being the social spending on tertiary education, which seems disproportionately distributed among the upper deciles.

In fact, when looking at its concentration, almost 15 percent of the total spending on tertiary education in Chile goes to the tenth decile, which is twice the share received by the bottom 10 percent of the population: 6.7 percent (Figure 10.B). In terms of its incidence, when social spending on tertiary education is analyzed as share of income in each decile, such share is higher for the first decile (4.8 percent) than for the tenth decile (0.4 percent), a result that is consistent with the positive marginal contribution to inequality (0.003) found previously, indicating that this component of social spending exerts a slightly equalizing effect.

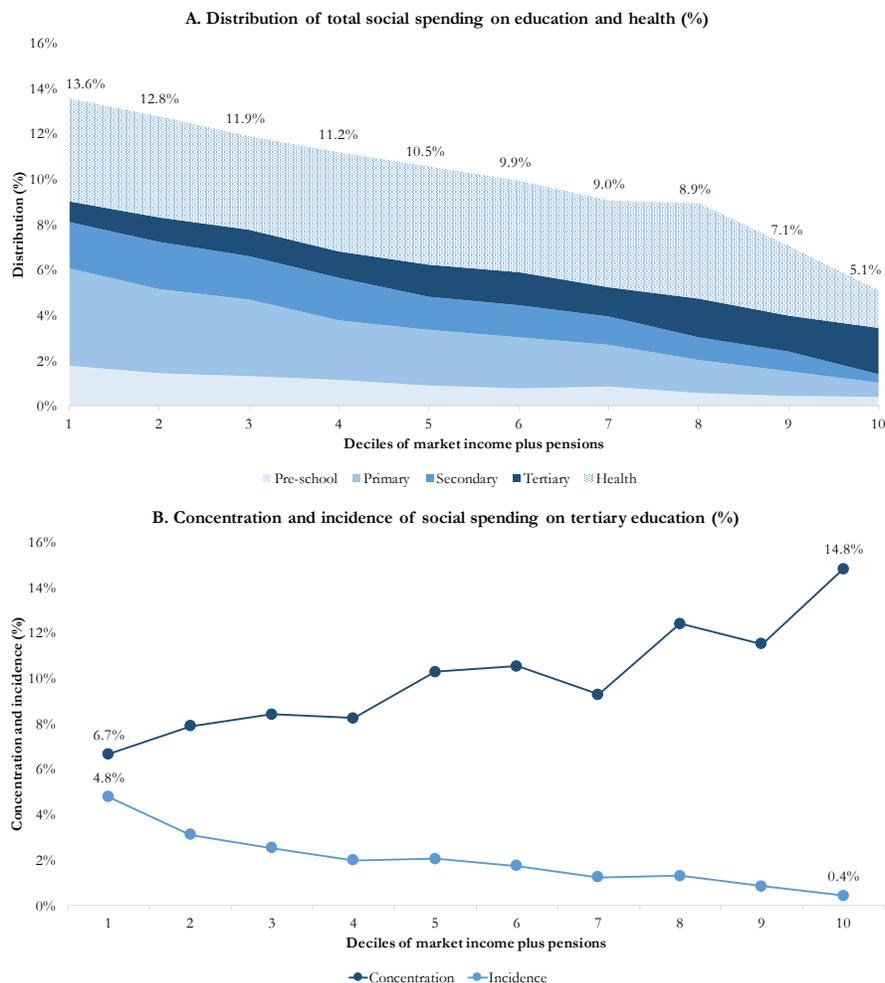
While social spending on tertiary education is slightly equalizing, this intervention is not pro-poor as indicated by its positive concentration coefficient (Figure 11). In fact, most of the interventions through public spending analyzed in this paper are equalizing (positive marginal contributions). Among them, the most pro-poor (negative concentration coefficients) are direct transfers followed by primary education, pre-school and secondary education. The water

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<sup>29</sup> The values of the ultra-poor (\$1.25/day), extreme (\$2.5/day), and moderate (\$4/day) poverty lines lie, respectively, at the first, third, and eight percentiles of the income distribution. The value of the \$10/day threshold dividing the vulnerable and the middle class lies at the 40<sup>th</sup> percentile, whereas the \$50/day line dividing the middle-class and the wealthy lies at the 94<sup>th</sup> percentile.

