



## INEQUALITY AND FISCAL REDISTRIBUTION IN MIDDLE INCOME COUNTRIES BRAZIL, CHILE, COLOMBIA, INDONESIA, MEXICO, PERU AND SOUTH AFRICA\*

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### Abstract

This paper examines the redistributive impact of fiscal policy for Brazil, Chile, Colombia, Indonesia, Mexico, Peru and South Africa using comparable fiscal incidence analysis with data from around 2010. The largest redistributive effect is in South Africa and the smallest in Indonesia. Success in fiscal redistribution is driven primarily by redistributive effort (share of social spending to GDP in each country) and the extent to which transfers/subsidies are targeted to the poor and direct taxes targeted to the rich. While fiscal policy always reduces inequality, this is not the case with poverty. Fiscal policy increases poverty in Brazil and Colombia (over and above market income poverty) due to high consumption taxes on basic goods. The marginal contribution of direct taxes, direct transfers and in-kind transfers is always equalizing. The marginal effect of net indirect taxes is unequalizing in Brazil, Colombia, Indonesia and South Africa. Total spending on education is pro-poor except for Indonesia, where it is neutral in absolute terms. Health spending is pro-poor in Brazil, Chile, Colombia and South Africa, roughly neutral in absolute terms in Mexico, and not pro-poor in Indonesia and Peru.

**JEL Codes:** H22, D31, I3

**Keywords:** fiscal incidence, social spending, inequality, developing countries

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## 1. Introduction

On average, advanced countries are less unequal than other regions of the world. Around 2010, the average Gini coefficient for advanced economies was roughly equal to 0.30 while the Gini coefficient for the rest of the world was approximately equal to 0.40.<sup>1</sup> Advanced countries, however, are not “born” less unequal. Relatively low inequality is the result of fiscal redistribution on a large scale. In the European Union, for example, the reduction in the Gini coefficient induced by direct taxes and transfers hovers around 21 percentage points if social insurance pensions are considered a transfer and 9 percentage points if pensions are assumed to be deferred income (EUROMOD, 2015).<sup>2</sup> Higgins et al. (2015) find that in the United States, the figures are 11 and 7 percentage points, respectively.<sup>3</sup>

How much fiscal redistribution takes place in middle-income countries? In this paper, I examine the redistributive impact of fiscal policy in Brazil, Chile, Colombia, Indonesia, Mexico, Peru and South Africa, seven middle-income countries that were available in the Commitment to Equity (CEQ) project.<sup>4</sup> In particular, I address the following questions: What is the impact of fiscal policy on inequality and poverty? What is the contribution of direct taxes and transfers, net indirect taxes and spending on education and health to the overall reduction in inequality? How pro-poor is spending on education and health?

The information used here is based on the following fiscal incidence analyses: Brazil (Higgins and Pereira, 2014), Chile (Jaime Ruiz-Tagle and Dante Contreras, 2014), Colombia (Melendez, 2014), Indonesia (Afkar et al.), Mexico (Scott, 2014), Peru (Jaramillo, 2014) and South Africa (Inchauste et al., 2015).<sup>5</sup> Lustig, Pessino and Scott (2014) and Lustig (2015a and b)<sup>6</sup> provide syntheses of the results. These studies use a common fiscal incidence method described in detail in Lustig and Higgins (2013) and of which a brief summary is included below. Known in the literature as the “accounting approach” because it ignores behavioral responses and general equilibrium effects, incidence analysis of public spending and taxation is designed to respond to the question of who benefits from government transfers and who ultimately bears the burden of taxes in the economy. With a long tradition in applied public finance, tax and benefit incidence analysis is an efficient instrument to evaluate whether fiscal policy has the desired effect on poverty and inequality

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<sup>1</sup> The Gini coefficients are simple averages calculated with the following data. Advanced countries: OECD Income Distribution Database: Gini, poverty, income, Methods and Concepts. OECD. Accessed December, 22, 2014.

<http://www.oecd.org/social/income-distribution-database.htm>. Developing countries except for Latin America and the Caribbean: PovcalNet: an online poverty analysis tool. The World Bank. Accessed November 05, 2014.

<http://iresearch.worldbank.org/PovcalNet/index.htm?0,0>. Latin America and the Caribbean: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank). Accessed July 22, 2013.

<http://sedlac.econo.unlp.edu.ar/eng/statistics-detalle.php?idE=35>.

<sup>2</sup> If pensions are assumed to be deferred income, they are counted as part of market or pre-fiscal income of people receiving them. The data are for 2010.

<sup>3</sup> Data is for 2011.

<sup>4</sup> Launched in 2008, the CEQ project is an initiative of the Center for Inter-American Policy and Research (CIPR) and the Department of Economics, Tulane University, the Center for Global Development and the Inter-American Dialogue. For more details visit [www.commitmentoequity.org](http://www.commitmentoequity.org).

<sup>5</sup> Note that in the cases of Chile, Colombia and Indonesia, there are no reports or published documents yet. The information can be found in the Commitment to Equity Master Workbooks. These Master Workbooks are available upon request. The requests should be placed directly to the authors of the country studies.

<sup>6</sup> The analysis is based on the country studies that have been undertaken and completed under the CEQ project by January 2015. The authors of the country studies are: Brazil (Higgins and Pereira, 2014), Chile (Jaime Ruiz Tagle and Dante Contreras, 2014), Colombia (Melendez, 2014), Indonesia (Afkar et al.), Mexico (Scott, 2014), Peru (Jaramillo, 2014) and South Africa (Inchauste et al., 2015).

(Musgrave, 1959; Pechman, 1985; Martinez-Vazquez, 2008). The increasing availability of household surveys containing sufficient information to assess the effects of fiscal policy on incomes and their distribution, has increased considerably the number of empirical studies in this area.

The contribution of specific fiscal interventions is calculated using the *marginal contribution* method. This method is equivalent to asking the question: how much would have inequality changed if the fiscal intervention of interest had not been there (keeping the rest of the fiscal system in place)?<sup>7</sup> The progressivity and pro-poorness of education and health spending are determined based on the size and sign of the relevant concentration coefficient. In keeping with generally accepted convention, spending is regressive when the concentration coefficient is *higher* than the market-income Gini. Spending is progressive, when the concentration coefficient is *lower* than the market-income Gini. Spending is pro-poor when the concentration coefficient is not only lower than the market-income Gini, but also has a negative value.<sup>8</sup> A negative concentration coefficient implies that *per capita* spending tends to be higher the poorer the individual.<sup>9</sup> When the concentration coefficient equals zero, per capita spending is the same across the distribution: spending is neutral in absolute terms. By definition, government spending that is pro-poor (or neutral in absolute terms) is also progressive. However, not all government spending that is progressive is pro-poor.

This article makes three important contributions. First, because the fiscal incidence analysis is comprehensive, one can estimate both the overall impact of the “fiscal system” as well as the marginal contribution of the main fiscal interventions to the overall reduction in inequality. The main fiscal interventions included here are: direct taxes, direct transfers, net indirect taxes and transfers in-kind (in the form of education and healthcare services). Second, the analysis includes the effects of fiscal policy not only on inequality but also on poverty. Third, because the seven studies apply a common methodology, results are comparable across countries.

The findings can be summarized as follows. The impact of fiscal policy on income redistribution results in various degrees of equalization with the largest redistributive effect in South Africa and the smallest one in Indonesia. South Africa’s result can be attributed to the combination of a large redistributive effort with transfers targeted to the poor and direct taxes targeted to the rich. In spite of this, South Africa remains the most unequal of the seven countries. Income redistribution tends to be higher in more unequal countries to start with: redistribution is considerable higher in countries with higher market income inequality such as South Africa and Brazil than in countries with relatively lower inequality such as Indonesia and Peru. As expected, the level of income redistribution and the size of the budget allocated to social spending (as a share of GDP) are associated. However, differences across countries suggest that institutional, political and demographic factors also affect the level of redistribution. Redistribution is considerably larger in countries with high social spending, such as Brazil and South Africa, than in Colombia, Indonesia and Peru, where social spending is more limited.

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<sup>7</sup> This method is described and used in OECD (2011). The analytical merits of this method compared to the sequential method are discussed in Lustig, Enami and Aranda (forthcoming).

<sup>8</sup> Implicit in the rankings is the assumption that concentration curves do not cross.

<sup>9</sup> This does not need to happen at every income level. A concentration coefficient will be negative as long as the concentration curve lies above the diagonal.

Direct taxes and direct transfers generally exercise an equalizing force. Indirect taxes are equalizing in Chile, Mexico and Peru, neutral in the case of South Africa but increase inequality in Brazil, Colombia and Indonesia. Contributory pensions are equalizing in Brazil, Colombia and Indonesia and unequalizing in Mexico and Peru, and very slightly so in Chile. Per capita total spending on public education tends to be higher for poorer households (i.e., pro-poor) in all countries except for Indonesia, where the per capita benefit is roughly the same for all households. Government spending on tertiary education increases with income in all countries, but only in Indonesia it increases inequality. Health spending is pro-poor (that is, per capita spending declines with income) in Brazil, Chile, Colombia and South Africa. In Mexico, the per capita benefit is roughly the same across the income scale. In Indonesia and Peru, health spending per person tends to increase with income but still reduces inequality.

Although education and health spending have the highest redistributive effect of the different components of fiscal policy, the existing information cannot disentangle to what extent the progressivity or pro-poorness of education and health spending is a result of differences in household or personal characteristics that could explain a more intense use by poorer households (e.g., having more children and worse health) or the “opting-out” of those better-off.

While fiscal policies overall unambiguously reduce income inequality, in terms of poverty reduction, the outcome is less auspicious. In Chile, Indonesia, Peru and South Africa poverty after cash transfers, net direct taxes and net indirect taxes is lower than market income poverty. In Colombia, however, income poverty increases after taxes and cash transfers are taken into account, a result driven by the impact of indirect taxes. Also, in Brazil income poverty would be higher if public pensions are considered as deferred income rather than a public transfer, which means that a portion of the poor who are not pensioners are net payers into the fiscal system.

The paper is organized as follows. Section 2 presents spending allocation and revenue raising patterns for the seven countries. Section 3 includes a brief description of the fiscal incidence methodology. Sections 4 and 5 discuss the impact of fiscal policy on inequality and poverty, respectively. Section 6 examines the pro-poorness of government spending on education and health. Section 7 concludes.

## 2. Budget size, social spending and taxation

The redistributive potential of a country is determined first and foremost by the size and composition of its budget and how government spending is financed. Figure 1 shows total primary spending<sup>10</sup> as a share of GDP and how much of it is devoted to social spending for around 2010. Social spending includes direct transfers, contributory and noncontributory pensions, and public spending on education and health.<sup>11</sup> It does not include housing subsidies or other forms of social spending. As one can observe, the seven

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<sup>10</sup> Primary spending equals total government spending minus interest payments on domestic and external public debt.

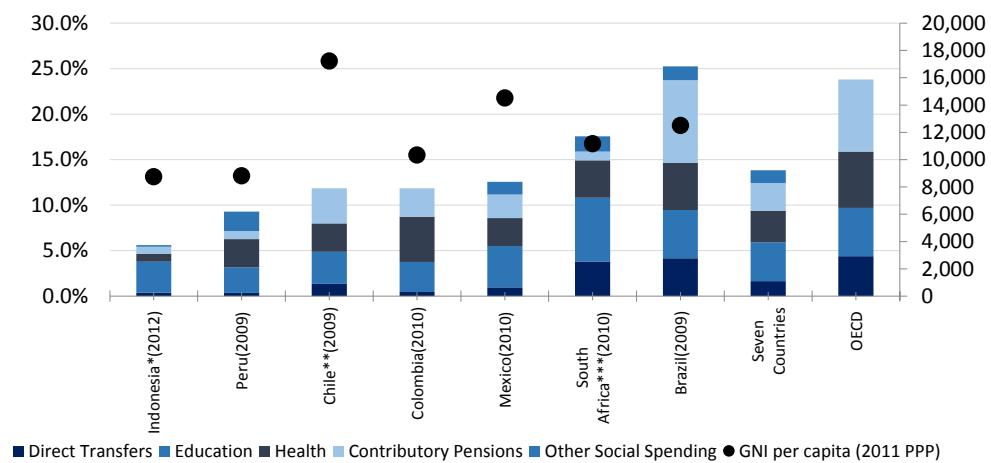
<sup>11</sup> Note that the numbers included in this section are those provided by the authors of the individual studies based on government statistics. The numbers do not necessarily match those found in “bulk” databases such as the World Bank’s World Development Indicators, OECD SOCX or other institutions that form part of the United Nations system broadly defined. Definitions of categories may vary too. The definition of social spending here is different from, for example, OECD’s. The OECD SOCX definition for public social expenditure is as follows: social spending with financial flows controlled by General Government (different levels of government and social security funds), as social insurance and social assistance payments. Social benefits include cash benefits (e.g., pensions, income support during maternity leave and social assistance payments) and social services (e.g., childcare, care for the elderly and disabled). It therefore excludes education spending.

countries are quite heterogeneous in terms of government size and resources committed to social spending. Primary government spending as a share of GDP in Brazil, for example, is similar to that found in OECD countries while in Indonesia and Colombia, the ratios are less than half as large as Brazil's. Brazil and South Africa stand out as countries with a relatively large government and more fiscal resources devoted to social spending. Brazil, for instance, allocates 23.7 percent of its GDP to direct transfers, pensions, education and health. On the other extreme is Indonesia, where the share is 5.4 percent.

