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Fiscal policy, income redistribution and poverty reduction in low and middle income countries*

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Abstract

Using comparable fiscal incidence analysis, this paper examines the impact of fiscal policy on inequality and poverty in twenty-nine low and middle income countries for around 2010. Success in fiscal redistribution is driven primarily by redistributive efforts (share of social spending to GDP in each country) and the extent to which transfers 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. While spending on pre-school and primary school is pro-poor (the per capita transfer declines with income) in almost all countries, pro-poor secondary school spending is less prevalent, and tertiary education spending tends to be progressive only in relative terms (equalizing, but not pro-poor). Health spending is always equalizing except for in Jordan.

Keywords: H22, H5, D31, I3.

JEL Classification: fiscal incidence, social spending, inequality, poverty, developing countries.

*This Working Paper is Chapter 9 in Lustig, Nora (editor). 2018. Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty (Brookings Institution Press and CEQ Institute, Tulane University). The online version of the Handbook is available here: http://www.commitmentoequity.org/publications-ceq-handbook/. 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. The CEQ project is housed in the Commitment to Equity Institute at Tulane. For more details visit www.commitmentoequity.org. I am very grateful to Alan Gelb and two anonymous reviewers for their very helpful suggestions. I am also very grateful to Israel Martinez for his excellent help in preparing the database used here. All errors and omissions remain my sole responsibility.

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1. Introduction

This paper analyzes the impact of fiscal policy on inequality and poverty in twenty-nine low and middle income countries for around 2010.[1] The studies apply the same fiscal incidence methodology described in detail in Lustig and Higgins and Lustig and Higgins (2017), Higgins and Lustig (2017), and Higgins (2017).[2] With a long tradition in applied public finance, fiscal incidence analysis is designed to respond to the question of who benefits from government transfers and who ultimately bears the burden of taxes in the economy.[3] The fiscal policy instruments included here are: personal income and payroll taxes, direct transfers, consumption taxes, consumptions subsidies and transfers in-kind in the form of education and healthcare free or subsidized services.

The data utilized here is based on thirty CEQ Assessments available in the Commitment to Equity Institute's[4] database on fiscal redistribution (twenty-nine low and middle income countries and the United States): Argentina, Armenia, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Ethiopia, Georgia, Ghana, Guatemala, Honduras, Indonesia, Iran, Jordan, Mexico, Nicaragua, Peru, Russia, South Africa, Sri Lanka, Tanzania, Tunisia, Uganda, United States, Uruguay, and Venezuela. The CEQ Assessments for Bolivia, Brazil, Mexico, Peru, and Uruguay are published in a Public Finance Review special issue by Lustig, Pessino, and Scott.[5] The results for Ghana, Guatemala, and Tanzania, and also the United States, are published in other peer-reviewed journals.[6] The CEQ Assessments for Armenia, Ethiopia, Georgia, Indonesia, Jordan, Russia, South Africa, and Sri Lanka appear in the World Bank edited volume by Inchauste and Lustig[7]. The CEQ Assessments for Argentina, Chile, Dominican Republic, El Salvador, Iran, Tunisia, and Uganda are chapters in Lustig (2017).[8] The studies for Costa Rica, Ecuador, Honduras, and Nicaragua are available in the CEQ Working Paper series in www.commitmentoequity.org.[9] The results for Colombia, and Venezuela are in the CEQ Data

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[1] The World Bank classifies countries as follows. Low-income: US$1,025 or less; lower-middle-income: US$1,026-4,035; upper-middle-income: US$4,036-12,475; and, high-income: US$12,476 or more. The classification uses Gross National Income per capita calculated with the World Bank Atlas Method, June 2017: http://data.worldbank.org/about/country-and-lending-groups. Using the World Bank classification, the group includes three *low-income* countries: Ethiopia, Tanzania, and Uganda; ten *lower middle-income* countries: Armenia, Bolivia, El Salvador, Ghana, Guatemala, Honduras, Indonesia, Nicaragua, Sri Lanka, and Tunisia; fourteen *upper middle-income* countries: Argentina, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, Iran, Jordan, Mexico, Peru, Russia, South Africa, and Venezuela; and, two *high-income* countries: Chile, and Uruguay.

[2] Lustig and Higgins (2013); Lustig and Higgins (2017), Higgins and Lustig (2017), and Higgins (2017).

[3] Musgrave (1959); Pechman (1985); Martinez-Vazquez (2008).

[4] Launched first as a project in 2008, the Commitment to Equity Institute (CEQ) at Tulane University was created in 2015 with the generous support of the Bill and Melinda Gates Foundation.

[5] Lustig, Pessino, and Scott (2014). Bolivia: Paz-Arauco and others (2014a); Brazil: Higgins and Pereira (2014); Mexico: Scott (2014); Peru: Jaramillo (2014); and, Uruguay: Bucheli and others (2014a).

[6] Ghana: Younger, Osei-Assibey, and Oppong (2017); Guatemala: Cabrera, Lustig, and Moran (2015); Tanzania: Younger, Myamba, and Mdadila (2016a); and, United States: Higgins and others (2016).

[7] Inchauste and Lustig (2017). Armenia: Younger and Khachatryan (2017); Ethiopia: Hill and others (2017); Georgia: Cancho and Bondarenko (2017); Indonesia: Jellema, Wai-Poi, and Afkar (2017); Jordan: Alam, Inchauste, and Serajuddin (2017); Russia: Lopez-Calva and others (2017); South Africa: Inchauste and others (2017); and, Sri Lanka: Arunatilake, Inchauste, and Lustig (2017).

[8] Argentina: Rossignolo (2017a); Chile: Martinez-Aguilar and others (2017); Dominican Republic: Aristy-Escuder and others (2017); El Salvador: Beneke, Lustig, and Oliva (2017); Iran: Enami (2017b) and for a more comprehensive version see Enami, Lustig, and Taqdiri (2017a); Tunisia: Jouini and others (2017); and, Uganda: Jellema and others (2017).

[9] Costa Rica: Sauma and Trejos (2014a); Ecuador: Llerena and others (2015); Honduras: Icefi (2017a); and, Nicaragua: Icefi (2017b).

Center on Fiscal Redistribution (same website).[10] The household surveys used in the country studies include either income or consumption as the welfare indicator.[11] As explained in Lustig and Higgins (2017), given that contributory pensions are part deferred income and part government transfer, results were calculated under both scenarios (that is, as pure deferred income and pure government transfers).

While fiscal policy unambiguously reduces income inequality, that is not always true for poverty. In Ethiopia, Tanzania, Ghana, Nicaragua, Uganda, and Guatemala the extreme poverty headcount ratio is higher after taxes and transfers than before.[12] In addition, to varying degrees, in all countries a portion of the poor are net payers into the fiscal system and are thus impoverished by the fiscal system.[13] While all taxes can be poverty-increasing as long as the poor and near poor have to pay taxes, consumption taxes are the main culprits of fiscally-induced impoverishment. As for the impact of specific instruments on inequality, net direct taxes and spending on education and health are always equalizing and net indirect taxes are equalizing in nineteen countries of the twenty-nine. An examination of the relationship between pre-fiscal inequality and social spending (as a share of GDP) and fiscal redistribution suggests that there is no evidence of a "Robin Hood paradox;" the more unequal countries tend to spend more on redistribution and show a higher redistributive effect, but the coefficient for the latter is not always significant. However, preliminary results of regression-based analysis indicate that the positive association between initial inequality and the size of the redistributive effect is not robust across the board. When one controls for income per capita and leaves out the "outliers" or measures redistribution in percent change instead of Gini points, the coefficient is often not statistically significant.

Several caveats are in order. 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 counter-factual 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

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[10] Colombia: Melendez and Martinez (2015); and, Venezuela: Molina (2016).

[11] The household surveys are (the letters "I" and "C" refer to income -or consumption- based data): Argentina (I): Encuesta Nacional de Gasto de los Hogares, 2012-13; Armenia (I): Integrated Living Conditions Survey, 2011; Bolivia (I): Encuesta de Hogares, 2009; Brazil (I): Pesquisa de Orçamentos Familiares, 2008-2009; Chile (I): Encuesta de Caracterizacion Social, 2013; Colombia (I): Encuesta Nacional de Calidad de Vida, 2010; Costa Rica (I): Encuesta Nacional de Hogares, 2010; Dominican Republic (I): Encuesta Nacional de Ingresos y Gastos de los Hogares, 2006-2007; Ecuador (I): Encuesta Nacional de Ingresos y Gastos de los Hogares Urbano y Rural, 2011-2012; El Salvador (I): Encuesta de Hogares de Propositos Multiples, 2011; Ethiopia (C): Household Consumption Expenditure Survey, 2010 -2011 and Welfare Monitoring Survey, 2011; Georgia (I): Integrated Household Survey, 2013; Ghana (C): Living Standards Survey, 2012-2013; Guatemala (I): Encuesta Nacional de Ingresos y Gastos Familiares, 2009-2010 and Encuesta Nacional de Condiciones de Vida, 2011; Honduras (I): Encuesta Permanente de Hogares de Propositos Multiples, 2011; Indonesia (C): Survei Sosial-Ekonomi Nasional, 2012; Iran (I): Iranian Urban and Rural Household Income and Expenditure Survey, 2011-2012; Jordan (C): Household Expenditure and Income Survey, 2010-2011; Mexico (I): Encuesta Nacional de Ingresos y Gastos de los Hogares, 2010; Nicaragua (I): Encuesta Nacional de Medicion de Nivel de Vida, 2009; Peru (I): Encuesta Nacional de Hogares, 2009; Russia (I): Russian Longitudinal Monitoring Survey of Higher School of Economics, 2010; South Africa (I): Income and Expenditure Survey, 2010-2011; Sri Lanka (C): Household Income and Expenditure Survey, 2009-2010; Tanzania (C): Household Budget Survey, 2011-2012; Tunisia (C): National Survey of Consumption and Household Living Standards, 2010; Uganda (C): Uganda National Household Survey, 2012- 2013; United States (I): Current Population Survey, 2011; Uruguay (I): Encuesta Continua de Hogares, 2009; Venezuela (I) Encuesta Nacional de Hogares por Muestreo (ENHM), third quarter 2012.