**Figure 10: Distribution of total social spending on education and health, and concentration and incidence of social spending on tertiary education**

*(Percentages by deciles of market income plus pensions)*

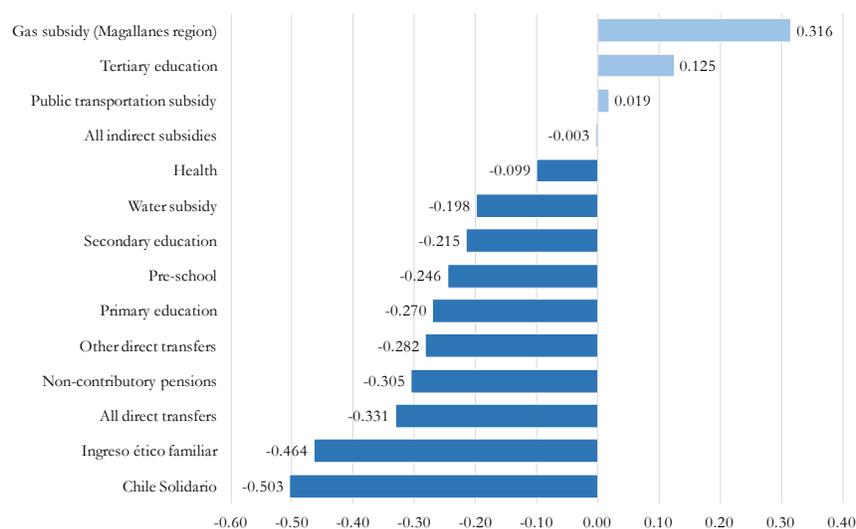


*Source:* Author’s elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016). *Notes:* The sum of the areas measured in the panel A equals 100 percent.

subsidy and social spending on health are also somewhat pro-poor. In the case of the subsidy to public transportation it is slightly equalizing but not pro-poor, whereas the subsidy to gas exerts a neutral effect on inequality (zero marginal contribution) and it is also not pro-poor<sup>30</sup>—the latter is not surprising given that the gas subsidy uses a geographical targeting and it does not consider the poverty status of the population—.

<sup>30</sup> The concentration coefficients for all fiscal interventions analyzed is shown in the appendix Table A1.

**Figure 11: Concentration coefficients of social spending and public spending on subsidies**



*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016).

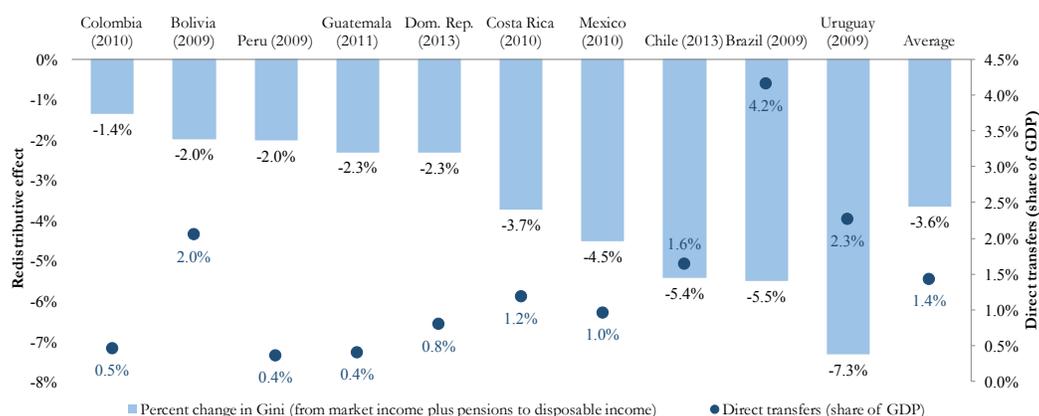
#### 4.2 Fiscal redistribution in Chile: A comparative perspective