**Figure 1: Size and composition of government budgets (circa 2010)**

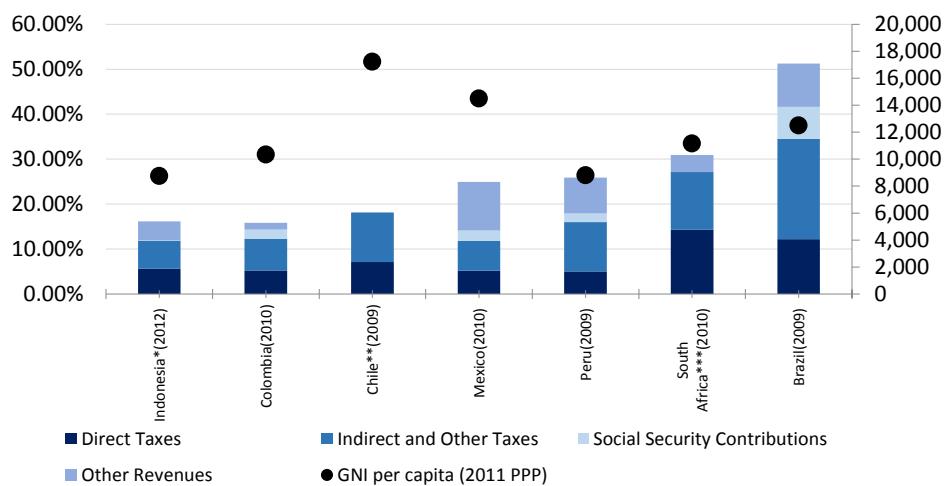
Panel a: Composition of Social Spending as a Share of GDP

(ranked by social spending/GDP)



Panel b: Composition of Total Government Revenues as a Share of GDP

(ranked by total government revenue/GDP)



Source: Author's calculations based on Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Note: Year of household survey in parenthesis. Data shown here is administrative data as reported by the studies cited above and the numbers do not necessarily

coincide with those of the OECD databases (or other multilateral organizations). Gross National Income per capita on right axis is in 2011 ppp from World Development Indicators (March 2011).

\* For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences. This adjustment, however, does not affect figures on this figure.

\*\* The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund; they were not included in the analysis for South Africa and are not shown here.

\*\*\* Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts.

Panel a shows the composition of social spending for the following categories: direct transfers, pensions, education and health around 2010. Direct transfers include noncontributory (social) pensions only. Brazil and South Africa devote a sizeable share to direct transfers: 4.2 percent and 3.8 percent, respectively. In addition to Bolsa Familia and the basic noncontributory pensions (which together comprise close to 1 percent of GDP), Brazil has another noncontributory program called “Special Circumstances Pensions” (that covers idiosyncratic shocks such as accident at work, sickness and other related shocks) to which it devotes 2.3 percent of GDP. In South Africa, the largest program is the noncontributory old-age pension (1.3 percent of GDP) followed by the child grant program (1.1 percent of GDP). On the other end of the spectrum are Indonesia and Peru, where direct transfers represent only 0.4 percent of GDP (in both cases). Peru allocates relatively little to income redistribution through its signature cash transfer *Juntos*. In the case of Indonesia, at the time of the survey (2012), the government allocated much more of its resources to energy subsidies (3.7 percent of GDP) than cash transfers (0.4 percent of GDP).

On average, these seven countries spend 1.6 percent of GDP on direct transfers, 3.0 percent on pensions (includes contributory pensions only and not social pensions, which are part of direct transfers), 4.3 percent on education and 3.5 percent on health. Total social spending of these four categories combined equals 13.4 percent of GDP. In comparison, the OECD countries (of which Chile and Mexico are members) on average spend 4.4 percent of GDP on direct transfers, 7.9 percent on pensions (includes contributory and social pensions), 5.3 percent on education and 6.2 percent on health. The average of total social spending is 26.7 percent of GDP, more than twice the average for the seven middle income countries. The largest difference occurs in direct transfers and contributory pensions. Direct transfers are almost three times as large, on average, in the OECD countries (even though the category does not include noncontributory pensions).<sup>12</sup>

The revenue collection patterns, as shown in Panel b, are heterogeneous as well. Mexico relies heavily on nontax revenues (from the state-owned oil company), followed by Brazil and Peru. In general, indirect taxes are a larger share of GDP, except for South Africa. In Brazil and Peru, indirect taxes are almost twice as large as direct taxes (both as a share of GDP).

Given their size and structure of spending, Brazil and South Africa have the largest amount of resources at their disposal to engage in fiscal redistribution. At the other end of the spectrum are Indonesia and Peru. Whether Brazil and South Africa achieve their higher redistributive potential, however, depends on how the burden of taxation and the benefits of social spending is distributed. This shall be discussed below. First, however, the next section presents a brief description of the fiscal incidence methodology utilized in the seven studies.

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<sup>12</sup> Figures for the seven countries are: Brazil (2009), Chile (2009), Colombia (2010), Indonesia (2012), Mexico (2010), Peru (2009) and South Africa (2010). OECD averages were provided by the organization itself and are for 2011.

### 3. Fiscal Incidence Analysis: Methodological Highlights<sup>13</sup>

Fiscal incidence analysis is used to assess the distributional impacts of a country's taxes and transfers. Essentially, fiscal incidence analysis consists of allocating taxes (personal income tax and consumption taxes, in particular) and public spending (social spending in particular) to households or individuals so that one can compare incomes before taxes and transfers with incomes after taxes and transfers.<sup>14</sup> Transfers include both cash transfers and benefits in kind such as free government services in education and healthcare. Transfers also include consumption subsidies such as food, electricity and fuel subsidies.

As with any fiscal incidence study, let's start by defining the basic income concepts. Here there are four: market, disposable, post-fiscal and final income.<sup>15</sup> These income concepts are described below and summarized in Diagram 1.

*Market income*<sup>16</sup> is total current income before direct taxes, equal to the sum of gross (pre-tax) wages and salaries in the formal and informal sectors (also known as earned income), income from capital (dividends, interest, profits, rents, etc.) in the formal and informal sectors (excludes capital gains and gifts), consumption of own production,<sup>17</sup> imputed rent for owner occupied housing, and private transfers (remittances, pensions from private schemes and other private transfers such as alimony).

*Disposable income* is defined as market income minus direct personal income taxes on all income sources (included in market income) that are subject to taxation plus direct government transfers (mainly cash transfers but can include near cash transfers such as food transfers, free textbooks and school uniforms).

*Post-fiscal (also called consumable) income* is defined as disposable income plus indirect subsidies (e.g., food and energy price subsidies) minus indirect taxes (e.g., value added taxes, excise taxes, sales taxes, etc.).

*Final income* is defined as post fiscal income plus government transfers in the form of free or subsidized services in education and health valued at average cost of provision<sup>18</sup> (minus co-payments or user fees, when they exist).

One area in which there is no clear consensus is how pensions from a pay-as-you-go contributory system should be treated. Arguments exist in favor of both treating contributory pensions as deferred income<sup>19</sup> or as a government transfer, especially in systems with a large subsidized component.<sup>20</sup> Since this is an unresolved issue, the studies analyzed here present results for both methods. One scenario treats social insurance contributory pensions (herewith called contributory pensions) as deferred income (which in

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<sup>13</sup> This section is based on Lustig and Higgins (2013).

<sup>14</sup> In addition to the studies cited here and other studies in [www.commitmentoequity.org](http://www.commitmentoequity.org), see, for example, Förster and Whiteford (2009), Immervoll and Richards (2011) and OECD (2011).

<sup>15</sup> In the case of Indonesia, the surveys do not have income data so the incidence analysis is based on assuming consumption equals disposable income.

<sup>16</sup> Market income is sometimes called primary or original income.

<sup>17</sup> Except in the case of South Africa, whose data on auto-consumption (also called own-production or self-consumption) was not considered reliable.

<sup>18</sup> See, for example, Sahn and Younger (2000).

<sup>19</sup> Breceda et al. (2008); Immervoll et al. (2009).

<sup>20</sup> Goñi et al. (2011); Immervoll et al. (2009); Lindert et al. (2006).

practice means that they are added to market income to generate the original or “pre-fisc” income). The other scenario treats these pensions as any other cash transfer from the government.<sup>21</sup> For consistency, when pensions are treated as deferred income, the contributions by individuals are included under savings (they are mandatory savings) while when they are treated as government transfers, the contributions are considered a direct tax.

It is important to note that the treatment of contributory pensions not only affects the amount of redistributive spending and how it gets redistributed, but also the ranking of households by original income or pre-fiscal income. For example, in the scenario in which contributory pensions are considered a government transfer, households whose main (or sole) source of income is pensions will have close to (or just) zero income before taxes and transfers and hence will be ranked at the bottom of the income scale. When contributory pensions are treated as deferred income, in contrast, households who receive contributory pensions will be placed at a (sometimes considerably) higher position in the income scale. Thus, the treatment of contributory pensions in the incidence exercise could have significant implications for the order of magnitude of the “pre-fisc” and “post-fisc” inequality and poverty indicators.

In the construction of final income, the method for education spending consists of imputing a value to the benefit accrued to an individual of going to public school which is equal to the per beneficiary input costs obtained from administrative data: for example, the average government expenditure per primary school student obtained from administrative data is allocated to the households based on how many children are reported attending public school at the primary level. In the case of health, the approach was analogous: the benefit of receiving healthcare in a public facility is equal to the average cost to the government of delivering healthcare services to the beneficiaries. In the case of Colombia, however, the method used was to impute the insurance value to beneficiary households rather than base the valuation on utilization of healthcare services.