[12] Because most of the studies were completed before the latest revision of the World Bank's global poverty line, the line used here is the *old* poverty line of US$1.25 per day in purchasing power parity of 2005.

[13] Higgins and Lustig (2016).

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.

2. The Redistributive and Poverty Reducing Effect of Fiscal Policy

Two key indicators of a government's (or society's) commitment to equalizing opportunities and reducing poverty and social exclusion are the share of total income devoted to social spending and how equalizing and pro-poor this spending is[14]. Typically, redistributive social spending includes cash benefits[15] and benefits in kind such as spending on education and health.[16] As shown in Enami, Lustig, and Aranda (2017) and Enami (2017a),[17] the redistributive potential of a country does indeed depend on the size and composition of government spending and how it is financed, as well as the progressivity of all the taxes and government spending combined.

Analogously, the impact of fiscal policy on poverty, will depend on the size and incidence of government spending and revenues. Recall that, in theory, a fiscal system can be inequality reducing but poverty increasing. How so? If every individual in the system pays more in taxes than he or she receives in transfers but the proportion of net tax payments (as a share of pre-fiscal or market income) is higher for the rich than for the poor, the system would be inequality reducing but poverty increasing. As we shall see below, this result is not uncommon in actual fiscal systems, especially when we focus on the cash portion of the fiscal systems (those that do not include the impact of the monetized value of government services). Given the importance of the size and composition of government revenues and spending, we start by showing the patterns observed in the twenty-nine countries analyzed here.

2.1 Taxes and Public Spending: Levels and Composition

Figure 1 shows government revenues as a share of GDP for around 2010. The revenue collection patterns are heterogeneous. In general, indirect taxes are the largest component of government revenues (as a share of GDP), except for Iran, Mexico and Venezuela where nontax revenues from oil-producing companies is the largest) and South Africa, where the share of direct taxes is the largest. Iran, Venezuela and Mexico rely very heavily on oil-related nontax revenues; these revenues represent around 50 percent or more of total revenues.

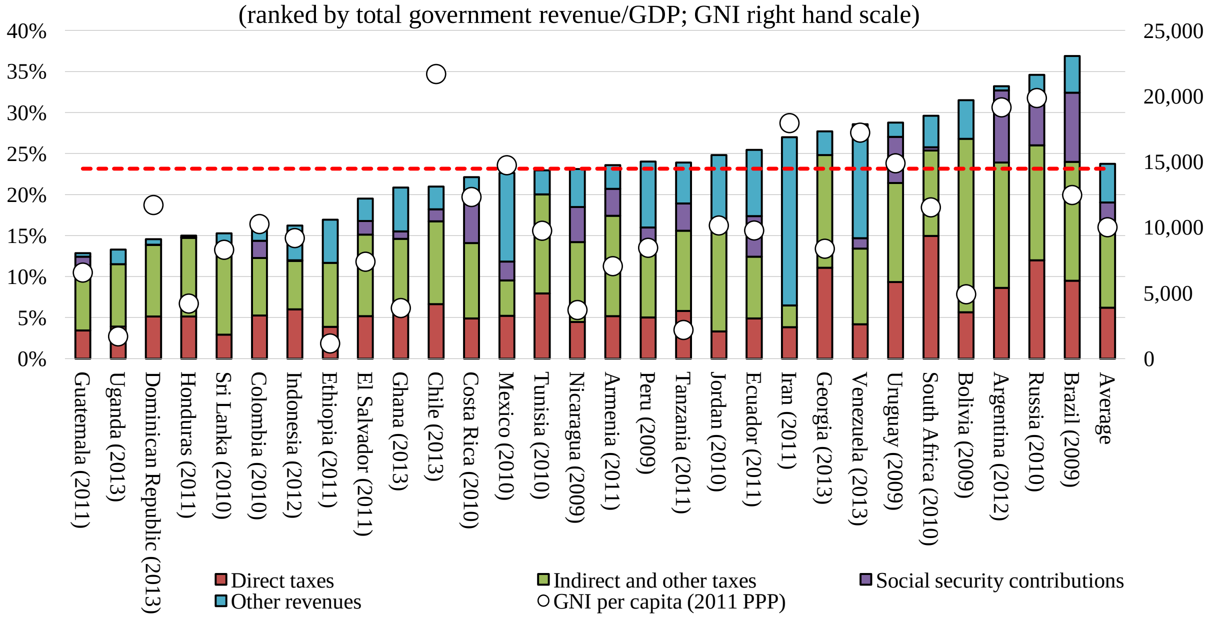
[14] Lindert (2004) and Barr (2012).

[15] "Cash" benefits typically include cash transfers and near-cash transfers such as school feeding programs and free uniforms and textbooks. Depending on the analysis, cash benefits also include consumption subsidies (for example, on food) and energy consumption and housing subsidies. The studies included here include cash and near-cash transfers as well as (in most cases) consumption subsidies. Housing subsidies are not included.

[16] Social spending as a category frequently includes spending on pensions funded by contributions. Following Lindert (1994), this analysis does not include them. Strictly speaking, one should include the subsidized portion of these pensions as part of redistributive social spending (for example, the portion of contributory pensions that is paid out of general revenues and not from contributions). However, estimates of these subsidies are hard to produce. As an alternative, the results for the scenario in which contributory pensions are treated as a government transfer and part of social spending are available upon request. Noncontributory pensions (also known as social or minimum pensions) are treated as any other cash transfer.

[17] Enami, Lustig, and Aranda (2017) and Enami (2017a).

Figure 1: Size and Composition of Government Revenues (as a % of GDP; circa 2010)



Source*:* CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).
Notes: The year for which the analysis was conducted is in parenthesis. Data shown here is administrative data as reported by the studies cited; the numbers do not necessarily coincide with those found in data bases from multilateral organizations (e.g., World Bank's WDI). Bolivia does not have personal income taxes. For Tanzania, fiscal year runs from July 2011 - June 2012. Gross National Income per capita on right axis is in 2011 PPP from World Development Indicators, August 29th, 2016 http://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD.

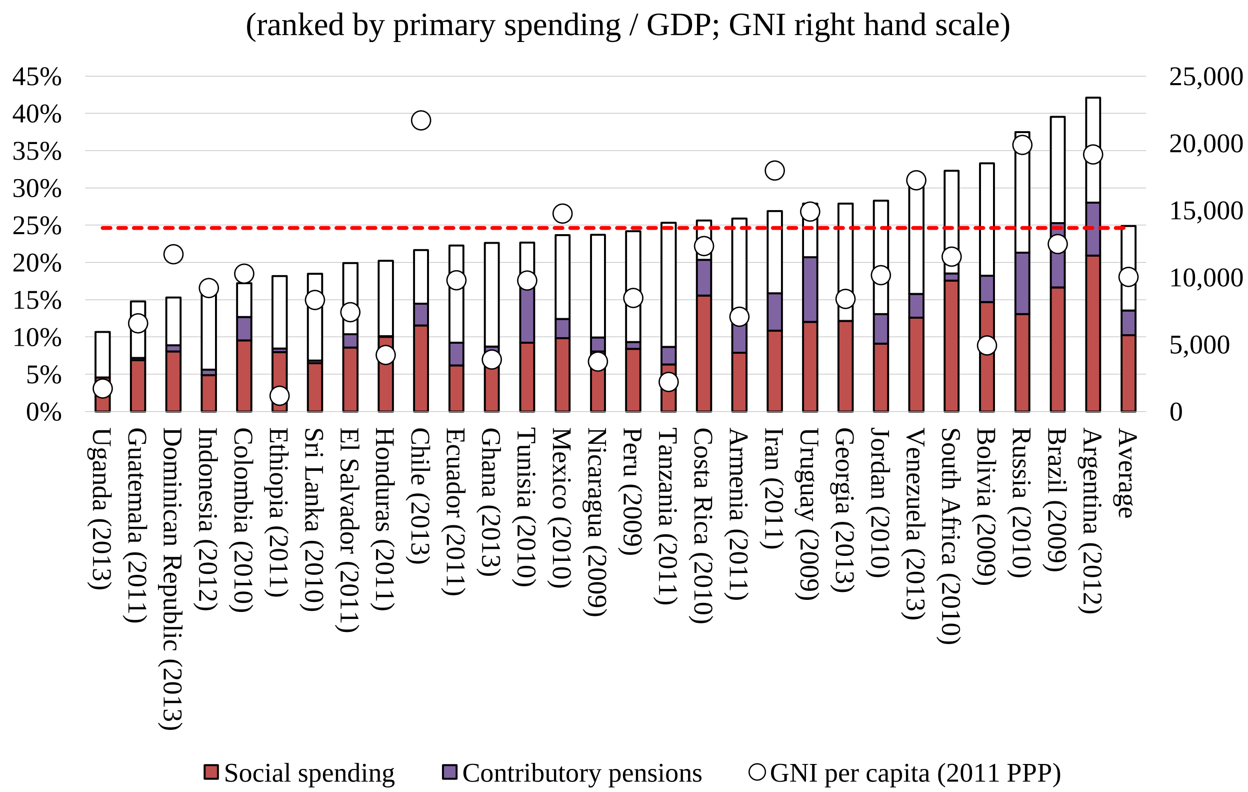
Figure 2 shows the level and composition of primary and social spending plus contributory pensions (panel A), and the composition of social spending for the following categories: direct transfers, education, health, other social spending, and contributory pensions around 2010 (panel B). On average, and excluding contributory pensions, the twenty-nine low-income and middle-income countries analyzed here allocate 10.2 percent of GDP to social spending while the advanced countries in the OECD group, allocate 18.8 percent of GDP, that is, almost twice as much. The twenty-nine countries on average spend 1.8 percent of GDP on direct transfers, 4.3 percent on education and 3.0 percent on health. In comparison, the OECD countries, on average, spend 4.4 percent of GDP on direct transfers, 5.3 percent on education and 6.2 percent on health.[18] The largest difference between the OECD group and our sample occurs in direct transfers. Regarding spending on contributory pensions (includes contributory pensions only and not social or noncontributory pensions, which are part of direct transfers), the twenty-

[18] The difference between the sum of these three items and the total in previous sentence is "Other social spending."