The redistributive effect of direct transfers, measured as the percent change in the Gini coefficient from market income plus pensions to disposable income, is particularly larger in Chile (5.4 percent) than in other Latin American countries with a comparable fiscal incidence analysis: it is well above the average, and between 2.3 and 4 times larger than the effect found in Dominican Republic, Guatemala, and the Andean countries. A salient result is that although spending on direct transfers as a share of GDP is lower in Chile (1.6 percent) than in Bolivia (2 percent), the redistributive gains are as much as 2.7 times larger in the former. Moreover, Chile achieves the same redistributive gains than Brazil (5.5 percent) with a significantly lower volume of direct transfers relative to GDP (Figure 12). Yet, Chile's redistributive effect of direct transfers is well below the effect observed in Uruguay (7.3 percent), and in all Eastern European countries shown in Figure 13 for which the comparison is possible.

For instance, in Georgia, a country with a similar Gini coefficient for market income plus pensions (0.483) as Chile's (0.494), the redistributive effect reaches 18.4 percent after deducting (adding) direct taxes (transfers) from/to disposable income, placing the Gini coefficient at 0.349. The magnitude of the redistributive effect is also similar in Poland (17.1 percent), although this country exhibits a Gini coefficient for market income plus pensions significantly lower (0.410). When social spending on education and health is considered, the inequality-reducing effect in Chile (15 percent) —relative to market income plus pensions— surpasses that of Armenia (11.4 percent) and levels that of the Russian Federation (15.6 percent), but it remains well below the effect found in Georgia (19.3 percent) and Poland (31.7 percent) (it is worth noting that when moving from disposable to consumable income —i.e.,

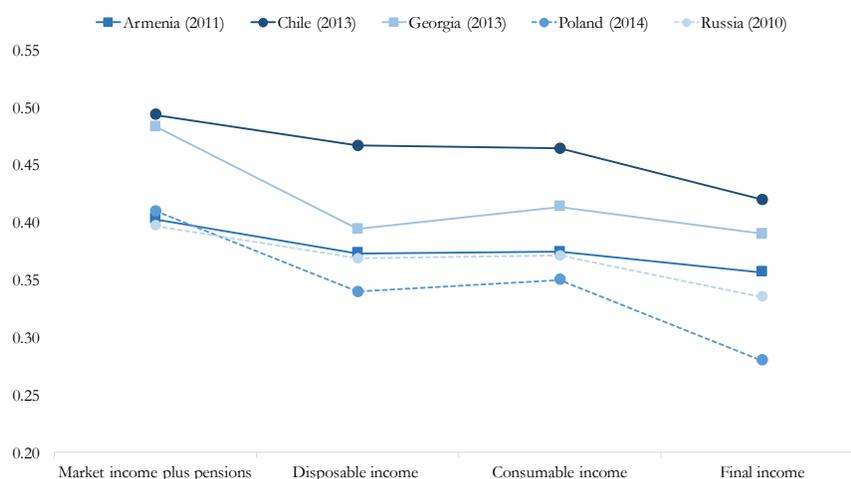
when considering indirect taxes and subsidies— only Chile exhibits a decline in the Gini coefficient, which is the result of the aforesaid Lambert’s conundrum).