This approach to valuing education and healthcare services amounts to asking the following question: how much would the income of a household have to be increased if it had to pay for the free or subsidized public service (or the insurance value in the cases in which this applies to healthcare benefits) at the full cost to the government? Such an approach ignores the fact that consumers may value services quite differently from what they cost. Given the limitations of available data, however, the cost of provision method is the best one can do for now.<sup>22</sup> For the readers who think that attaching a value to education and health services based on government costs is not accurate, the method applied here is equivalent to using a simple binary indicator of whether or not the individual uses the government service.<sup>23 24</sup>

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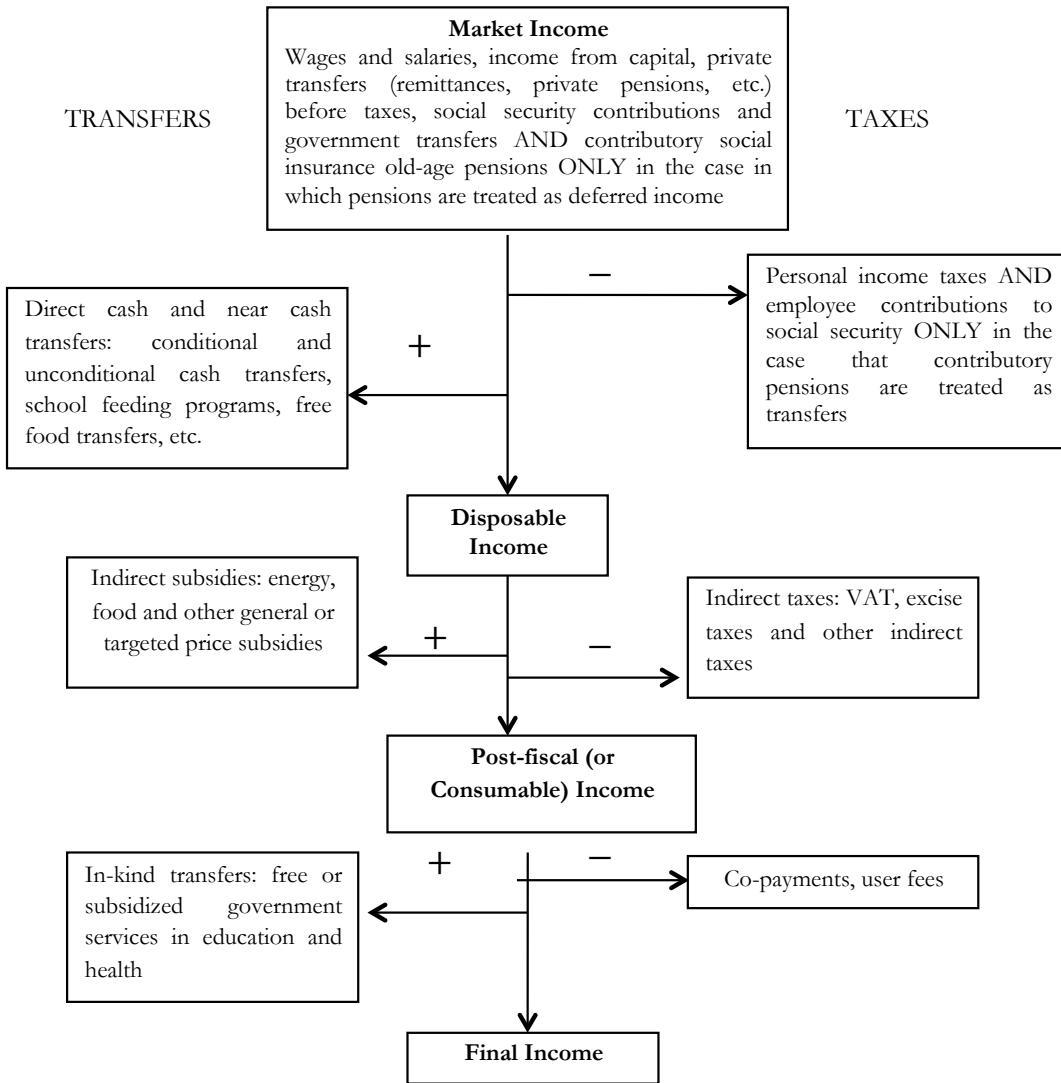
<sup>21</sup> Immervoll et al. (2009) do the analysis under these two scenarios as well.

<sup>22</sup> By using averages, it also ignores differences across income groups and regions: e.g., governments may spend less (or more) per pupil or patient in poorer areas of a country. Some studies in the CEQ project adjusted for regional differences. For example, Brazil's health spending was based on regional specific averages.

<sup>23</sup> This is of course only true within a level of education. A concentration coefficient for total non-tertiary education, for example, where the latter is calculated as the sum of the different spending amounts by level, is not equivalent to the binary indicator method.

<sup>24</sup> In order to avoid exaggerating the effect of government services on inequality, the totals for education and health spending in the studies reported here were scaled-down so that their proportion to disposable income in the national accounts are the same as those observed using data from the household surveys.

**Diagram 1**



The welfare indicator used in the fiscal incidence analysis is income per capita,<sup>25</sup> except for the case of Indonesia in which the welfare indicator was consumption-based (also in per capita).<sup>26</sup> In Indonesia, the method was to assume that disposable income equals consumption and market income was generated “backwards” applying a “net to gross” conversion.<sup>27</sup> Furthermore, the Indonesian survey does not include individuals with income levels beyond the threshold at which direct taxes begin to apply (see Afkar et al., 2015). In the data for South Africa, Free Basic Services are considered as direct transfers.<sup>28</sup> The only

<sup>25</sup> No adjustments were made for household composition or economies of scale. For Brazil, Higgins et al. (forthcoming) analyze the impact of taxes and transfers using equivalized income.

<sup>26</sup> In Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences because they are considered to be very large.

<sup>27</sup> See, for example, Immervoll and O'Donoghue, 2001.

<sup>28</sup> These Free Basic Services are delivered by municipal governments sometimes at zero cost and sometimes at a subsidized price. Given the difficulty in determining which case applies for households included in the survey, the analysis was carried out in both ways. Results in which the Free Basic Services are considered a subsidy are available upon request.

contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund (GEPF). Since the government made no transfers to the GEPF in 2010/11, there is no scenario in which contributory pensions are treated as a transfer. Also, survey data on own-consumption (which is part of market income) were not considered reliable in the case of South Africa (see Inchauste et al., 2015). In Chile, contributions to the old (pay-as-you-go) pension system are not available as a separate item in National Accounts (Ruiz-Tagle and Contreras, 2014).<sup>29</sup>

The fiscal incidence analysis used here is point-in-time and does not incorporate behavioral or general equilibrium effects. That is, no claim is made that the original or market income equals the true counterfactual income in the absence of taxes and transfers. It is a first-order approximation that measures the average incidence of fiscal interventions. However, the analysis is not a mechanically applied accounting exercise. The incidence of taxes is the economic rather than statutory incidence. It is assumed that individual income taxes and contributions both by employees and employers, for instance, are borne by labor in the formal sector. Individuals who are not contributing to social security are assumed to pay neither direct taxes nor contributions. Consumption taxes are fully shifted forward to consumers. In the case of consumption taxes, the analyses take into account the lower incidence associated with own-consumption, rural markets and informality.

In general, fiscal incidence exercises are carried out using household surveys and this is what was done here. The surveys used in the country studies are the following: Brazil: Pesquisa de Orçamentos Familiares, 2009 (I); Chile: Encuesta de Caracterización Social (CASEN), 2009 (I); Colombia: Encuesta de Calidad de Vida, 2010 (I); Indonesia: Survei Sosial-Ekonomi Nasional, 2012 (C); Mexico: Encuesta Nacional de Ingreso y Gasto de los Hogares, 2010 (I); Peru: Encuesta Nacional de Hogares, 2009 (I); South Africa: Income and Expenditure Survey and National Income Dynamics Study, 2010-2011 (I). The description of how each income concept was constructed and which assumptions were made in each country can be found in the following references: Brazil (Higgins and Pereira, 2014), Chile (Jaime Ruiz Tagle and Dante Contreras, 2014), Colombia (Melendez, 2014), Indonesia (Afkar et al.), Mexico (Scott, 2014), Peru (Jaramillo, 2014) and South Africa (Inchauste et al., 2015).<sup>30</sup>

#### **4. The Redistributive Effect of Fiscal Policy**

A typical indicator of the redistributive effect of fiscal policy is the difference between the market income Gini and the Gini for income after taxes and transfers.<sup>31</sup> If the redistributive effect is positive (negative), fiscal policy is equalizing (unequalizing).

Figure 4 presents the Gini coefficient for market income and the other three income concepts shown in

<sup>29</sup> For details, see Lustig and Higgins (2013).

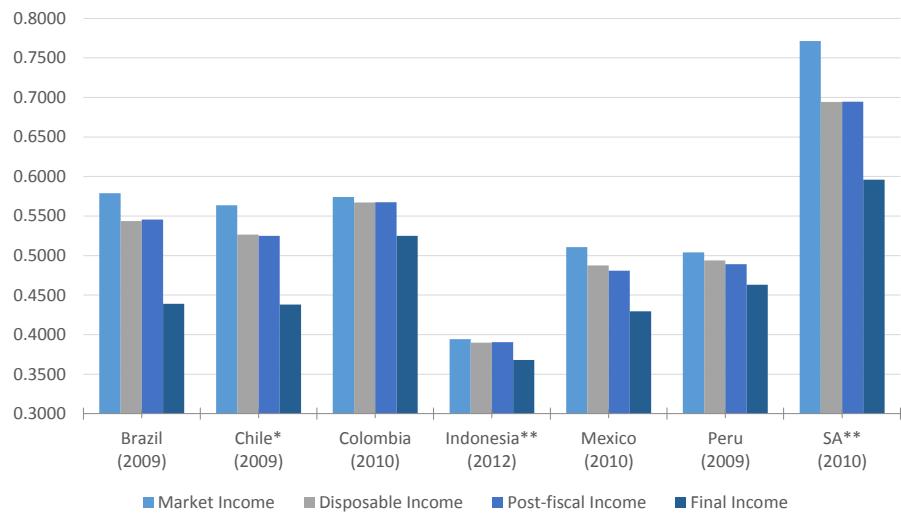
<sup>30</sup> Note that empirically one often starts from a concept different from market income. In many income-based surveys, reported income corresponds (or is assumed to be) market income net of direct taxes. In consumption-based surveys, there is often no reported income at all. In those cases, the incidence analysis assumed that consumption is equivalent to disposable income.

<sup>31</sup> All the theoretical derivations that link changes in inequality to the progressivity of fiscal interventions have been derived based on the so-called family of S-Gini indicators, of which the Gini coefficient is one case. See for example, Duclos and Araar (2006). While one can calculate the impact of fiscal policy on inequality using other indicators (and one should), it will not be possible to link them to the progressivity of the interventions.

Diagram 1: disposable, post-fiscal and final income.<sup>32</sup> In broad terms, disposable income measures how much income individuals may spend on goods and services (and save, including mandatory savings such as contributions to a public pensions system that is actuarially fair). Post-fiscal income measures how much individuals are able to actually consume. For example, a given level of disposable income--even if consumed in full--could mean different levels of actual consumption depending on the size of indirect taxes and subsidies. Final income includes the value of public services in education and health if individuals would have had to pay for those services at the average cost to the government. Based on the fact that contributory pensions can be treated as deferred income or as a direct transfer, here all the calculations are presented for two scenarios: one with contributory pensions included in market income and another with them as government transfers. For consistency, remember that in the first scenario contributions to the system are treated as mandatory savings and in the second as a tax.

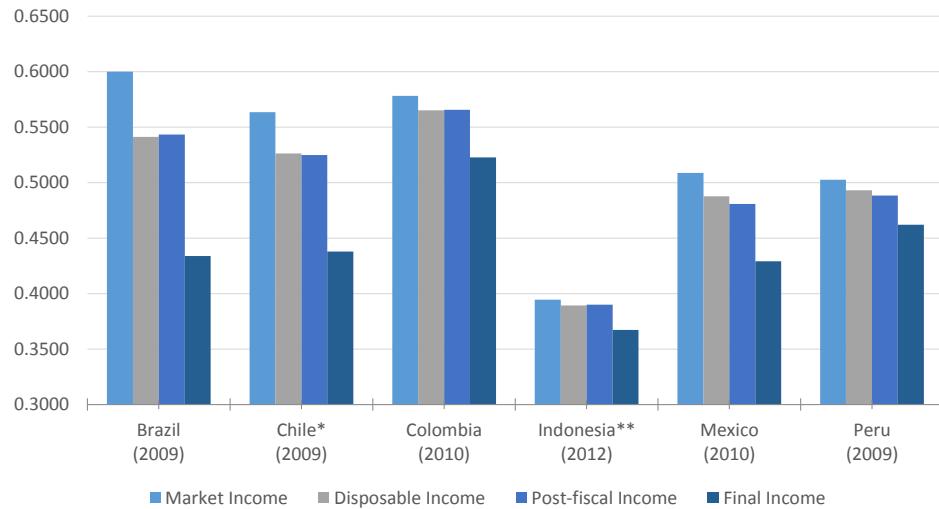
**Figure 2: Fiscal Policy and Inequality (circa 2010)**  
**(Gini Coefficient for Market, Disposable, Post-fiscal and Final Income)**

Panel a: Pensions in Market Income



<sup>32</sup> Other measures of inequality such as the Theil index or the 90/10 ratio are available in the individual studies. Requests should be addressed directly to the authors.

Panel b: Pensions as Transfers



Source: Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

\* Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

\*\*For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences. This adjustment, however, does not affect figures on this figure.

\*\*\*The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund; they were not included in the analysis for South Africa and are not shown here. The scenario for South Africa assumed free basic services are direct transfers.