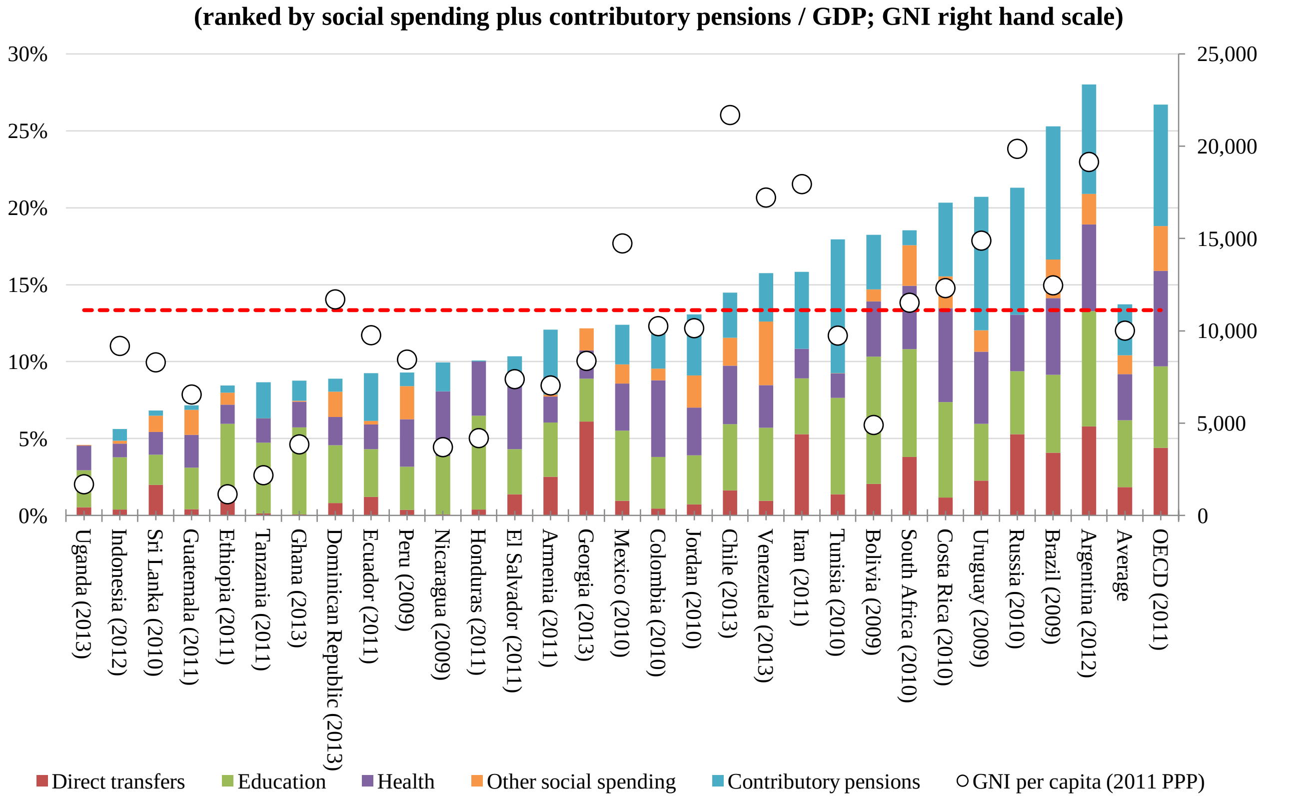
nine low-income and middle-income countries spend 3.3 percent of their GDP while OECD countries, spend 7.9 percent.

Figure 2: (Panel A and B): Size and Composition of Primary and Social Spending Plus Contributory Pensions (as a % of GDP; circa 2010)

Panel A: Primary and Social Spending Plus Contributory Pensions as a % of GDP



Panel B: Composition of social spending plus contributory pensions as a % of GDP.



Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

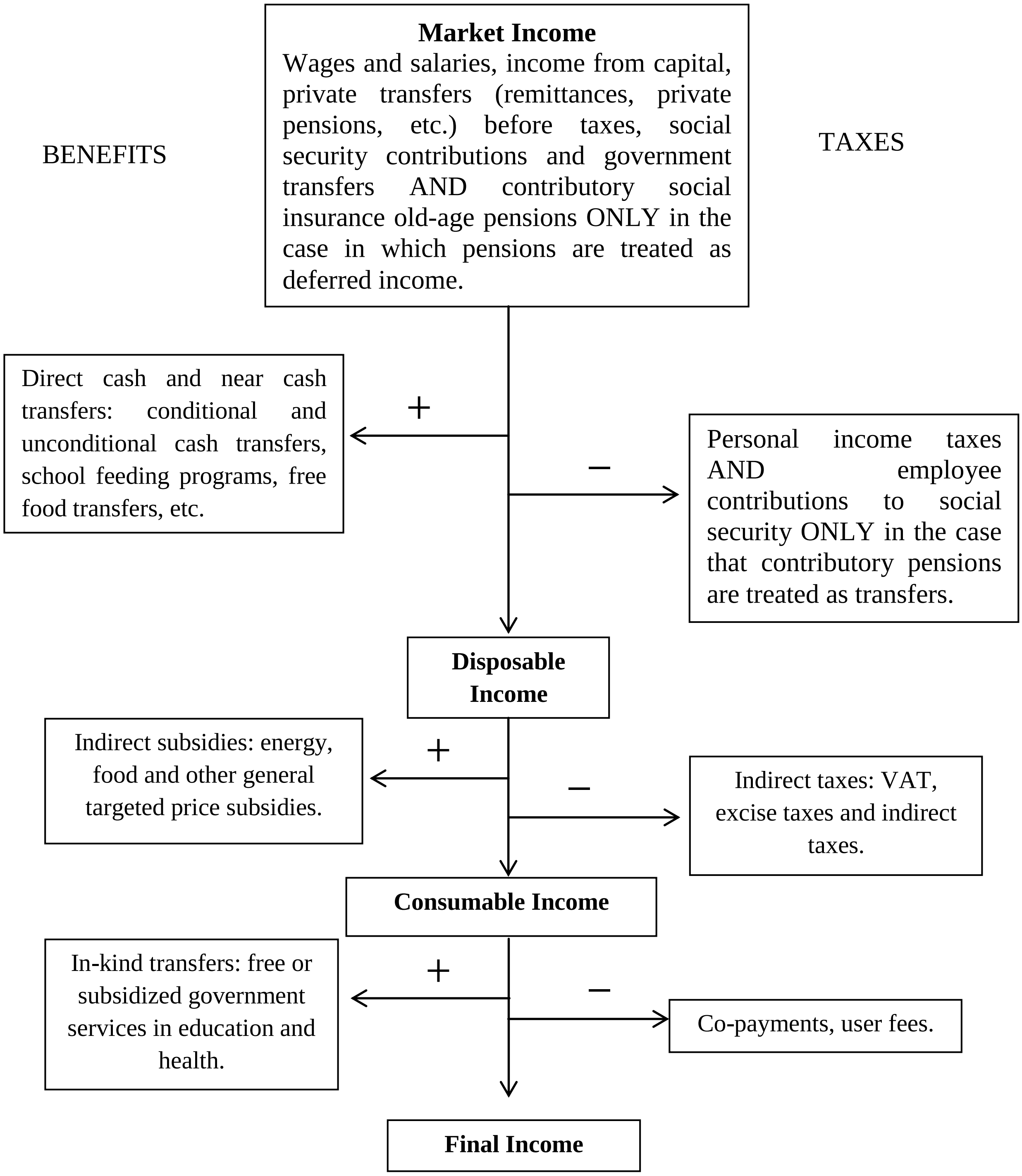
Notes: The year for which the analysis was conducted is in parenthesis. Data shown here is administrative data as reported by the studies cited; the numbers do not necessarily coincide with those found in data bases from multilateral organizations (e.g., World Bank's WDI). The scenario for South Africa assumed free basic services are direct transfers. For Tanzania, fiscal year runs from July 2011 - June 2012. Figure for OECD average (includes only advanced countries) was directly provided by the statistical office of the organization. Other social spending includes expenditures in housing and community amenities; environmental protection; and recreation, culture and religion. The only contributory pensions in South Africa are for public servants who must belong to the GEPF. The government made no transfers to the GEPF in 2010/11. The only contributory pensions in Sri Lanka are for public servants and income from pensions has been considered as part of the public employees' labor contract, rather than a transfer in spite of the fact that the funding comes from general revenues. Gross National Income per capita on right axis is in 2011 PPP from World Development Indicators, August 29th, 2016: http://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD.

Given the size of social spending excluding contributory pensions, Argentina, South Africa, and Brazil (from highest to lowest) show the largest amount of resources at their disposal to engage in fiscal redistribution. At the other end of the spectrum are Uganda, Indonesia, Sri Lanka, and Guatemala (from lowest to highest). Whether the first group 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 twenty-nine studies.