**Figure 12: Redistributive effects and social spending on direct transfers in selected Latin American countries**



*Source:* Author’s elaboration based on the following works: Bolivia (Paz Arauco et al., 2014); Brazil (Higgins and Pereira, 2014); Chile (Martínez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martínez, 2015); Costa Rica (Sauma and Trejos, 2014); Dominican Republic (Aristy-Escuder et al., 2016); Guatemala (Cabrera and Moran, 2016); Mexico (Scott, 2014); Peru (Jaramillo, 2014); and Uruguay (Bucheli et al., 2014). *Notes:* The year for which the country analysis was conducted is shown in parentheses in each bar of the graph. The average is the simple mean of the percent changes by country. The figures shown in the graph may slightly differ from those originally published in the works cited due to recent updates of the CEQ methodology.

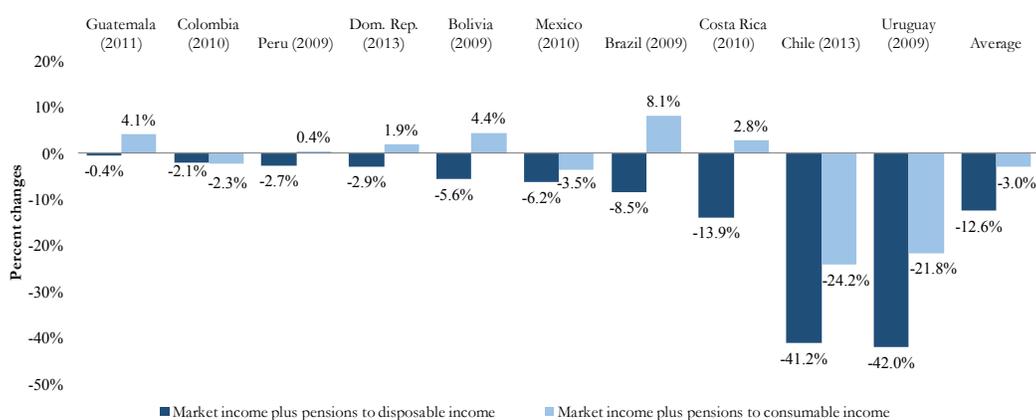
**Figure 13: Inequality dynamics in Chile and selected countries in Eastern Europe**



*Source:* Author’s elaboration based on the following works: Armenia (Younger and Khachatryan, forthcoming); Chile (Martínez-Aguilar and Ortiz-Juarez, 2016); Georgia (Cancho and Bondarenko, forthcoming); Poland (Goraus and Inchauste, 2016); and Russia (Lopez-Calva et al., forthcoming). *Note:* The year for which the country analysis was conducted is shown in parentheses in each country label of the graph.

Regarding the influence of direct transfers on poverty, Figure 14 shows that they can reduce the incidence of poverty in Chile by 41.2 percent with respect to the market income plus pensions concept, a change that is similar to that observed in Uruguay (42 percent) and threefold the regional average (12.6 percent). The intervention of indirect taxes and subsidies in Chile halves the magnitude of such reduction (24.2 percent), although it remains large enough to position Chile as the best performer among the Latin American countries with a comparable assessment. In startling contrast, in countries like Bolivia, Brazil, Costa Rica, Dominican Republic and Guatemala the effect of indirect taxes and subsidies on poverty more than compensates the gains from direct transfers.

**Figure 14: Poverty-reducing effects in selected Latin American countries**



*Source:* Author's elaboration based on the following works: Bolivia (Paz Arauco et al., 2014); Brazil (Higgins and Pereira, 2014); Chile (Martínez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martínez, 2015); Costa Rica (Sauma and Trejos, 2014); Dominican Republic (Aristy-Escuder et al., 2016); Guatemala (Cabrera and Moran, 2016); Mexico (Scott, 2014); Peru (Jaramillo, 2014); and Uruguay (Bucheli et al., 2014). *Notes:* The incidence of poverty is measured according to the \$4/day poverty line. The year for which the country analysis was conducted is shown in parentheses in each bar of the graph. The average is the simple mean of the percent changes by country. The figures shown in the graph may slightly differ from those originally published in the works cited due to recent updates of the CEQ methodology.