As can be observed, in Colombia, Indonesia and Peru, fiscal income redistribution is quite limited while in South Africa, Chile and Brazil, it is of a relevant magnitude. Mexico is in the middle of these two groups. One can observe that South Africa is the country that redistributes the most but it still remains the most unequal of all seven. It is interesting to note that although Brazil, Chile and Colombia start out with similar market income inequality, Brazil and Chile reduce inequality considerably while Colombia does not. Similarly, Mexico and Peru start out with similar levels of market income inequality but Mexico reduces inequality by more. Indonesia is the less unequal of all seven and fiscal redistribution is also the smallest in order of magnitude. The largest change in inequality occurs between post-fiscal and final income. This is not surprising given the fact that governments spend more on education and health than on direct transfers and pensions. However, one should not make sweeping conclusions from this result because—as discussed above—in-kind transfers are valued at average government cost which is not really a measure of the “true” value of these services to the individuals who use them.

Panels a and b in Figure 2 show that the patterns of inequality decline are similar whether one looks at the scenario in which contributory pensions are considered deferred income (and, thus, part of market income) or with pensions as transfers. In Brazil and Colombia, and to a lesser extent in Indonesia, the redistributive effect is larger when pensions are treated as a transfer, while in Mexico and Peru it is somewhat lower.

## *Are Pensions Equalizing or Unequalizing?*

One common question is whether contributory pensions are equalizing or unequalizing. Table 1 shows the Gini coefficients with market income with and without contributory pensions. As one can observe, contributory pensions are equalizing in Brazil, Colombia and Indonesia and unequalizing in Mexico, Peru and Chile (quite slightly and besides the system has been replaced by individualized accounts).<sup>33</sup> The fact that the pattern depends on the country is interesting. Statements such as “pensions are regressive” (by that meaning that they are unequalizing) are not universally true.

**Table 1: Gini Coefficient for Pre-pension and Post-pension Market Income (circa 2010)**

	Brazil (2009)	Chile <sup>a</sup> (2009)	Colombia (2010)	Indonesia <sup>b</sup> (2012)	Mexico (2008)	Peru (2009)	South Africa <sup>c</sup> (2010)
Pension as % GDP	9.06%	3.87%	3.14%	0.76%	2.60%	0.90%	0.97%
Gini Market Income w/o Pensions	0.5999	0.5635	0.5781	0.3944	0.5087	0.5025	--
Gini Market Income w/Pensions	0.5788	0.5637	0.5742	0.3942	0.5107	0.5039	0.7712
Change in %	3.6%	-0.04%	0.7%	0.1%	-0.4%	-0.3%	--
Change in ppts	0.0211	-0.0002	0.0039	0.0002	-0.0019	-0.0014	--

Source: author's based on Armenia: Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Note: year of household survey in parenthesis.

a. For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences

a. Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

c. The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund. Since the government made no transfers to the GEPF in 2010/11, there is no scenario in which contributory pensions are treated as a transfer. The scenario for South Africa assumed free basic services are direct transfers.

## *The redistributive effect of fiscal policy: do more unequal countries redistribute more?*

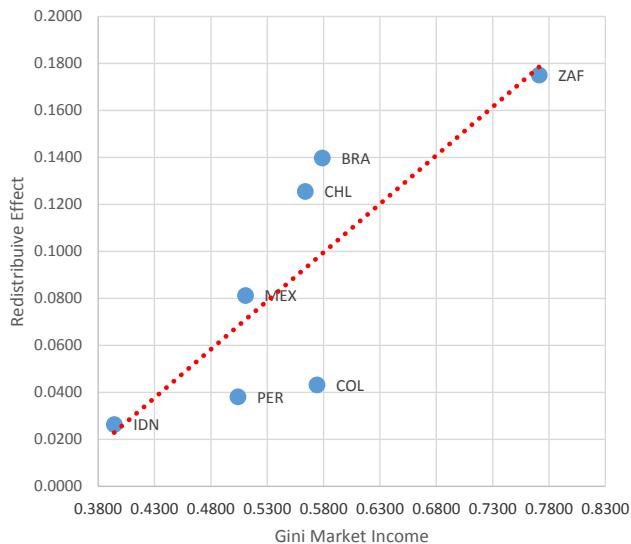
Income redistribution tends to be higher in more unequal countries to start with: redistribution is considerably higher in countries with higher market income inequality such as South Africa, Brazil and Chile than in countries with relatively lower inequality, such as Indonesia, Peru and Mexico (see Figure 7.4, Panel A). Among these countries, Colombia stands as an outlier with a rather low degree of redistribution given its high level of market income inequality. Previous studies also generally suggest a positive correlation between market income inequality and measures of redistribution. Lustig (2015a) finds this in an analysis for thirteen developing countries. An OECD study (2011, Chapter 7) illustrates that more market income inequality tends to be associated with higher redistribution, for a sub-set of OECD countries, both within countries (over time) and across countries.

<sup>33</sup> Note that this is not equivalent to estimating the marginal contribution of pensions assuming all the other fiscal interventions are in place.

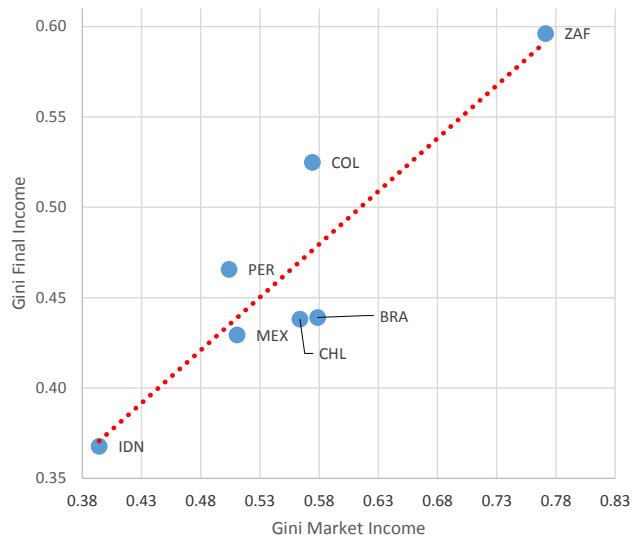
Differences in redistribution change the relative ranking of countries by inequality level. Figure 3, Panel B displays the levels of income inequality before (horizontal axis) and after (vertical axis) accounting for fiscal policies. Fiscal policies reduce inequality in all countries and South Africa continues to be the most unequal country and Indonesia the least unequal country based on income before or after fiscal policy. However, due to lower redistribution, Colombia and Peru end up being more unequal than Brazil, Chile and Mexico, once fiscal policies are considered.

**Figure 3. Inequality and redistribution, 2010**

A. Redistribution and market income inequality



B. Final income inequality and market income inequality



Source: Lustig, N. (2015b).

*Note:*

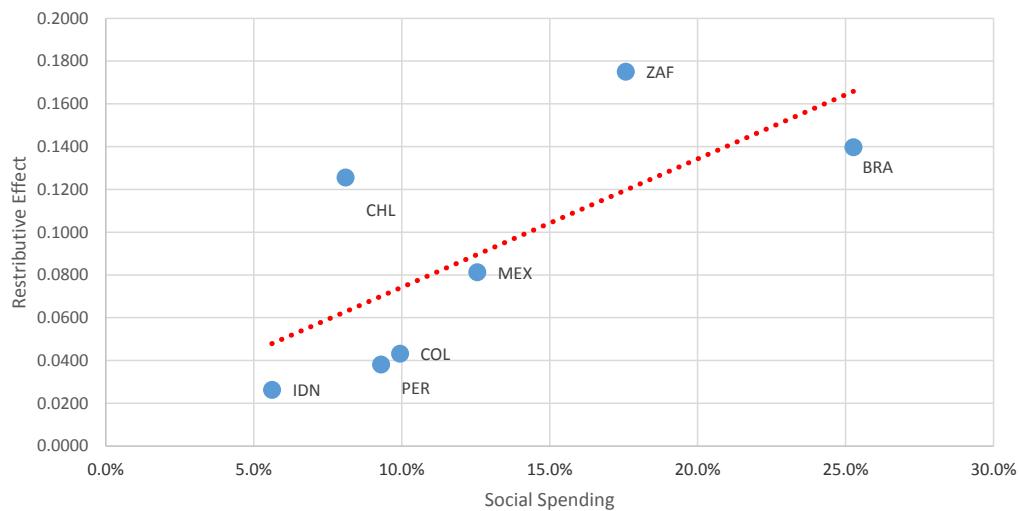
Red line is the trends.

For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences. This adjustment, however, does not affect numbers on this figure. The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund; they were not included in the analysis for South Africa and are not shown here. The scenario for South Africa assumed free basic services are direct transfers.

Redistribution measures the difference between Gini of market and final incomes. Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

As expected, the level of income redistribution and the size of the budget allocated to social spending (as a share of GDP) are associated. However, differences across countries suggest that institutional factors such as the composition and design of such policies and their interaction with socio-economic circumstances also affect the level of redistribution. Figure 4 presents the level of redistribution and social spending measured in the CEQ database. Redistribution is considerably larger in countries with high social spending, such as Brazil and South Africa, than in Colombia, Indonesia and Peru, where social spending is more limited. Given the level of social spending, income redistribution is particularly high in South Africa and Chile.

**Figure 4. Redistribution and social spending, 2010**



Source: Lustig, N. (2015b).

Notes:

Trend line in red.

For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences. This adjustment, however, does not affect numbers on this figure.

The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund; they were not included in the analysis for South Africa and are not shown here. The scenario for South Africa assumed free basic services are direct transfers.

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### *Redistributive Effect: A Comparison with Advanced Countries*

How do these seven middle income countries compare with the fiscal redistribution that occurs in advanced countries? Although the methodology is somewhat different, one obvious comparator is the analysis produced by EUROMOD for the twenty-seven countries in the European Union.<sup>34</sup> Given that EUROMOD covers only direct taxes, contributions to social security and direct transfers, the comparison can be done for the redistributive effect from market to disposable income. A comparison is also made with the United States.<sup>35</sup>

There are three important differences between the advanced countries and the seven middle income ones analyzed here. First, market income inequality tends to be somewhat higher for the middle income countries.<sup>36</sup> However, the difference is most striking when pensions are treated as transfers. The average Gini coefficient for the seven middle income countries for the scenario in which pensions are treated as

<sup>34</sup> The data for EU 27 is from EUROMOD statistics on Distribution and Decomposition of Disposable Income, accessed at <http://www.iser.essex.ac.uk/euromod/statistics/> using EUROMOD version no. G2.0. The year 2010 was used.

<sup>35</sup> Higgins et al. (forthcoming).

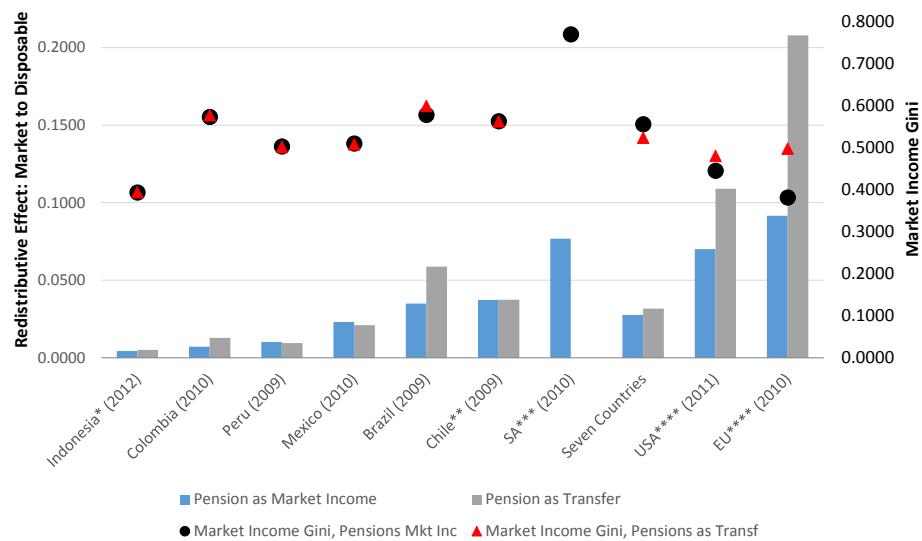
<sup>36</sup> South Africa pulls the average up but Indonesia pulls it down.

deferred income and the scenario in which they are considered transfers is 55.7 and 55.9 percent, respectively. In contrast, in the EU, the corresponding figures are 38.2 and 49.9 percent, respectively; and in the US, they are, 44.6 and 48.1, respectively. One important aspect to note, however, is that in the EU, pensions include both contributory and noncontributory social pensions while in the middle income countries and the US, the category of pensions includes only contributory pensions. If the latter would include noncontributory pensions as part of market income, the Gini would be lower.