3. Fiscal Policy and Inequality

Recall that in order to measure the redistributive effect, each CEQ Assessment constructs four income concepts: market income, disposable income, consumable income, and final income. To refresh the reader's memory, we replicate the diagram presented in Lustig and Higgins (2017):

Diagram 1: Basic Income Concepts



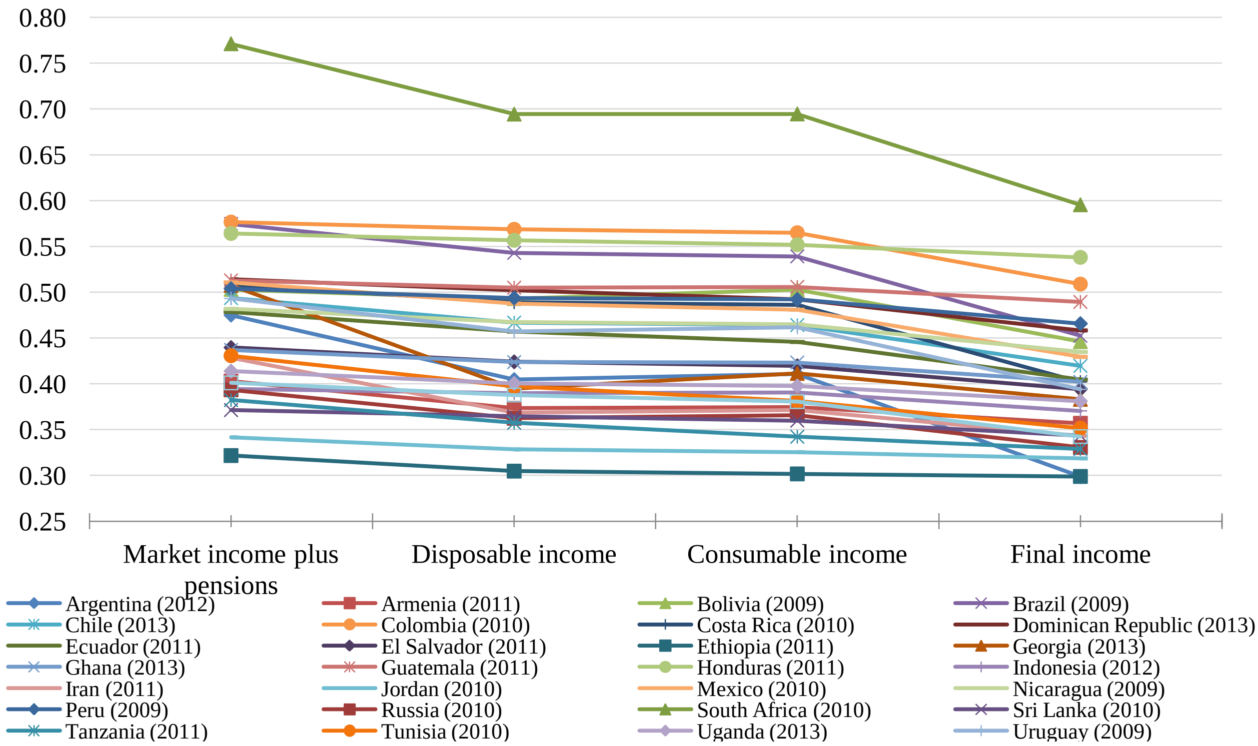
Source*:* Lustig and Higgins (2017)

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, where "after" can refer to just direct taxes and transfers as in disposable income, to the latter plus the effect of net indirect taxes as in consumable income, and to the latter plus the effect of education and health spending as in final income.[19] If the redistributive effect is positive (negative), fiscal policy is equalizing (unequalizing).

Figure 3 presents the Gini coefficient for market income and the other three income concepts shown in diagram 9-1: disposable, consumable and final income.[20] 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). Consumable 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 3: (Panel A and B): Fiscal Policy and Inequality (circa 2010): Gini Coefficient for Market, Disposable, Consumable, and Final Income

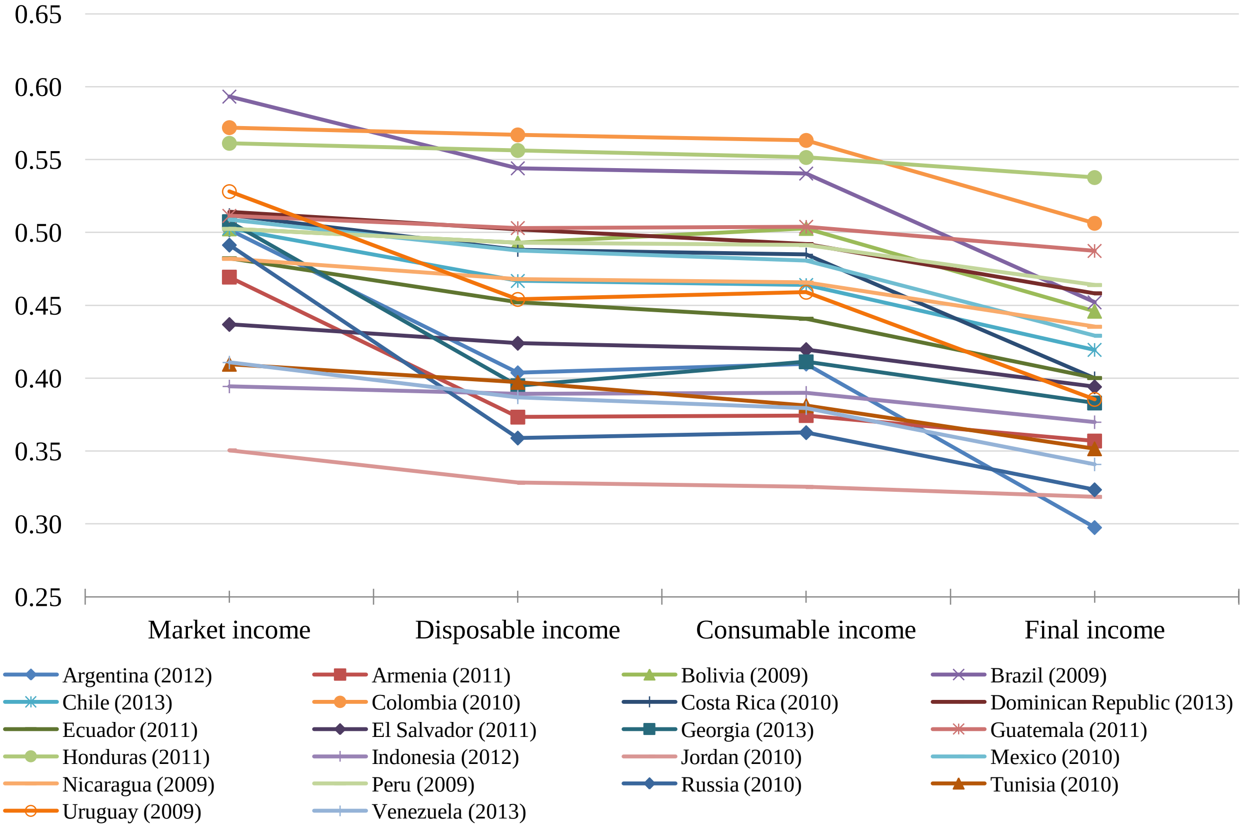
Panel A: Contributory pensions as deferred income.



[19] 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.

[20] 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: Contributory Pensions as Transfers



Source*:* CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

Notes*:* In Ethiopia, Ghana, Indonesia, Jordan, Sri Lanka, Tanzania, Tunisia and Uganda, consumption expenditure is the primary income measure, and as all other income concepts including market income are derived assuming that consumption expenditure is equal to disposable income. For Argentina, Ethiopia, Ghana, Indonesia, Jordan, Russia, South Africa and Tanzania, the study includes indirect effects of indirect taxes and subsidies. Bolivia does not have personal income taxes. In Bolivia, Costa Rica, Ecuador, Honduras, South Africa, and Sri Lanka, market income does not include consumption of own production because the data was either not available or not reliable. For Brazil, the results for the analysis presented here differ from the results published in Higgins and Pereira (2014) because the latter include taxes on services (ISS), on goods and services to finance pensions (CONFINS) and to finance Social Workers (PIS), while the results presented here do not include them. Post publishing the mentioned paper, the authors concluded that the source for these taxes was not reliable. Gini coefficients for Chile are estimated here using total income and, thus, differ from official figures of inequality which are estimated using monetary income (i.e., official figures exclude owner's occupied imputed rent). In South Africa, the results presented here assume that free basic services are a direct transfer. In Armenia, Costa Rica, Iran, Peru, South Africa and Uruguay, there are no indirect subsidies. Poverty headcount ratios and inequality rates for Uganda were estimated using adult equivalent income. For the rest of the countries, the indicators were estimated using per capita income. For Dominican Republic, the study analyzes the effects of fiscal policy in 2013, but the household income and expenditure survey dates back to 2006-07. For Indonesia, the fiscal incidence analysis was carried out adjusting for spatial price differences. Personal income taxes are assumed to be zero because the vast majority of households have implied market incomes below the tax threshold. The only contributory pensions in South Africa are for public servants who must belong to the GEPF. Since the government made no transfers to the GEPF in 2010/11, there is no scenario with contributory pensions as transfer. The only contributory pensions in Sri Lanka are for public servants and income from pensions has been considered as part of the public employees' labor contract, rather than a transfer in spite of the fact that the funding comes from general revenues. In other words, for Ethiopia, Ghana, Iran, South Africa, Sri Lanka, Tanzania, and Uganda, there is no scenario in which contributory pensions are considered as a transfer. Georgia has a noncontributory public pension scheme only and, therefore, they are only treated as a transfer. In all these cases, the scenario is the same in both panels. The scenario for pensions as deferred income for Iran defines market income as proposed in this Handbook while all the other studies define market income as proposed in the CEQ Handbook 2013. The results for Iran's pensions as deferred income scenario used the new definition of pre-fiscal income: factor income plus old-age contributory pensions MINUS contributions to old-age pensions. In the rest of the countries, the latter had not been subtracted.