## 5. Summing up

The results from the fiscal incidence analysis presented in this paper indicate, in general, that fiscal interventions in Chile exert a positive net effect in reducing poverty and inequality, and favor upward economic mobility, especially among the poorest. In particular, subsidies to public transportation and water exert a positive, yet modest effect on poverty and inequality, whereas the effects of gas subsidy are mostly neutral. Direct transfers are progressive (i.e., the benefits as share of pre-fiscal income decline with income), as well as equalizing and poverty-decreasing (i.e., direct transfers show positive marginal contributions to both inequality and poverty). In terms of their effect on poverty, for instance, direct transfers reduce the incidence by 4-5 percentage points, depending on the poverty line used, with non-contributory pensions and the flagship cash transfer scheme (*Chile Solidario/Ingreso Ético Familiar*) accounting for the

lion's share of such reduction. Direct transfers are also pro-poor, as indicated by their negative concentration coefficient (i.e., per capita benefits from direct transfers decline with income).

On the other hand, direct taxes on personal income are found to be equalizing and poverty-neutral; social contributions are unequalizing and poverty-increasing; and indirect taxes are poverty-increasing, but they exert a slight equalizing effect. This counterintuitive result (the so-called Lambert's conundrum) is feasible because indirect taxes, although regressive relative to pre-fiscal income (market income plus pensions), are found to be progressive with respect to the less unequally distributed post-transfers income (disposable income). In other words, indirect taxes exert an equalizing effect over and above the effect exerted by progressive direct taxes and direct transfers. As discussed by Enami, Lustig and Aranda (2017), the latter is not equivalent to ascertain that regressive taxes can be fine as long as the net effect of the whole fiscal system is equalizing, but rather that such net effect with a regressive tax, relative to pre-fiscal income, can be more equalizing than without the tax.

Regarding in-kind transfers in the form of education and health, all the interventions are equalizing, being social spending on primary and secondary education and health the ones with the largest effect on inequality. The latter is not surprising given that Chile spends more on education and health (8.1 percent of the country's GDP) than in direct transfers (1.6 percent). Yet, such result must be interpreted with caution because in-kind transfers are monetized at average government cost, which not necessarily reflects the actual value of the education and health services provided and there are no adjustments for differences in quality across the distribution. It is important to highlight that although social spending on tertiary education is slightly equalizing, this intervention is not pro-poor as indicated by its positive concentration coefficient. Conversely, social spending on basic (pre-school and primary) and secondary education and health is not only equalizing but also pro-poor (negative concentration coefficients).

Four additional results are worth noting. Firstly, after the intervention of taxes, subsidies and direct transfers not only the incidence of poverty reduces, but also the depth of poverty and the magnitude of inequality among the poor fall remarkably. Secondly, when using the official moderate poverty line the net effect of the whole fiscal system leaves fewer individuals impoverished (7.5 percent of Chile's population, or 47.1 percent of the post-fiscal poor) in comparison to the number of fiscal gainers (10.6 percent of the total, or 65.1 percent of the pre-fiscal poor), and the magnitude of monetary fiscal gains is as much as 4 times larger than that of fiscal impoverishment. Thirdly, the 7.5 percent of Chile's population experiencing fiscal impoverishment lives in 0.37 million households out of which the 69 percent are not recipients of any of the main direct transfers analyzed, which is of significance as 84 percent of the fiscal impoverished are members of households identified as poor according to the official definition. This result is indicative of the additional efforts required to improve the targeting and expand the coverage of direct transfers among the poor population, in particular because direct transfers have a significant large effect in reducing inequality and poverty.