Second, as expected and shown in Figure 5, the redistributive effect is larger in the EU countries and, to a lesser extent, in the United States (except for South Africa, whose redistributive effect is larger than in the US when pensions are part of market income). In the seven middle income countries, whether pensions are treated as deferred income or a transfer makes a relatively small difference. This is not the case in the EU countries where the difference is huge. In the EU, the redistributive effect with pensions as market income and pensions as a transfer is 9.2 and 20.8 Gini points, respectively. In the United States, the numbers are less dramatically different: 7 and 10.9, respectively. In the seven middle income countries, the numbers are 2.8 and 3.2 Gini points, respectively. Clearly, the assumption made about how to treat incomes from pensions, again, makes a big difference.

**Figure 5: Redistributive Effect: Brazil, Chile, Colombia, Indonesia, Mexico, Peru, South Africa, EU and the United States**

(Change in Gini Points: Market to Disposable Income; circa 2010)



Source: author's based on Armenia: Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015. European Union: EUROMOD statistics on Distribution and Decomposition of Disposable Income, accessed at <http://www.iser.essex.ac.uk/euromod/statistics/> using EUROMOD version no. G2.0. United States: Higgins, Sean et al., forthcoming.

Note: Year of household survey in parenthesis. For definition of income concepts see the section on methodological highlights in text.

\* For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences.

\*\* The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund. Since the government made no transfers to the GEPF in 2010/11, there is no scenario in which contributory pensions are treated as a transfer. The scenario for South Africa assumed free basic services are direct transfers.

\*\*\* The Gini coefficients for the United States are for equivalized income.

Third, in no European country nor in the United States, contributory pensions are unequalizing. On the

contrary, vis-à-vis *market income without pensions*, they exert a large equalizing force in the EU and less so in the US. Using data for 2010, for example, the difference between the market income Gini and the market income Gini plus pensions is 11.6 percentage points in the EU and 3.9 in the United States. As we saw above, in the seven middle income countries pensions are not always equalizing.

### *Measuring the Contribution of Taxes and Transfers<sup>37</sup>*

Suppose one observes that fiscal policy has an equalizing effect. Can one measure the influence of specific taxes (direct vs. indirect, for example) or transfers (direct transfers vs. indirect subsidies or in-kind transfers, for example) on the observed result?<sup>38</sup> A fundamental question in the policy discussion is whether a particular fiscal intervention (or a particular combination of them) is equalizing or unequalizing. In a world with a single fiscal intervention (and no reranking), it is sufficient to know whether a particular intervention is progressive or regressive to give an unambiguous response using the typical indicators of progressivity such as the Kakwani index.<sup>39</sup> In a world with more than one fiscal intervention (even in the absence of reranking), this one-to-one relationship between the progressivity of a particular intervention and its effect on inequality breaks down. As Lambert (2001) so eloquently demonstrates it, depending on certain characteristics of the fiscal system, a regressive tax can exert an equalizing force over and above that which would prevail in the absence of that regressive tax.<sup>40</sup>

An example borrowed from Lambert (2001, Table 11.1, p. 278) helps illustrate this point in the case of a regressive tax (Table 2).<sup>41</sup> The table below shows that “...taxes may be regressive in their original income... and yet the net system may exhibit more progressivity” than the progressive benefits alone. The redistributive effect for taxes *only* in this example is equal to -0.0517, highlighting their regressivity.<sup>42</sup> Yet, the redistributive effect for the net fiscal system is 0.25, higher than the redistributive effect for benefits *only* equal to 0.1972. If taxes are regressive vis-à-vis the original income but progressive with respect to the less unequally distributed post-transfers income, regressive taxes exert an equalizing effect over and above the effect of progressive transfers.<sup>43</sup>

**Table 2: Lambert's Conundrum**

	1	2	3	4	Total
Original income x	10	20	30	40	100
Tax Liability t(x)	6	9	12	15	42
Benefit level b(x)	21	14	7	0	42
Post-benefit income	31	34	37	40	142
Final income	25	25	25	25	100

<sup>37</sup> This section is based on Lustig et al. (forthcoming).

<sup>38</sup> Note that the influence of specific interventions may not be equalizing, even if the overall effect of the net fiscal system is.

<sup>39</sup> The Kakwani index for taxes is defined as the difference between the concentration coefficient of the tax and the Gini for market income. For transfers, it is defined as the difference between the Gini for market income and the concentration coefficient of the transfer. See, for example, Kakwani (1977).

<sup>40</sup> See Lambert (2001), pp. 277 and 278. Also, for a derivation of all the mathematical conditions that can be used to determine when adding a regressive tax is equalizing or when adding a progressive transfer is unequalizing, see Lustig et al. (forthcoming).

<sup>41</sup> Lambert, Peter (2001) *The Distribution and Redistribution of Income*. Third Edition. Manchester University Press.

<sup>42</sup> Since there is no reranking, the R-S equals the difference between the Ginis before and after the fiscal intervention.

<sup>43</sup> Note that Lambert uses the term progressive and regressive differently than other authors in the theoretical and empirical incidence analysis literature. Thus, he calls “regressive” transfers that are equalizing. See definitions in earlier chapters of his book.

Source: Lambert, 2001, Table 11.1, p. 278.

Note that Lambert's conundrum is not equivalent to the well-known (and frequently repeated) result that efficient regressive taxes can be fine as long as, when combined with transfers, the net fiscal system is equalizing.<sup>44</sup> The surprising aspect of Lambert's conundrum is that a net fiscal system *with* a regressive tax (vis-à-vis market) is *more* equalizing than *without* it.<sup>45</sup>

The implications of Lambert's "conundrum"<sup>46</sup> in real fiscal systems are quite profound. It means that in order to determine whether a particular intervention (or, a particular policy change) is inequality increasing or inequality reducing--and by how much-- one must resort to numerical calculations that include the whole system. As Lambert mentions, his example is "not altogether farfetched."<sup>47</sup> Two renowned studies in the 1980s found this type of result for the US and the UK.<sup>48</sup> It also made its appearance in a 1990s study for Chile.<sup>49</sup> In the present analysis, as shall be seen below, Lambert's conundrum is found for indirect taxes in the cases of Chile and to a smaller extent in South Africa. This counter-intuitive result is the consequence of path dependency: a particular tax can be regressive vis-à-vis market income but progressive vis-à-vis the income that would prevail if all the other fiscal interventions were already in place.

There are several ways of calculating the contribution of a particular fiscal intervention to the change in inequality (or poverty) taking account of path dependency. The most commonly used in the literature are the marginal contribution and the sequential contribution. A less commonly used measure is the total average contribution. The total average contribution is calculated by considering all the possible paths and taking, for example, the so-called Shapley value.<sup>50</sup> The sequential contribution is calculated as the difference between inequality indicators with fiscal interventions ordered in a path according to their institutional design.<sup>51</sup> For example, if direct transfers are subject to taxation, the sequential contribution of personal income taxes is the difference between market income plus transfers and market income plus transfers and minus personal income taxes. The marginal contribution of a tax (or transfer) is calculated by taking the difference between the inequality indicator *without* the tax (or transfer) and *with* it.<sup>52</sup> For example, the marginal contribution of indirect taxes is the difference between the Gini for post-fiscal income plus indirect

<sup>44</sup> As Higgins and Lustig (2015) mention, "efficient taxes that fall disproportionately on the poor, such as a noexemption value added tax, are often justified with the argument that 'spending instruments are available that are better targeted to the pursuit of equity concerns' (Keen and Lockwood, 2010, p. 141). Similarly, Engel et al. (1999, p. 186) assert that 'it is quite obvious that the disadvantages of a proportional tax are moderated by adequate targeting' of transfers, since 'what the poor individual pays in taxes is returned to her.' Ebrill et al. (2001, p. 105) argue that 'a regressive tax might conceivably be the best way to finance pro-poor expenditures, with the net effect being to relieve poverty'."

<sup>45</sup> It can also be shown that if there is reranking, a pervasive feature of net tax systems in the real world, making a tax (or a transfer) more progressive can increase post-tax and transfers inequality. In Lambert's example, regressive taxes not only enhance the equalizing effect of transfers, but making taxes more progressive (i.e., more disproportional in the Kakwani sense) would result in higher(?) inequality; any additional change (towards more progressivity) in taxes or transfers would just cause reranking and an increase in inequality.

<sup>46</sup> This is Lambert's choice of words (p. 278).

<sup>47</sup> Quotes are from Lambert, op. cit, p. 278.

<sup>48</sup> O'Higgins and Ruggles (1981) for the UK and Ruggles and O'Higgins (1981) for the US.

<sup>49</sup> Engel et al. (1999). Although the authors did not acknowledge this characteristic of the Chilean system in their article, in a recent interaction with the lead author, it was concluded that the Chilean system featured regressive albeit equalizing indirect taxes.

<sup>50</sup> For an analysis of the Shapley value and its properties see, for example, Shorrocks (2013.)

<sup>51</sup> OECD (2011) used this method, for example.

<sup>52</sup> The *marginal contribution* should not be confused with the *marginal incidence*, the latter being the incidence of a small change in spending. The *marginal contribution* is not a derivative. Note that, because of path dependency, adding up the marginal contributions of each intervention will not be equal to the total change in inequality. Clearly, adding up the sequential contributions will not equal the total change in inequality either. An approach that has been suggested to calculate the contribution of each intervention in a way that they add up to the total change in inequality, is to use the Shapley value. The studies analyzed here do not have estimates for the latter.

taxes (i.e., post fiscal income *without* the indirect taxes) and post-fiscal income. Given the uncertainties that surround choosing the correct institutional path, this paper uses the marginal contribution method. In addition, the marginal contribution has a straightforward policy interpretation because it is equivalent to asking the question: what would inequality be if the system did not have a particular tax (or transfer) or if a tax (or transfer) was modified? Would inequality be higher, the same or lower with the tax (or transfer) than without it?<sup>53</sup>

Figure 6 shows the marginal contribution for two net fiscal systems: from market to disposable income and from market to post-fiscal income. Both are presented because the existing fiscal redistribution studies frequently stop at direct taxes and direct transfers.<sup>54</sup> The numbers in this figure were calculated using deciles and not the whole sample and hence the redistributive effect is larger than in figures shown above because it ignores intra-decile inequality.<sup>55</sup> Note that an equalizing (unequalizing) effect is presented with a positive (negative) sign.<sup>56</sup> The first result to note is that direct taxes and direct transfers are, as expected, always equalizing, whether one calculates their marginal contribution with respect to disposable income or post-fiscal income.<sup>57</sup> Direct transfers exert a particularly high equalizing force in South Africa and Brazil.<sup>58</sup>

The second result to note is that the marginal contribution of direct taxes is higher than the marginal contribution of direct transfers in Mexico and Peru while the converse is true in Brazil, Chile, Colombia, Indonesia and South Africa. This is interesting because a statement such as direct transfers are empirically more important than direct taxes in terms of income redistribution are not of general validity. The third result to note is that the effect of indirect taxes is not always unequalizing. The marginal contribution is equalizing in the cases of Chile, Mexico and Peru and neutral in the case of South Africa. More interesting still is the fact that indirect taxes in Chile and South Africa are regressive--the Kakwani coefficients for indirect taxes for Chile and South Africa is -.02 and -.08, respectively—and yet equalizing and neutral, respectively. That is, in these two countries one finds the counter-intuitive effect known as Lambert's conundrum: a regressive tax can be equalizing (or neutral).

**Figure 6: Marginal Contribution of Taxes and Transfers (circa 2010)**

(Pensions as Market Income)

Panel a. Redistributive Effect from Market to Disposable

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<sup>53</sup> Note that if certain fiscal interventions come in bundles (e.g., a tax that only kicks in if a certain transfer is in place), the marginal contribution can be calculated for the net tax (or the net benefit) in question.