As can be observed, in Ethiopia, Jordan, Guatemala, and Indonesia, fiscal income redistribution is quite limited while in Argentina, Georgia, South Africa, and Brazil, it is of a relevant magnitude. One can observe that --in the scenario in which contributory pensions are treated as deferred income--Argentina and South Africa are the countries that redistribute the most; South Africa, however, remains the most unequal even after redistribution. It is interesting to note that although Brazil and Colombia start out with similar market income inequality, Brazil reduces inequality considerably while Colombia does not. Similarly, Mexico, Costa Rica, and Guatemala start out with similar levels of market income inequality but Mexico and Costa Rica reduce inequality by more. Ethiopia is the less unequal of all twenty-nine and fiscal redistribution is also the smallest in order of magnitude. In almost all cases, the largest change in inequality occurs between consumable 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 explained in Lustig and Higgins (2017) and Higgins and Lustig (2017) -- 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.

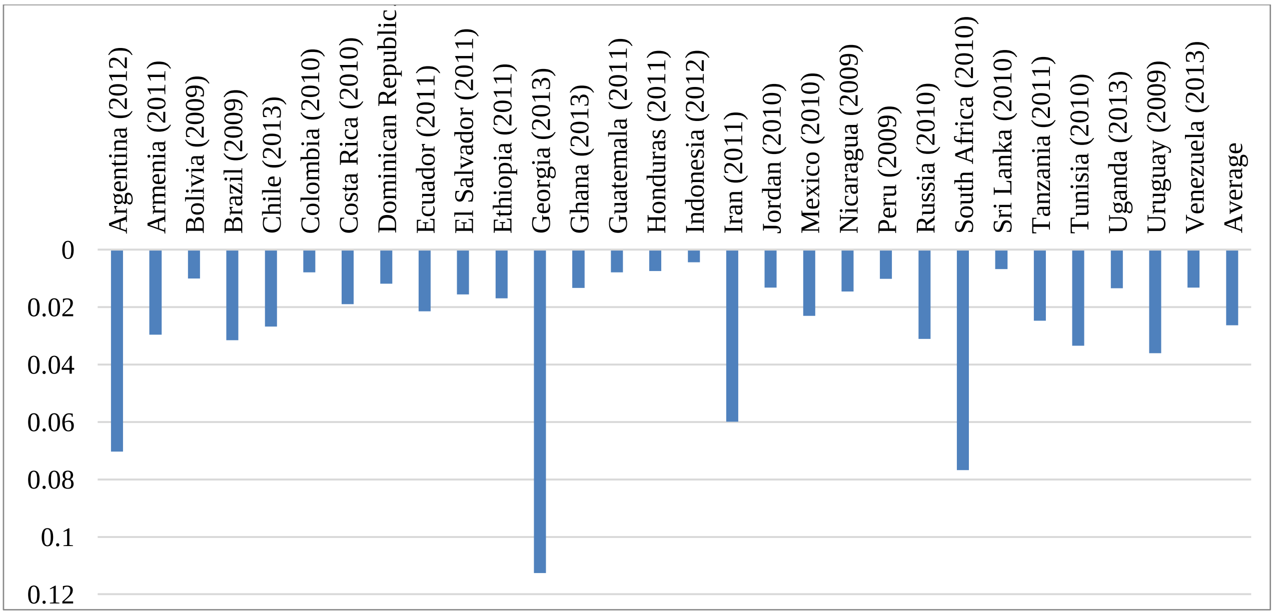
As indicated in Lustig and Higgins (2017), contributory pensions are in many cases a combination of deferred income and government transfer. Given that at present the CEQ methodology does not include a way to estimate which portion of a contributory pension is deferred income and which is a government transfer (or a tax, if the individual receives less than what he or she should have received given his/her contributions), the CEQ Assessments produce results for both "extreme" assumptions: contributory pensions as pure deferred income (in which contributions are a form of mandatory savings) and as pure government transfer (in which contributions are treated as any other direct tax). Panels A and B in figure 3 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 Argentina, Armenia, Brazil, Russia, and Uruguay, the redistributive effect is considerably larger when contributory pensions are treated as a transfer. These are countries with higher coverage and an older population. In Chile, Costa Rica, Ecuador, Jordan and Venezuela, the effect is larger but very slightly. Interestingly, in Bolivia, Colombia, El Salvador, Honduras, Mexico, Nicaragua, and Tunisia, the redistributive effect is smaller when contributory pensions are considered a government transfer versus deferred income.

4. Measuring the Marginal Contribution of Taxes and Transfers

As discussed in Lustig and Higgins (2017), the CEQ methodology measures the impact of a tax or a transfer by relying on the marginal contribution which, as formally discussed in Enami, Lustig and Aranda (2017), is equal to the difference between the Gini (or other inequality measures) for a post-fiscal income concept *without* the fiscal intervention of interest (for example, a particular tax) and the post-fiscal income including all the interventions. Figure 4 shows the marginal contribution on net direct taxes (direct taxes net of direct transfers), net indirect taxes (indirect taxes net of subsidies), and spending on education and health. Existing fiscal redistribution studies frequently stop at direct taxes and direct transfers.[21] Note that an equalizing (unequalizing) effect is presented with a positive (negative) sign but with downward point bars. [22] The first result to note is that net direct taxes are, as expected, always equalizing. The second result to note is that net indirect taxes are equalizing in nineteen of the twenty-nine countries. The marginal contribution of government spending on education and health is always equalizing.

Figure 4 (Panel A, B, and C): Marginal Contribution of Taxes and Transfers (circa 2010)

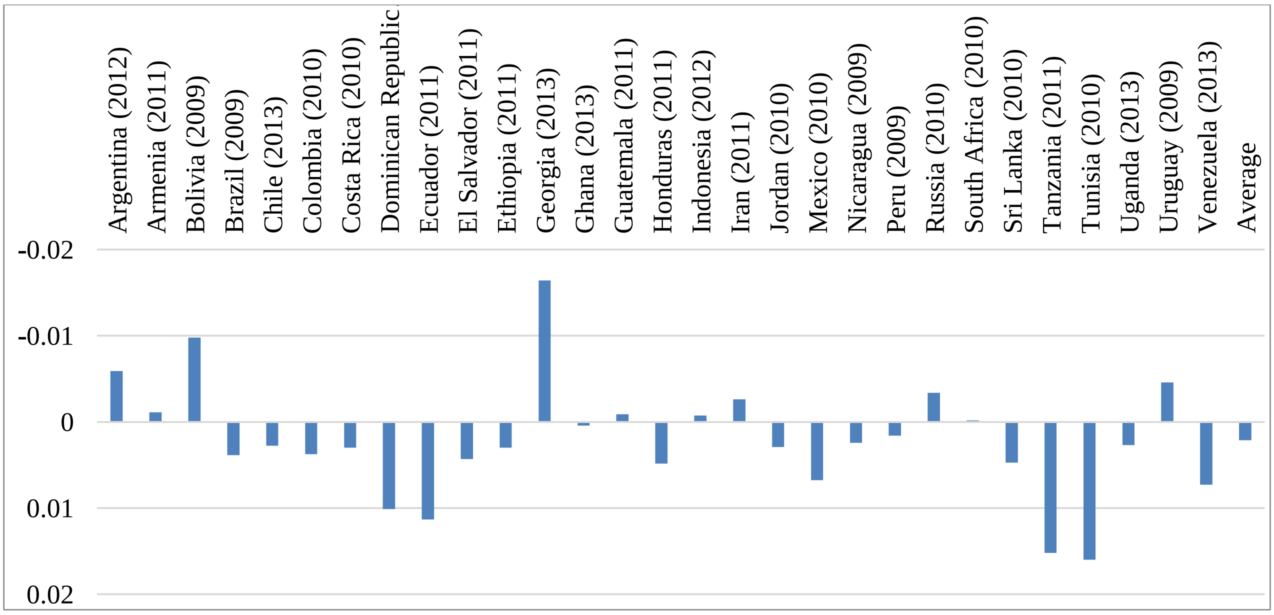
Panel A: Marginal Contributions of Net Direct Taxes (Contributory Pensions as Deferred Income).



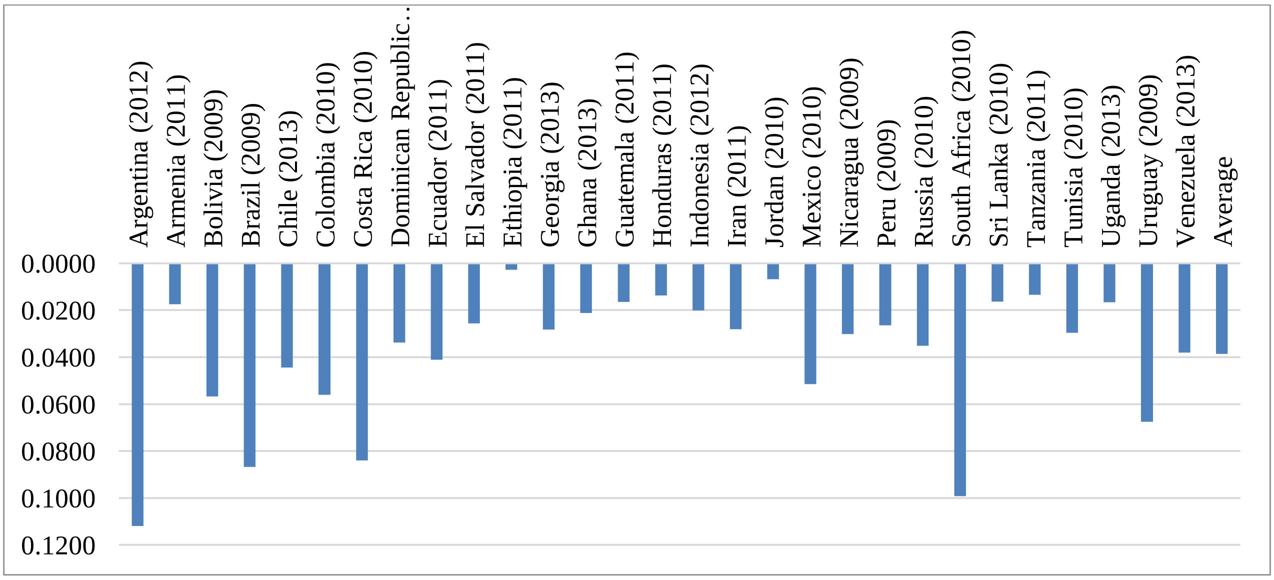
[21] For example, the data published by EUROMOD, op. cit.