Finally, when put into a regional perspective, the redistributive effect of direct transfers (i.e., the decline in inequality from pre-fiscal income to post-transfers income) is particularly larger in Chile than in other Latin American countries with a comparable fiscal incidence analysis. A remarkable result is that with 1.6 percent of the GDP on direct transfers, the redistributive gains in Chile are as much as 2.7 times larger than in Bolivia and virtually the same as in Brazil, where direct transfers account for 2 and 5.5 percent of the GDP, respectively. In terms of the effect on poverty, as measured by the \$4/day poverty line, direct transfers in Chile reduce the incidence by 41.2 percent with respect to pre-fiscal income, placing the country as a top performer in the region.

As part of its efforts to address persistently high levels of income inequality, the Government of Chile enacted a comprehensive tax reform in 2014 aimed at generating additional tax revenues (amounting to around 3 percent of the GDP) to finance social spending, specially on education; improving neutrality and equity of the tax system; improving the efficiency of tax incentives on savings and investment; and reducing tax evasion and avoidance (Arenas de Mesa, 2016). Even though the effect of such reform is not quantified in this paper, further spending on education could potentially contribute to income inequality decline in the medium and long-term. Moreover, an ex ante evaluation of the reform using the 2013 fiscal records suggested that the tax reform would likely increase the effective tax burden for the top 1 percent of the income distribution by 6 percentage points (equivalent to an increase from 2.4 to 3.5 percent of the GDP, with 80 percent of the latter figure being paid by the top 0.1 percent), while for most of the population the tax burden is expected to remain roughly constant, making the tax system, eventually, more progressive (World Bank, 2016).

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## Appendix

**Table A1: Marginal contributions to inequality by end income concept, concentration coefficients and Kakwani indexes for all fiscal interventions**

	Marginal contributions to inequality	Concentration coefficients	Kakwani index
<b>When disposable income is the end income concept</b>			
Direct taxes	0.011	0.946	0.452
Noncontributory pensions	0.010	-0.305	0.799
All direct taxes and contributions	0.007	0.637	0.143
Other direct transfers	0.005	-0.282	0.775
<i>Chile Solidario</i>	0.003	-0.503	0.997
<i>Ingreso Ético Familiar</i>	0.001	-0.464	0.958
All social contributions	-0.003	0.327	-0.166
<b>When consumable income is the end income concept</b>			
Direct taxes	0.012	0.946	0.452
All direct taxes and contributions	0.008	0.637	0.143
All taxes and contributions	0.008	0.518	0.025
Other direct transfers	0.006	-0.282	0.775
All indirect subsidies	0.003	-0.003	0.497
Subsidy to public transportation	0.002	0.019	0.475
<i>Ingreso Ético Familiar</i>	0.001	-0.464	0.958
Subsidy to drinkable water	0.001	-0.198	0.692
All indirect taxes	0.000	0.466	-0.027
Gas subsidy	0.000	0.316	0.177
All social contributions	-0.004	0.327	-0.166
<i>Chile Solidario</i>	n.a.	-0.503	0.997
Noncontributory pensions	n.a.	-0.305	0.799
<b>When final income is the end income concept</b>			
All education	0.032	-0.171	0.664
Primary education	0.014	-0.270	0.763
Health	0.014	-0.099	0.593
All direct taxes	0.012	0.946	0.452
All direct taxes and social contributions	0.009	0.637	0.143
Secondary education	0.008	-0.215	0.708
Pre-school	0.005	-0.246	0.739
All indirect taxes	0.004	0.466	-0.027
Tertiary education	0.003	0.125	0.369
All indirect subsidies	0.002	-0.003	0.497
All direct transfers	n.a.	-0.331	0.824

*Source:* Author's elaboration based on Martínez-Aguilar and Ortiz-Juarez (2016). *Notes:* The values of the concentration coefficient and Kakwani index for each fiscal intervention are the same regardless of the end income concept because such coefficients and indexes are calculated with respect to the market income plus pensions concept. The "n.a." label represents the cases where the Gini coefficient is not calculated without the corresponding fiscal intervention because without it the income of some households becomes negative.