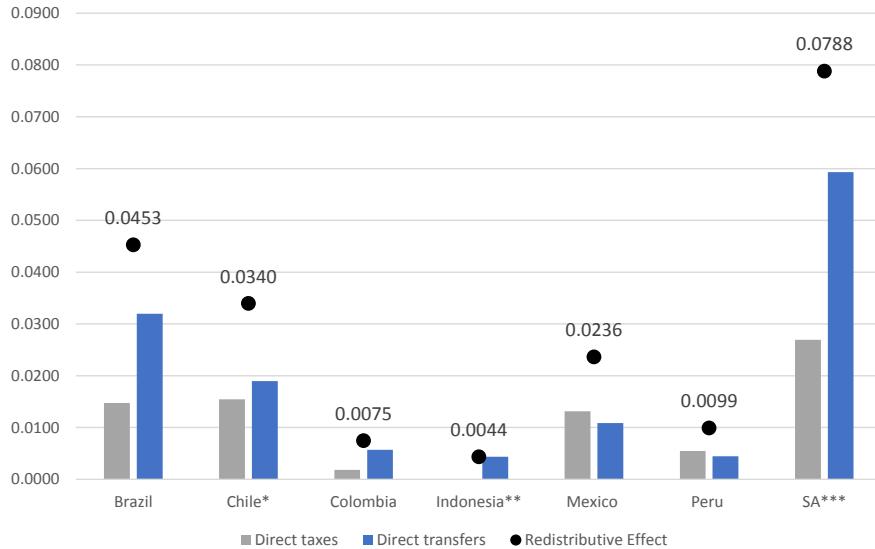
<sup>54</sup> For example, the data published by EUROMOD, op cit.

<sup>55</sup> In addition, this decile-based analysis assumes no reranking. Hence, it is not presented for the pensions as transfers case because there reranking is for sure quite important. For the scenario with pensions as market income, the extent of reranking caused by redistributive policy is small so the decile-based analysis is a good approximation.

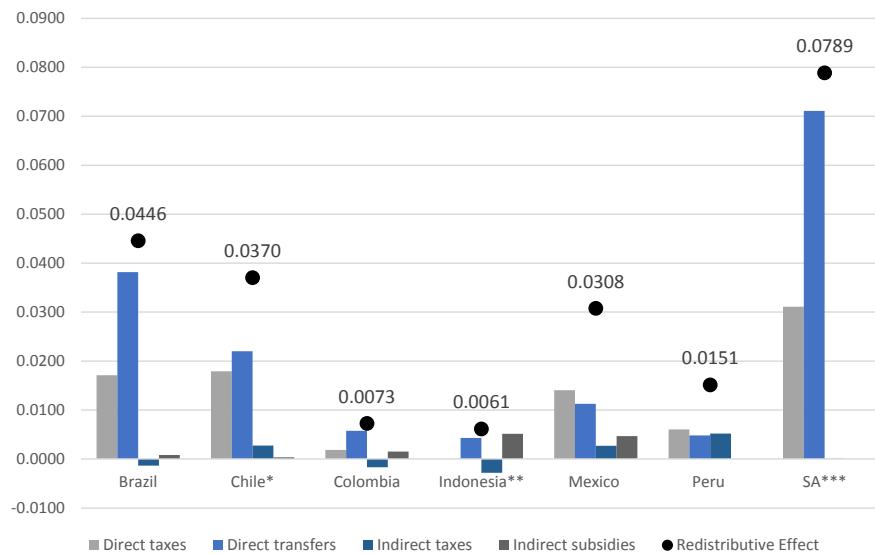
<sup>56</sup> Note that for the reasons mentioned in the paragraph immediately above, one cannot compare the orders of magnitude between categories of income.

<sup>57</sup> Although not shown here, the same is true for in-kind transfers. These are not shown because the marginal contribution is identical to the sequential contribution presented in Figure 4.1 given that in-kind transfers are added at the end.

<sup>58</sup> Note that one cannot compare orders of magnitude between interventions in an exact way because one drawback of the marginal contribution method is that the sum of all the marginal contributions is not equal to the total redistributive effect.



Panel b. Redistributive Effect from Market to Post-Fiscal



Source: author's calculations based on Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Notes:

Redistributive effect equals the difference between market income Gini and disposable income Gini or post-fiscal income Gini.

These calculations are based on the distribution of income and fiscal interventions by decile. The differences between the redistributive effect presented here and those found in other graphs or tables is because the latter were calculated using the entire sample. The calculations presented here ignore the intra-decile distribution.

Fiscal interventions that do not apply to a certain country are left blank.

\* Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

\*\* The Indonesian survey does not include individuals beyond the income at which direct taxes begin to apply, this scenario uses a consumption based survey

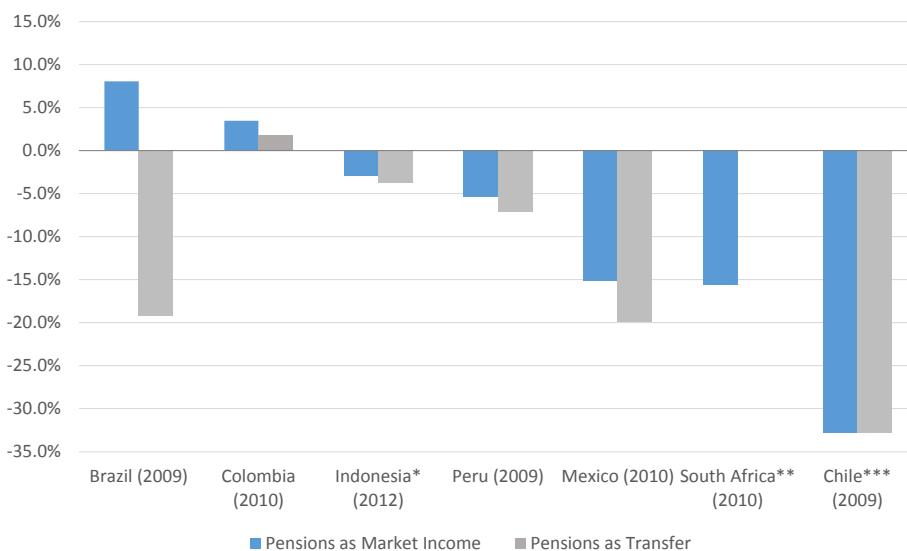
\*\*\* The South Africa scenario assumes Free Basic Services as direct transfers. The fiscal incidence analysis for South Africa does not include a scenario with contributory pensions as transfers.

## 5. Fiscal Policy and the Poor

The above discussion has concentrated on the impact of fiscal policy on inequality. As important is the impact of fiscal policy on poverty. In particular, because the results not necessarily go in the same direction: i.e., an inequality reducing fiscal system could be poverty increasing. The effect of fiscal policy on poverty can be measured using the typical indicators such as the headcount ratio for market income and income after taxes and transfers. Another measure that one can use to assess the impact of fiscal policy on the poor is the extent to which market income poor end up being net payers to the fiscal system in cash terms (leaving out in-kind services).

When both direct and indirect taxes are included and using the \$2.50 ppp a day poverty line,<sup>59</sup> fiscal policy reduces the headcount ratio in Chile, Indonesia, Mexico, Peru and South Africa (Figure 7).<sup>60</sup> However, there is a startling result. In the scenario in which pensions are considered deferred income, while Brazil's and Colombia's poverty rates decline as a result of direct transfers (not shown in the Figure), the effect of consumption taxes is such that post-fiscal income poverty is *higher* than market income poverty in both countries. In the case of Brazil, this is clearly the consequence of its tax system in which basic foodstuff such as rice and beans end up being heavily taxed.<sup>61</sup> This is a worrisome result. Poverty should not be higher as a result of fiscal policy. Note that both Brazil and Colombia show this feature despite the fact that the net fiscal system (even without including in-kind transfers) reduces inequality. This emphasizes the fact that the impact of fiscal interventions on inequality and poverty should be studied separately.

**Figure 7: Fiscal Policy and Poverty Reduction (circa 2010)**  
 (Change in Headcount Ratio from Market to Post-fiscal Income for Pensions in Market Income and  
 Pensions in Transfers; in %)<sup>a</sup>



Source: author's calculations based on Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Notes:

<sup>59</sup> The \$2.50 ppp a day poverty line is considered to be a reasonable international extreme poverty line for middle-income countries: for example, in the case of Latin America, this poverty line is close to the average of the local extreme poverty lines.

<sup>60</sup> Chile's result is particularly high because market income poverty is lower in Chile than in the other countries. Thus, a similar change in percentage points represents a large change when measured in percentage change as done in Figure 6 above.

<sup>61</sup> See Higgins and Pereira (2014).

a. Poverty is measured with the international poverty line of US\$2.50 ppp/day (with the 2005 ppp). Countries are ranked by the change in poverty for the scenario where contributory pensions are included in market income.

\*Data for Indonesia is consumption-based and income-based for the rest.

\*\*The South Africa scenario assumes Free Basic Services as direct transfers. The fiscal incidence analysis for South Africa does not include a scenario with contributory pensions as transfers, hence it is not shown above.

\*\*\* Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

When analyzing the impact of fiscal interventions on living standards, it is useful to distinguish between the net benefits in cash from the benefits received in the form of free government services in education and health. The cash component is measured by post-fiscal income. The level of post-fiscal income will tell whether the government has enabled an individual to be able to purchase private goods and services above his or her original market income.

In principle, it would be desirable for the poor—especially the extreme poor—to be net receivers of fiscal resources in cash so that poor individuals can buy/consume the minimum amounts of food and other essential goods imbedded in the selected poverty line. Figure 8 shows at which market income category, individuals—on average—become net payers to the fiscal system (again, this calculation only takes into account direct transfers in cash or near cash such as food).<sup>62</sup> In Brazil net payers to the fiscal system begin in the income category \$US2.50-\$US4/day in purchasing power parity. That is, in the group classified as moderately poor. In the case of Chile, Colombia, Mexico, Peru and South Africa, the net payers start in the group known as “vulnerable.” In Indonesia, only the “rich” are net payers to the fiscal system (on average).<sup>63</sup> If contributory pensions are considered a government transfer, net payers to fiscal system start at the lowest income group in Chile (the \$US4 – 10 ppp/day). In Brazil and Mexico, the net payers start in the “middle class” and in Indonesia there are no net payers.<sup>64</sup>

**Figure 8: Net Payers to the Fiscal System (circa 2010)**

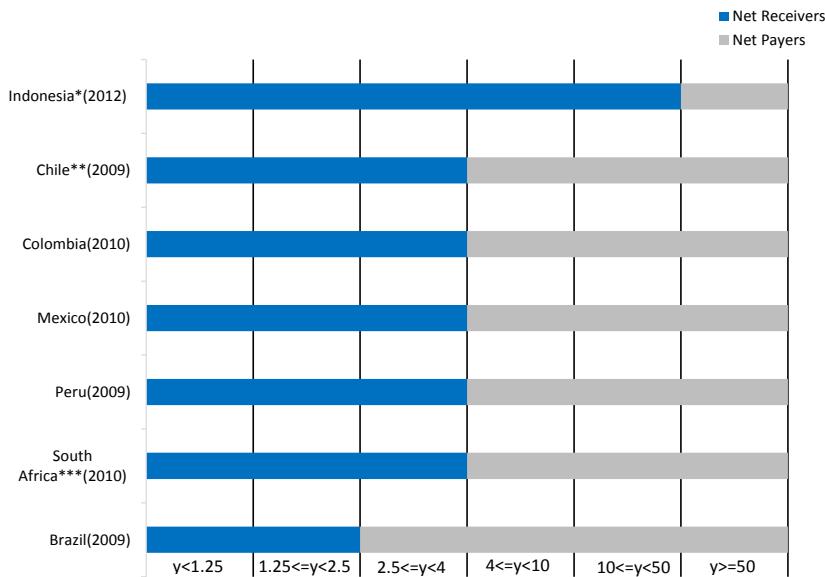
Panel a: Pensions as Market Income

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<sup>62</sup> Note that this graph presents a nonanonymous result: it looks at the extent to which the market income poor become net payers to the fiscal system on average. This information cannot be extrapolated from the typical poverty measures where winners and losers are not tracked.

<sup>63</sup> These income categories are based on Lopez-Calva and Ortiz (2014) and Ferreira et al. (2012).

<sup>64</sup> For Colombia and Peru, information for the case with pensions as government transfers is not available. The only contributory pensions in South Africa are for public servants who must belong to the Government Employees Pension Fund. Since the government made no transfers to the GEPF in 2010/11, there is no scenario in which contributory pensions are treated as a transfer.