[22] Note that for the reasons mentioned in the paragraph immediately above, one cannot compare the orders of magnitude between categories of income.

Panel B: Marginal Contributions of Net Indirect Taxes (Contributory Pensions as Deferred Income).



Panel C: Marginal Contributions of In-Kind Transfers in Education and Health (Contributory Pensions as Deferred Income).



Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

Notes: The marginal contribution of net direct taxes is calculated as the difference between Gini of market income plus contributory pensions and disposable income (panel A). The marginal contribution of net indirect taxes is calculated as the difference between Gini of disposable income and consumable income (panel B). The marginal contribution of in-kind transfers is calculated as the difference between Gini of consumable income and final income (panel C). Also, see notes on figure 3.

Country specific results indicate that, as expected, direct taxes, direct transfers, and spending on education and health are equalizing. However, contrary to expectations, indirect taxes, indirect subsidies, and spending on tertiary education are more frequently equalizing than unequalizing. Results also show the presence of Lambert´s conundrum (see Lustig and Higgins [2017] and Enami, Lustig and Aranda [2017]) in the case of Chile where the VAT is regressive --the Kakwani coefficients is negative-- and yet its marginal contribution is equalizing.[23]

5. Is There Evidence of a Robin Hood Paradox?

One of the most important findings in Lindert's[24] path-breaking work is that both across countries and over time, resources devoted to the poor are lower in the nations in which poverty and inequality are greater[25]. According to Lindert[26],

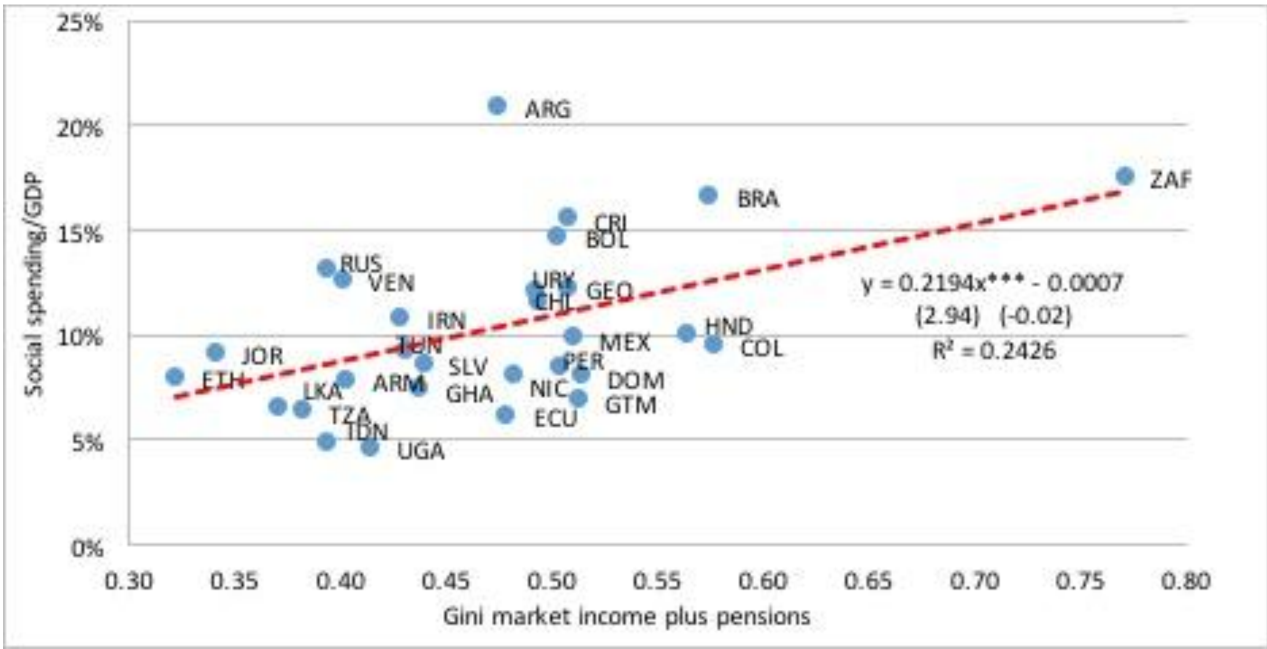
> History reveals a "Robin Hood paradox," in which redistribution from rich to poor is least present when and where it seems most needed. Poverty policy within any one polity or jurisdiction is supposed to aid the poor more, … the greater the income inequality. Yet over time and space, the pattern is usually the opposite. While there are exceptions to this general tendency, the underlying tendency itself is unmistakable, both across the globe and across the past three centuries.

An examination of the relationship between pre-fiscal inequality and social spending suggests that there is no evidence of a "Robin Hood paradox:" as it is shown in figure 5, the more unequal countries devote more resources to tax-based redistribution measured by the size of social spending as a share of GDP (even if we leave out "outliers," this result holds).

[23] These results are available upon request.
[24] Lindert (2004).
[25] Lindert (2004).
[26] Lindert (2004, 15).

Figure 5: Initial Inequality and Social Spending, circa 2010

(Social Spending/GDP and Market Income Plus Pensions Inequality (Contributory Pensions as Deferred Income))



Source*:* Author's estimates. CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

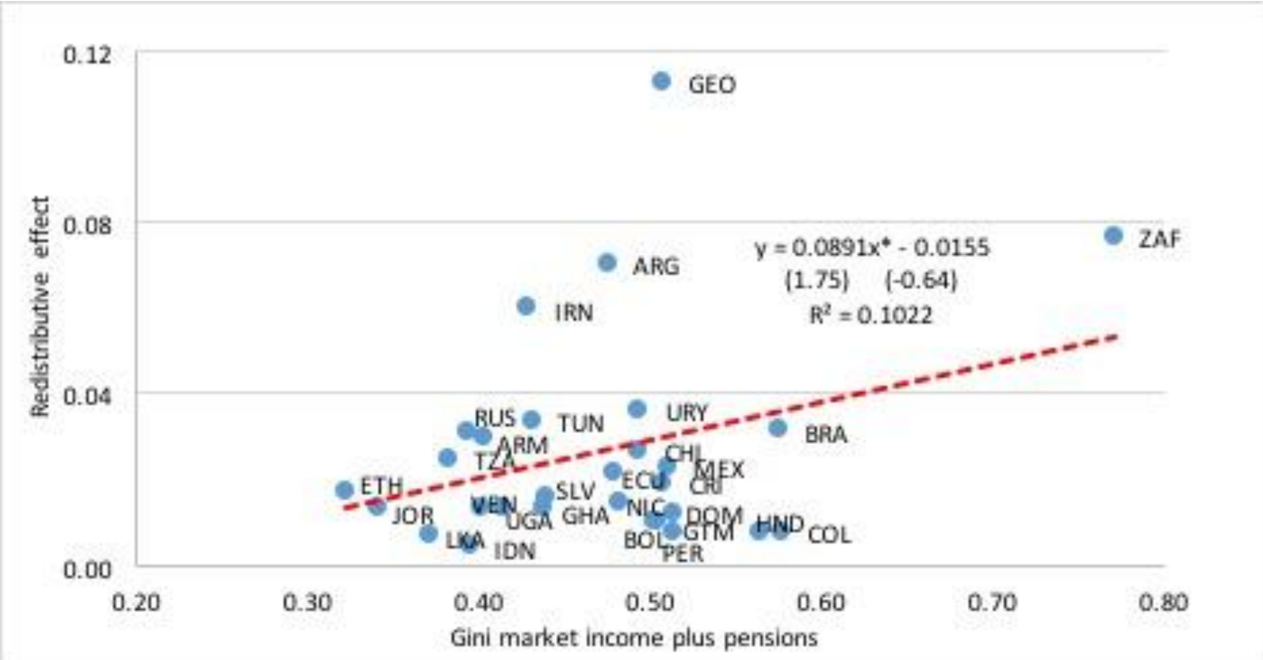
Notes*:* The dotted line in red is the slope obtained from a simple regression with social spending/GDP as a dependent variable. Social spending includes: direct transfers, spending on education and health, and other social spending. In parentheses are t statistics. * p<0.1, ** p<0.05, ***p<0.01. Also, see notes on figure 3.