Source: author's based on Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Note: year of household survey in parenthesis. The income categories are based on Lopez-Calva and Ortiz (2014) and Ferreira et al. (2012).

\* For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences.

\*\* Chile only has a pay-as-you-go system for older workers and a fully funded system running since 1980 based on individual accounts. The contributions to the old system (the ones that may subsist) are not available as a separate item in National Accounts. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

\*\*\* The results for South Africa are for the scenario in which Free Basic Services are considered a direct transfer. For details, see Inchauste, op. cit.

These results are the consequence of a variety of factors. In the case of Brazil, it is the consequence of consumption taxes on basic foodstuffs that wipe out the benefits from direct transfers such as Bolsa Familia for a considerable number of the market income poor. In the case of Indonesia, direct taxes start at income levels that are higher than the highest income in the survey and the indirect taxes are not high; in addition, the energy subsidies in Indonesia, although not targeted to the poor in particular, do help the poor as well as the “vulnerable” and “middle-class” groups.

## 5. Education and Health Spending<sup>65</sup>

To what extent are the poor benefitting from government spending on education and health? The pro-poorness of public spending on education and health here is measured using concentration coefficients (also called quasi-Ginis).<sup>66</sup> In keeping with conventions, spending is defined as regressive whenever the concentration coefficient is higher than the Gini for market income. When this occurs, it means that the

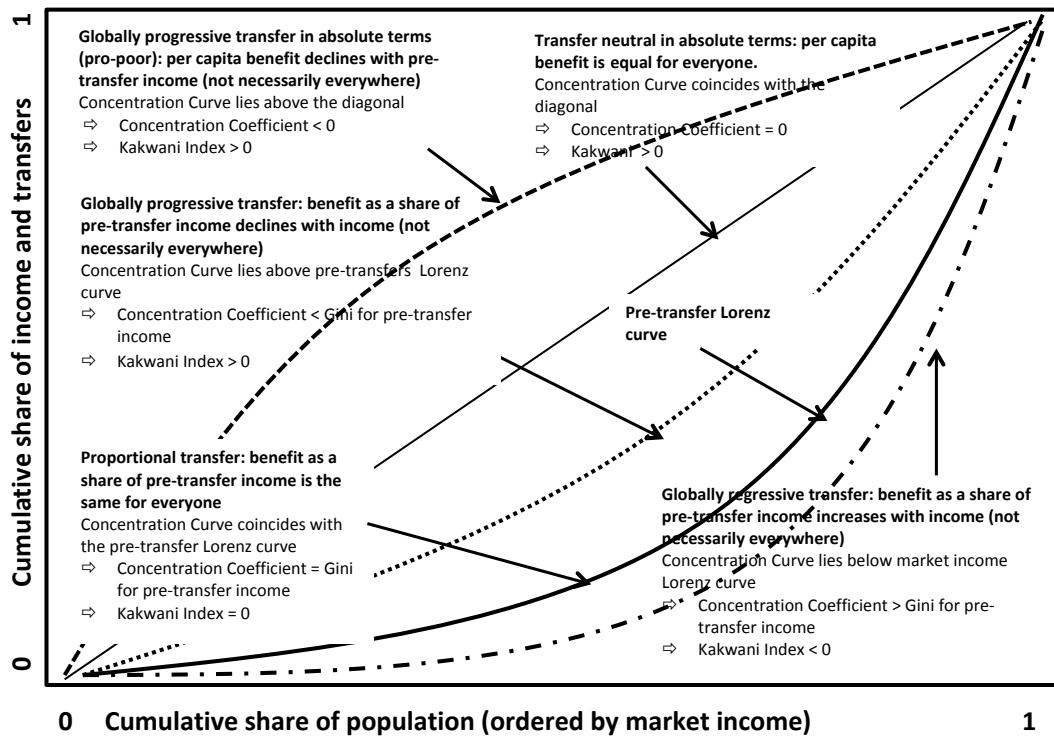
<sup>65</sup> Section based on Lustig (2015b).

<sup>66</sup> A concentration coefficient is calculated in a way analogous to the Gini coefficient. Let  $p$  be the cumulative proportion of the total population when individuals are ordered in increasing income values using market income, and let  $C(p)$  be the concentration curve, i.e., the cumulative proportion of total program benefits (of a particular program or aggregate category) received by the poorest  $p$  percent of the population. Then, the concentration coefficient of that program or category is defined as  $2 \int_0^1 (p - C(p)) dp$ .

benefits from that spending as a share of market income *tend* to rise with market income.<sup>67</sup> Spending is progressive whenever the concentration coefficient is lower than the Gini for market income. This means that the benefits from that spending as a share of market income tend to fall with market income. Within progressive spending, spending is neutral in absolute terms -- spending per capita is the same across the income distribution--whenever the concentration coefficient is equal to zero. Spending is defined as *pro-poor* whenever the concentration coefficient is not only lower than the Gini but also its value is negative. Pro-poor spending implies that the *per capita* government spending on the transfer *tends* to fall with market income.<sup>68</sup> Any time spending is pro-poor or neutral in absolute terms, by definition it is progressive. The converse, of course, is not true.<sup>69</sup> The taxonomy of transfers is synthesized in Diagram 2.

**Diagram 2: Progressivity of Transfers**

**Progressivity of Transfers: A Diagrammatic Representation**



Source: Lustig et al. (forthcoming).

A clarification is in order. In the analysis presented here, households are ranked by per capita market income, and no adjustments are made to their size because of differences in the composition by age and

<sup>67</sup> I say “tend” because for global regressivity/progressivity to occur it is not a necessary condition for the share of the benefit to rise/fall at each and every income level. When the latter occurs, the benefit is regressive/progressive *everywhere*. Whenever a benefit is *everywhere* regressive/progressive, it will be *globally* regressive/progressive, but the converse is not true.

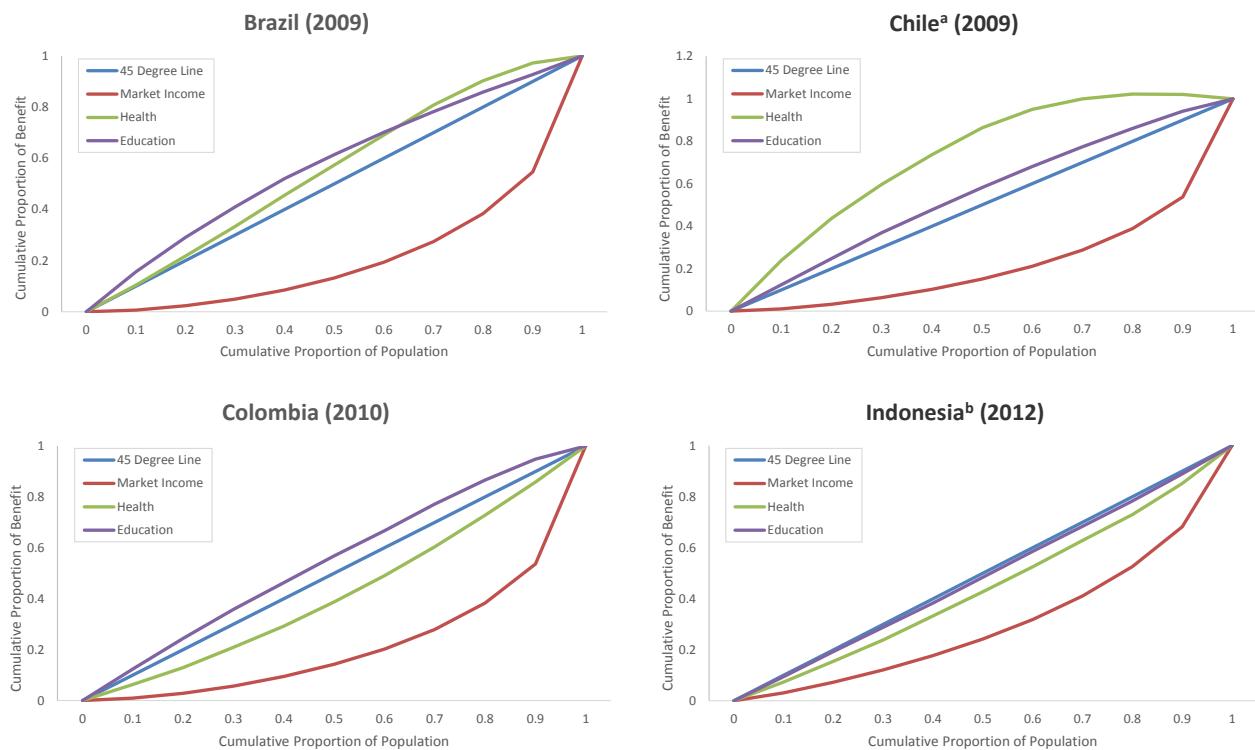
<sup>68</sup>This case is also sometimes called progressive in absolute terms.

<sup>69</sup> As mentioned above, care must be taken not to infer that any spending that is progressive (regressive) will automatically be equalizing (unequalizing).

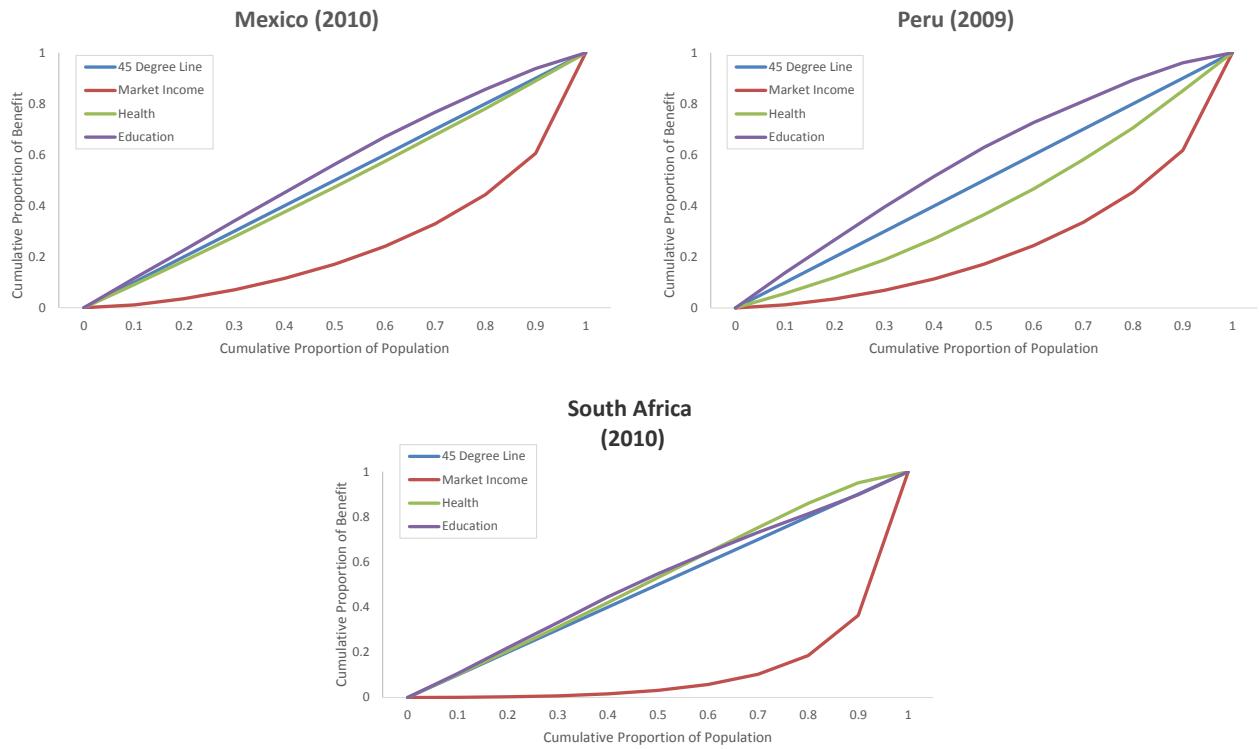
gender. In some analyses, the pro-poorness of education spending, for example, is determined using children—not all members of the household—as the unit of analysis. Because poorer families have, on average, a larger number of children, the observation that concentration curves are pro-poor is a reflection of this fact. It doesn't mean that poorer families receive more resources per child.

Figure 9 shows the market and final income Lorenz curves and the concentration curves for education and health spending for each country. Brazil, Chile and South Africa “push” the market income Lorenz curve outward (towards the diagonal) the most while Indonesia the least.<sup>70</sup> While in Brazil and South Africa this result is driven primarily by the level of spending on education and health and its progressivity, Chile’s level of spending is lower but its progressivity, especial in health spending, is much higher, as can be observed in Figure 10.

**Figure 9: Lorenz Curves for Market and Final Income and Concentration Curves for Education and Health (circa 2010)**



<sup>70</sup> The fact that South Africa stands out as the most redistributive is also a consequence of it being the country with the highest market income inequality. See, for example, Figure 7.2 in OECD (2011).



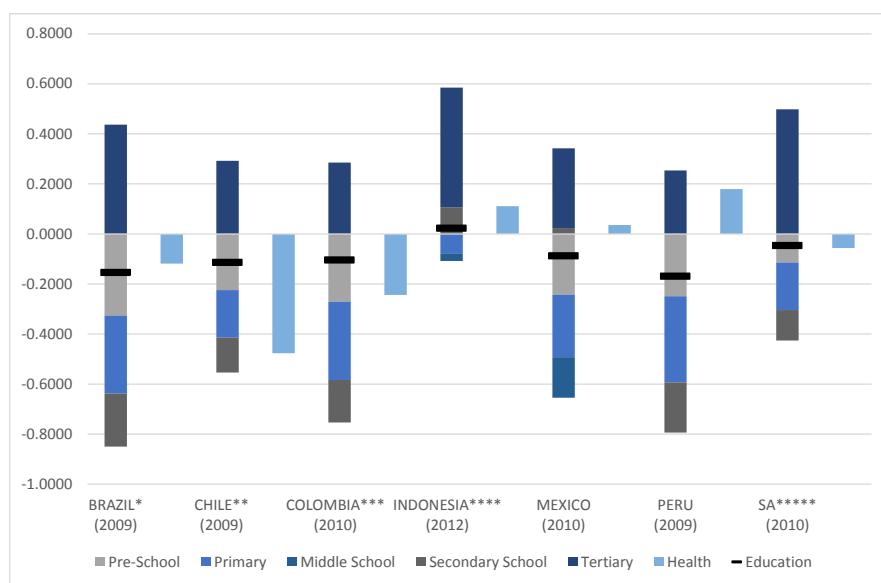
Source: author's based on Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; Indonesia: Afkar et al., 2015; Mexico: Scott, 2014; Peru: Jaramillo, 2014; South Africa: Inchauste et al., 2015.

Note: year of household survey next to name.

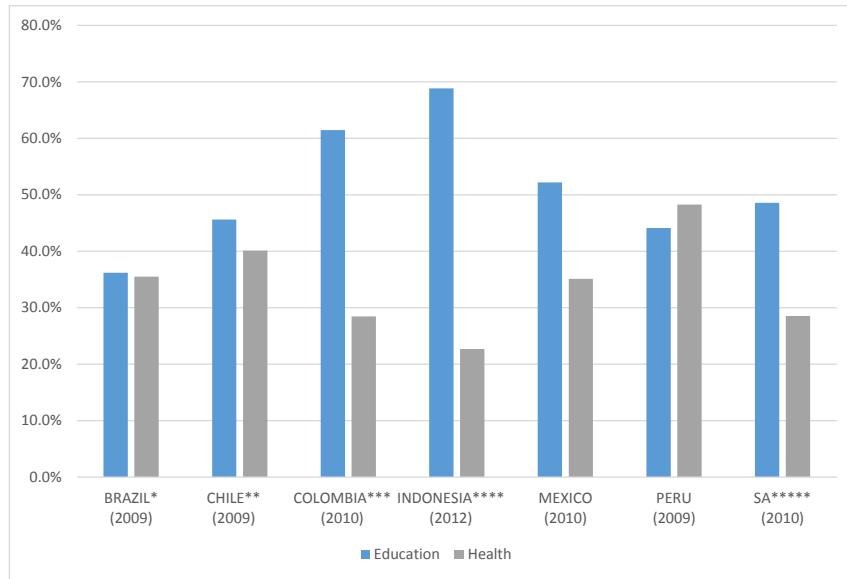
- a. The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.
- b. The Indonesian survey does not include individuals beyond the income at which direct taxes begin to apply, this scenario uses a consumption based survey

**Figure 10: Concentration Coefficients and Budget Shares for Education and Health**

Panel A. Concentration coefficients for education and health



Panel B. Education and health spending as a share of household market income



Source: Lustig (2015b).

Note: Year of survey in parenthesis. Budget share is measured with total spending on direct transfers, education and health in the denominator.

\* Note that the total for education spending on this figure does not equal total education spending in Brazil because the latter includes spending on other types of education, an item that accounts for 1.3 percent of GDP (9.95 Percent of the budget).

\*\* The data for Chile is based on the survey information released by the government before they changed the methodology in 2013. In the past, income variables were adjusted for under-reporting before the microdata was released to the public. Hence, current versions of Gini are lower than they used to be because top incomes are no longer adjusted upwards.

\*\*\* For Colombia, this figure does not include spending on the contributory health system. In other figures and tables of this paper it does.

\*\*\*\* The Indonesian survey does not include individuals beyond the income at which direct taxes begin to apply, this scenario uses a consumption based survey

\*\*\*\*\* Note that the total for education spending on this figure does not equal total education spending in South Africa because the latter includes spending on other types of education, an item that accounts for 1.05 percent of GDP (7.27 percent of the budget).

Table 3 summarizes the results regarding the pro-poorness of government spending on education (total and by level) and health. Total spending on education is pro-poor in all countries except for Indonesia, where it is (approximately) neutral in absolute terms. Pre-school tends to be pro-poor in all countries for which there is data, particularly so in South Africa. Primary school is pro-poor in all countries. For secondary school, the pattern is quite heterogeneous. It is progressive only in relative terms in Indonesia, (roughly) neutral in absolute terms in Mexico, and pro-poor in the rest. Government spending on tertiary education is regressive in Indonesia and progressive only in relative terms in various degrees in the rest. Compared with their respective levels of market income inequality, spending on tertiary education is most progressive in South Africa followed by Colombia and Chile.

Health spending is progressive in only relative terms in Indonesia and Peru; roughly neutral in absolute

terms in Mexico; and, pro-poor in Brazil, Chile, Colombia and South Africa. Compared to their market income inequality (i.e., the Kakwani index), the lowest progressivity is found in Indonesia and Peru.

**Table 3: Progressivity and Pro-poorness of Education and Health Spending. Summary of Results**

	Educ Total		Pre-school		Primary		Secondary		Tertiary		Health				
	Pro-poor CC is negative	Same per capita for all; CC=0	Progressive CC positive but lower than market income Gini	Pro-poor CC is negative	Same per capita for all; CC <0	Progressive CC positive but lower than market income Gini	Pro-poor CC is negative	Same per capita for all; CC=0	Progressive CC positive but lower than market income Gini	Pro-poor CC is negative	Same per capita for all; CC=0	Progressive CC positive AND higher than market income Gini	Pro-poor CC is negative	Same per capita for all; CC=0	Progressive CC positive but lower than market income Gini
Brazil (2009)	+			+			+			+			+		
Chile (2009)	+			+			+			+			+		
Colombia (2010)	+			+			+			+			+		
Indonesia (2012)		+		na			+			+					+
Mexico (2010)	+			+			+			+			+		+
Peru (2009)	+			+			+			+			+		+
South Africa (2010)	+			+			+			+			+		+

\*CC is almost equal to market income Gini coefficient

If the Concentration Coefficient is higher or equal to -0.5 but not higher than 0.5, it was considered equal to 0.

Source: Lustig (2015b).

While the results regarding the pro-poorness of spending on education and health are quite encouraging, a caveat is in order. Guaranteeing access and facilitating usage of public education and health services for the poor is not enough. As long as the quality of schooling and healthcare provided by the government is low, distortive patterns (e.g., mostly the middle-classes and the rich benefitting from free tertiary education),<sup>71</sup> such as those observed in Brazil and South Africa, will be a major obstacle to the equalization of opportunities. However, with the existing information, one cannot disentangle to what extent the progressivity or pro-poorness of education and health spending is a result of differences in family composition (i.e., the poor have more children and, therefore, poor households receive higher benefits in the form of basic education transfers) or frequency of illness (i.e., the poor have worst health than the nonpoor) versus the “opting-out” of the middle-classes and the rich.

## 6. Conclusions (to be revised)

In this paper, I examine the redistributive impact of fiscal policy in seven middle-income countries: Brazil, Chile, Colombia, Indonesia, Mexico, Peru and South Africa. In particular, I address the following questions: What is the impact of fiscal policy on inequality and poverty? What is the contribution of direct taxes and transfers, net indirect taxes and spending on education and health to the overall reduction in inequality? How pro-poor is spending on education and health?

In order to analyze the impact of fiscal policy on income inequality it is useful to separate the “cash” portion of the system (direct and indirect taxes, direct transfers and indirect subsidies) from the “in kind” portion (the monetized value of the use of government education and health services). The results show that the reduction in inequality induced by the cash portion of the fiscal system is quite heterogeneous, with South Africa redistributing the most and Indonesia the least. Redistributive success is determined primarily by the amount of resources devoted to (collected from) direct transfers (direct taxes) and their progressivity, and the presence of unequalizing net indirect taxes.

While the cash portion of the net fiscal system is always equalizing, the same cannot be said for poverty. In

<sup>71</sup> Among the reasons for this outcome is the fact that children of poor households tend to drop out of high school more and the rich children who receive enough quality (often private) education are better equipped to pass the entrance examination.

Brazil and Colombia, the headcount ratio measured with the international extreme poverty line of US\$2.50 ppp per day is higher for post-fiscal income than for market income. In these two countries, fiscal policy *increases* poverty, meaning that a significant number of the market income poor (nonpoor) are made poorer (poor) by taxes and transfers. This startling result is primarily the consequence of high consumption taxes on basic goods.

The marginal contribution of direct taxes and direct transfers is always equalizing. The marginal contribution of direct taxes is higher than the marginal contribution of direct transfers in Mexico and Peru while the converse is true in Brazil, Chile, Colombia, Indonesia and South Africa. The effect of net indirect taxes is unequalizing in Brazil, Colombia, Indonesia, neutral in South Africa but equalizing in Chile, Mexico and Peru. In Chile and South Africa, indirect taxes are regressive, and yet equalizing and neutral, respectively. That is, in these two countries one finds the counter-intuitive uncovered by Lambert (2001): a regressive tax is not always unequalizing. Measured with respect to market income only, the marginal contribution of contributory social security old-age pensions is equalizing in Brazil, Colombia and Indonesia and unequalizing in Chile, Mexico and Peru. Except for Brazil, the order of magnitude of the marginal contribution is rather small.

Turning now to the in-kind portion of the fiscal system, the marginal contribution of spending on education and health is always equalizing and rather large. The latter is not surprising given that the use of government services is monetized at a value equal to average government cost. Total spending on education is pro-poor in all countries except for Indonesia, where it is (approximately) neutral in absolute terms. Pre-school tends to be pro-poor in all countries for which there is data, particularly so in South Africa. Primary school is pro-poor in all countries. For secondary school, the pattern is quite heterogeneous. It is progressive only in relative terms in Indonesia, (roughly) neutral in absolute terms in Mexico, and pro-poor in the rest. Government spending on tertiary education is regressive in Indonesia and progressive only in relative terms in various degrees in the rest. Compared with their respective levels of market income inequality, spending on tertiary education is most progressive in South Africa followed by Colombia and Chile. Health spending is progressive in only relative terms in Indonesia and Peru; roughly neutral in absolute terms in Mexico; and, pro-poor in Brazil, Chile, Colombia and South Africa. Compared to their market income inequality (i.e., the Kakwani index), the lowest progressivity is found in Indonesia and Peru.

While the results concerning the distribution of the benefits of in-kind services in education and health are encouraging from the equity point of view, it is important to note that they may be due to factors one would prefer to avoid. The more intensive use of services in education and health on the part of the poorer portions of the population, for example, may be caused by the fact that, in their quest for quality, the middle-classes (and, of course, the rich) chose to use private providers. This situation leaves the poor with access to second-rate services. In addition, if the middle-classes opt out of public services, they may be much more reluctant to pay the taxes needed to improve both the coverage and quality of services than they would be if services were used universally.

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