Second, as shown in figure 6, redistribution from rich to poor is greater in countries where market income inequality is higher, a result that seems consistent with the prediction of the Meltzer and Richard median-voter hypothesis.[27]

[27] Meltzer and Richards (1981). An OECD study 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. (OECD, 2011)

Figure 6: Initial Inequality and Fiscal Redistribution, circa 2010

(Redistributive Effect and Market Income Plus Pensions Inequality (Contributory Pensions as Deferred Income))



Source: Author's estimates. CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

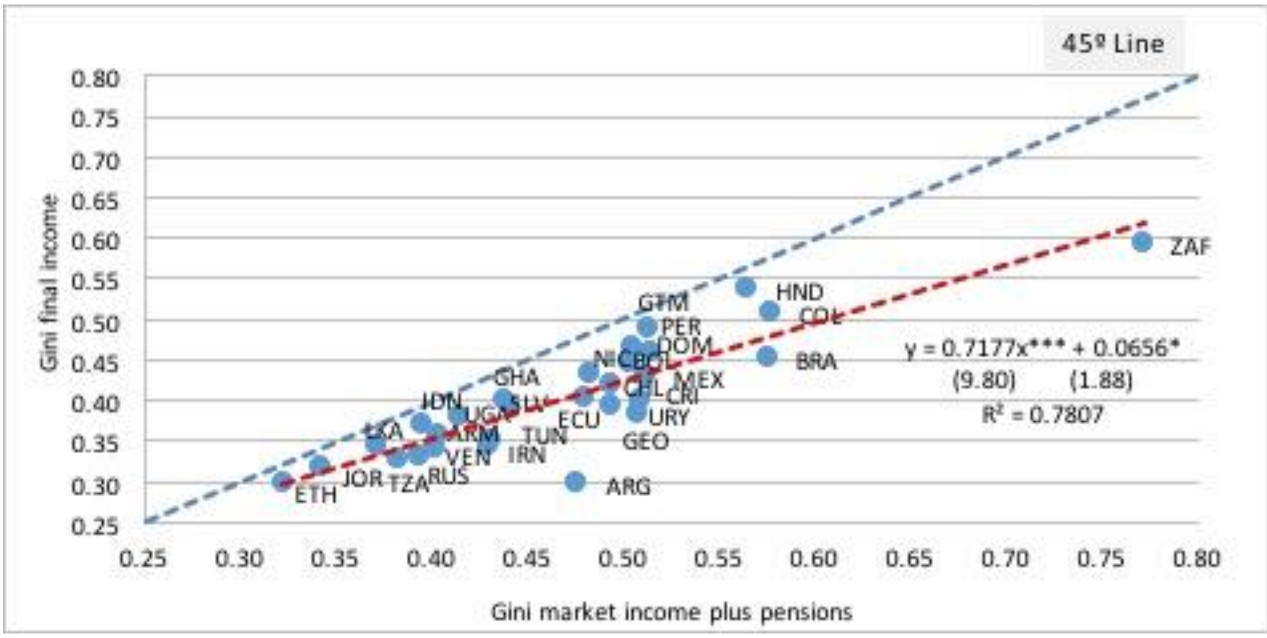
Notes: The dotted line in red is the slope obtained from a simple regression with the redistributive effect as a dependent variable. Redistributive effect is defined as the difference between Gini of market income plus contributory pensions and disposable income. In parentheses are t statistics. * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Also, see notes on figure 3.

Could the above results be driven because more unequal countries tend to be richer and therefore have higher capacity to raise revenues and afford higher levels of spending? Preliminary results from regressing the redistributive effect (measured as change in the Gini coefficient from market to final income in Gini points) on GNI per capita and the market-income Gini shows that the coefficient for the latter is positive: that is, the more unequal, the more redistribution. The coefficient for GNI per capita is significant but small. The coefficient for market income inequality, however, is not significant when the redistributive effect is measured from market to disposable income only, when pensions are considered a pure transfer, when removing Argentina and South Africa, or when the redistributive effect is measured in percent (instead of Gini points). In a few cases, the coefficient for the market-income Gini is even negative but not significant.[28]

Differences in redistribution change the ranking of countries by inequality level. Figure 7, panel A displays the levels of income inequality before (horizontal axis) and after (vertical axis) accounting for fiscal policies. Since all data points fall below the diagonal, fiscal policies reduce inequality in all countries. South Africa continues to be the most unequal country and Ethiopia the least unequal country based on income before or after fiscal policy. However, due to lower redistribution, Peru ends up being more unequal than Brazil once fiscal policies are considered while the opposite was true when inequality is measured with market income.

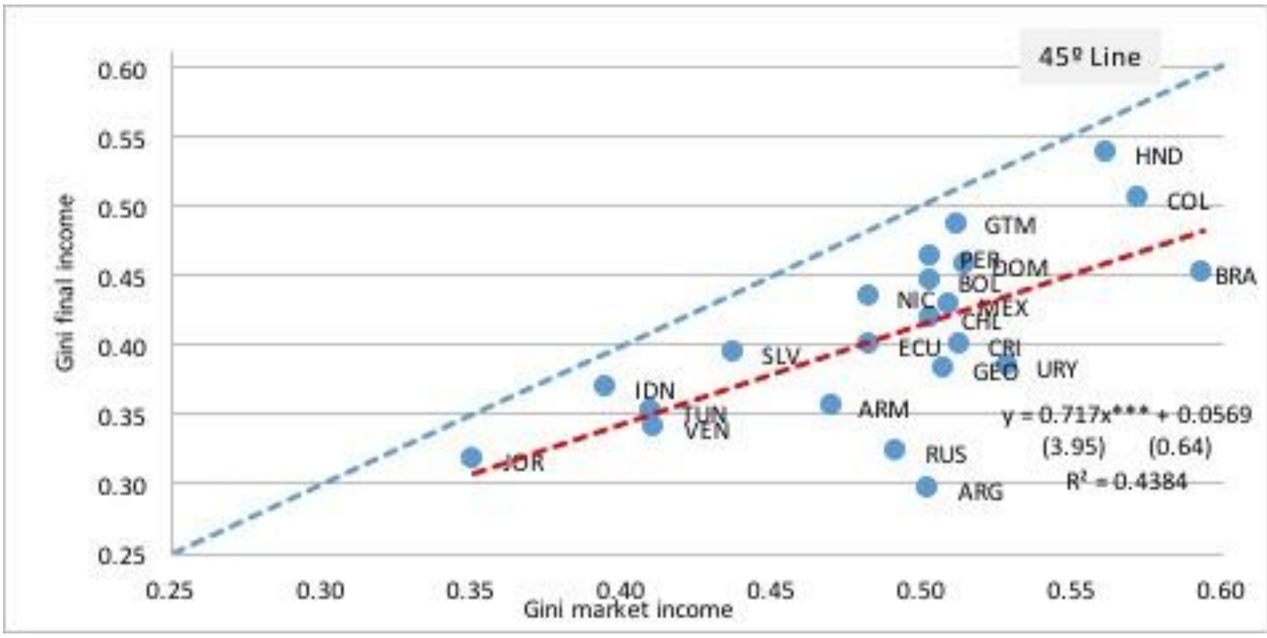
Figure 7 (Panel A and B): Market Income Plus Contributory Pensions Gini Versus Final Income Gini, circa 2010

Panel A: Final Income Inequality and Market Income Plus Contributory Pensions Inequality (Contributory Pensions as Deferred Income)



[28] Results are available upon request.

Panel B: Final Income Inequality and Market Income Inequality (Contributory Pensions as Transfers)



Source: Author's estimates. CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

Notes: The dotted line in red is the slope obtained from a simple regression with the final income Gini as a dependent variable. The dotted line in blue is a 45 degree line. In parentheses are t statistics. * p<0.1, ** p<0.05, ***p<0.01. The number of countries in panel B is smaller because it does not include the countries for which --for different reasons-- there is no additional scenario in which contributory pensions were considered a transfer, namely: Ethiopia, Ghana, Iran, South Africa, Sri Lanka, Tanzania, and Uganda. Also, see notes on figure 3.

6. Redistributive Effect: a Comparison with Advanced Countries

How do these twenty-nine 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-eight countries in the European Union.[29] 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.[30]

[29] The data for EU 28 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. G3.0.

[30] Higgins and others. (2016).

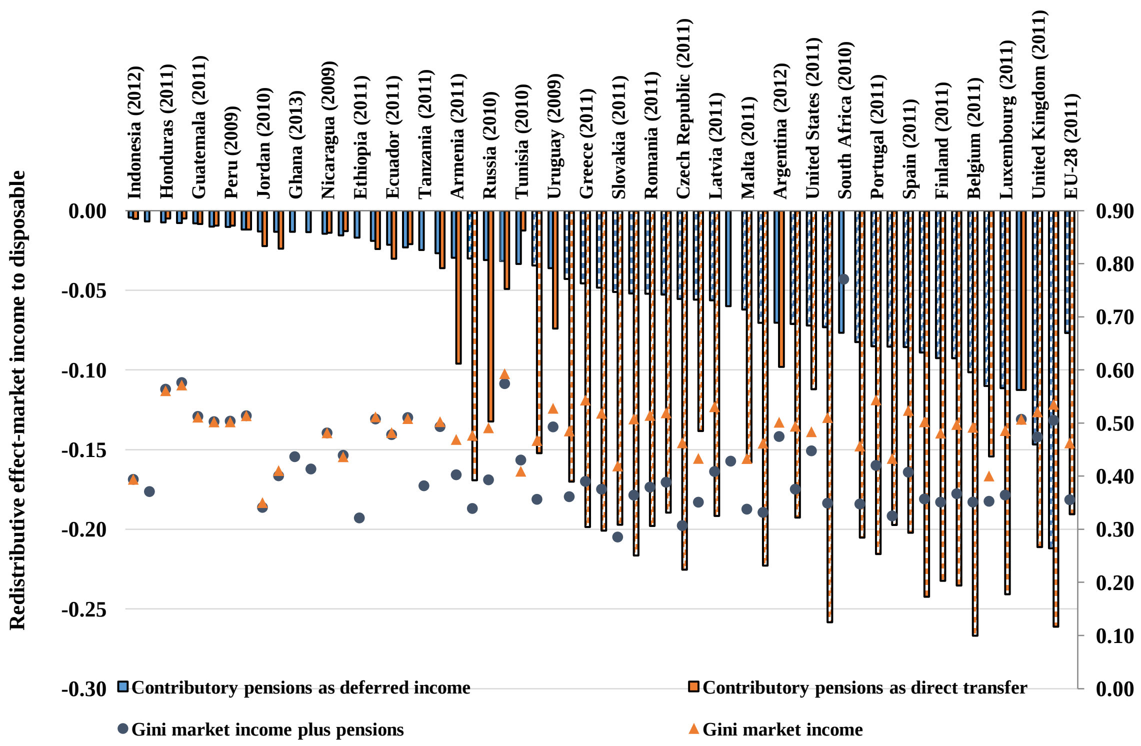
There are three important differences between the advanced countries and the twenty-nine ones analyzed here. First, market income inequality tends to be somewhat higher for the twenty-nine countries.[31] However, the difference is most striking when pensions are treated as transfers. The average market Gini coefficient for the twenty-nine countries for the scenario in which pensions are treated as deferred income and the scenario in which they are considered transfers is 47.0 and 48.8 percent, respectively. In contrast, in the EU, the corresponding figures are 35.6 and 46.3 percent, respectively; and in the US, they are, 44.8 and 48.4, respectively. One important aspect to note, however, is that in the EU, pensions include both contributory and noncontributory social pensions while in the twenty-nine countries and the US, the category of pensions includes only contributory pensions. In the scenario where we consider the pre-fiscal income market income plus contributory pensions, the Gini for the pre-fiscal income would be lower.

Second, as expected and shown in figure 8, the redistributive effect is larger in the EU countries and, to a lesser extent, in the United States if pensions are considered a government transfer. Except for Argentina, Armenia, Brazil, Russia, and Uruguay --countries with large contributory pension systems-- in the rest of the low and 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 contributory pensions as deferred income and contributory pensions as a transfer is 7.7 and 19.0 Gini points, respectively. In the United States, the numbers are less dramatically different: 7.2 and 11.2, respectively. (In the twenty-nine countries, the numbers are 2.6 and 3.7 Gini points, respectively). Clearly, the assumption made about how to treat incomes from pensions, again, can make a big difference. The results for the scenario with pensions as transfers for the EU and the US are influenced by what in Lustig and Higgins (2017) we called the presence of "false poor:" that is, many households composed of retirees appear, by definition, with zero or near zero market income. However, as discussed in Lustig and Higgins (2017), strictly speaking the counterfactual income should not be zero but what these households would have been able to spend during retirement based on the history of their contributions and market returns.

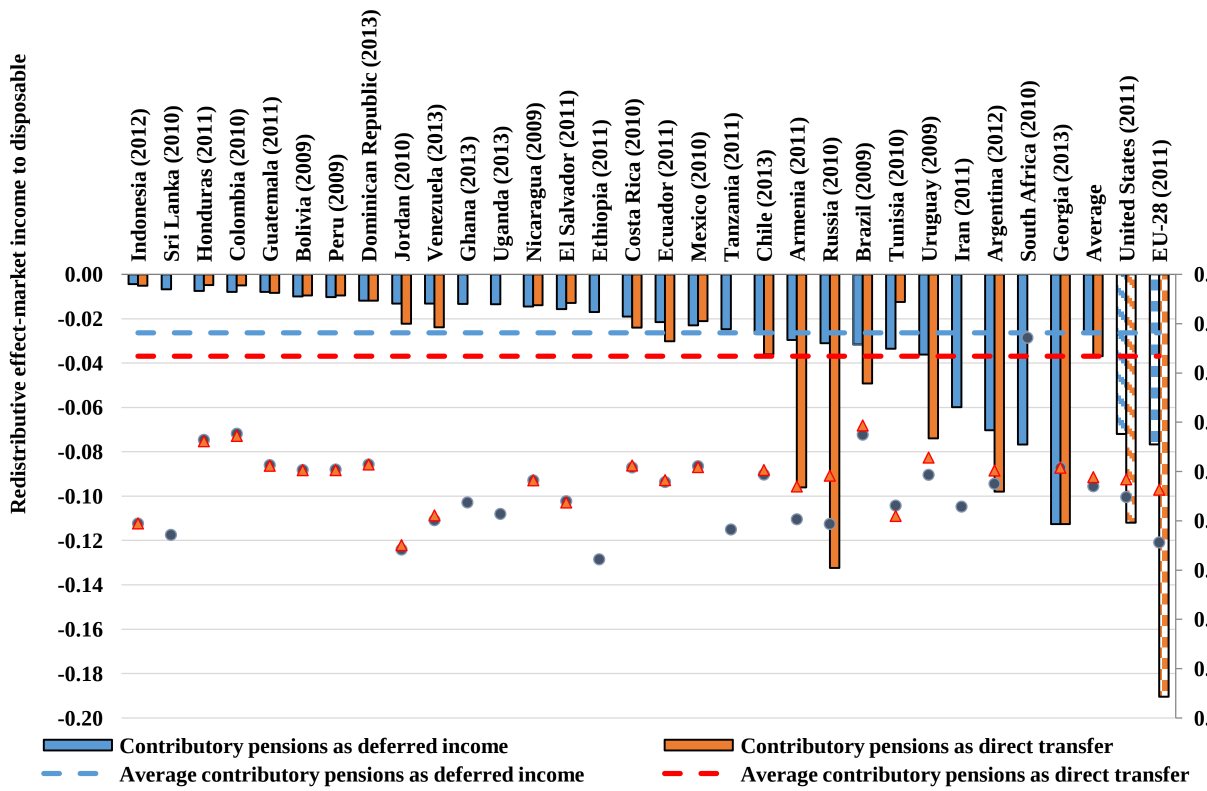
[31] South Africa pulls the average up but Indonesia pulls it down.

Figure 8: Redistributive Effect: Comparing Developing and Advanced Countries (Change in Gini Points; circa 2010)

Panel A: Individual Countries



Panel B: Low and Middle Income Countries, the United States, and average for EU-28



Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); European Union (EUROMOD version no. G3.0); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); United States (Higgins and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

Notes: The year for which the analysis was conducted is in parenthesis. For definition of income concepts see the section on methodological highlights in text. Redistributive effect is defined as the difference between Gini of market income plus contributory pensions and disposable income with contributory pensions treated as deferred income and the difference between Gini of market income and disposable income with contributory pensions treated as transfers. The graph is ranked from the smallest to the largest by redistributive effect with contributory pensions treated as deferred income. The number of countries in the scenario in which contributory pensions are treated as a transfer is smaller because it does not include the countries for which --for different reasons-- there is no additional scenario in which contributory pensions were considered a transfer, namely: Ethiopia, Ghana, Iran, South Africa, Sri Lanka, Tanzania, and Uganda. Also, see notes on figure 3.

While in low and middle income countries pensions can sometimes be equalizing and unequalizing at other times, in no European country nor in the United States, contributory pensions are ever 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 2011, for example, the difference between the market income Gini and the market income Gini plus contributory pensions is 10.7 percentage points in the EU and 3.6 in the United States.

How does social spending in today's developing countries compare with that of today's advanced countries but when their income per capita was similar the former's? Around 2010, among the countries that spent the least on education is El Salvador: 2.9 percent of GDP. According to Angus Maddison's estimates, in 1990 international dollars, El Salvador's GDP per capita in 2008 was similar to that of the United States in 1880, and Guatemala's and Peru's were similar to the United States' around 1900. The United States, a pioneer in public education, according to Lindert devoted only 0.74 percent of GDP in 1880 and 1.24 percent in 1900.[32] That is, the lowest spenders on public education of the twenty-nine countries in this paper spent more than twice the amount spent by the United States when it was approximately equally poor. Sweden was as rich as today's El Salvador around 1910, at which time Sweden spent 1.26 percent of GDP on public education, or about half as much as El Salvador in 2010. Around 2010, Indonesia showed among the lowest spending on health: 0.9 percent of GDP; the figure for Ethiopia was 1.25 percent and for Brazil above 5 percent. When the United States (around 1900) was as rich as Indonesia in the early twenty-first century (2008), according to Lindert it spent about 0.17 percent of GDP in government subsidies for health care.[33] When the United States was as rich as Brazil was in 2008, it spent only 0.4 percent of GDP in health subsidies.[34]

[32] Appendix C in Lindert (2004).
[33] Table 1D in Lindert (1994).
[34] The United States in about 1925 was as rich as Brazil in 2008. The health spending figure corresponds to 1920 (Lindert 1994).

7. 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: in other words, 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). A third measure is that of fiscal impoverishment[35]; in other words, the extent to which fiscal policy makes the poor (non-poor) poorer (poor).

When analyzing the impact of fiscal interventions on poverty, 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 of fiscal policy impact is measured by comparing the indicators for consumable income with the same indicators using market income. The level of consumable 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. As shown in figure 9 (panel A), using the $1.25 (PPP 2005 per day) poverty line, [36] fiscal policy reduces the headcount ratio for consumable income in most countries.[37] However, there is a startling result. In the scenario in which pensions are considered deferred income, the consumable income headcount ratio for Ethiopia, Ghana, Guatemala, Nicaragua, Uganda, and Tanzania is *higher* than the headcount ratio for market income. This is a worrisome result. Poverty should not be higher as a result of fiscal policy. Note that this result occurs 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, as indicated in Lustig and Higgins (2017). Of course, at the higher $2.50 a day poverty line, the number of countries in which the headcount for consumable income is higher than that for market income rises.[38]

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[35] Higgins and Lustig (2016).

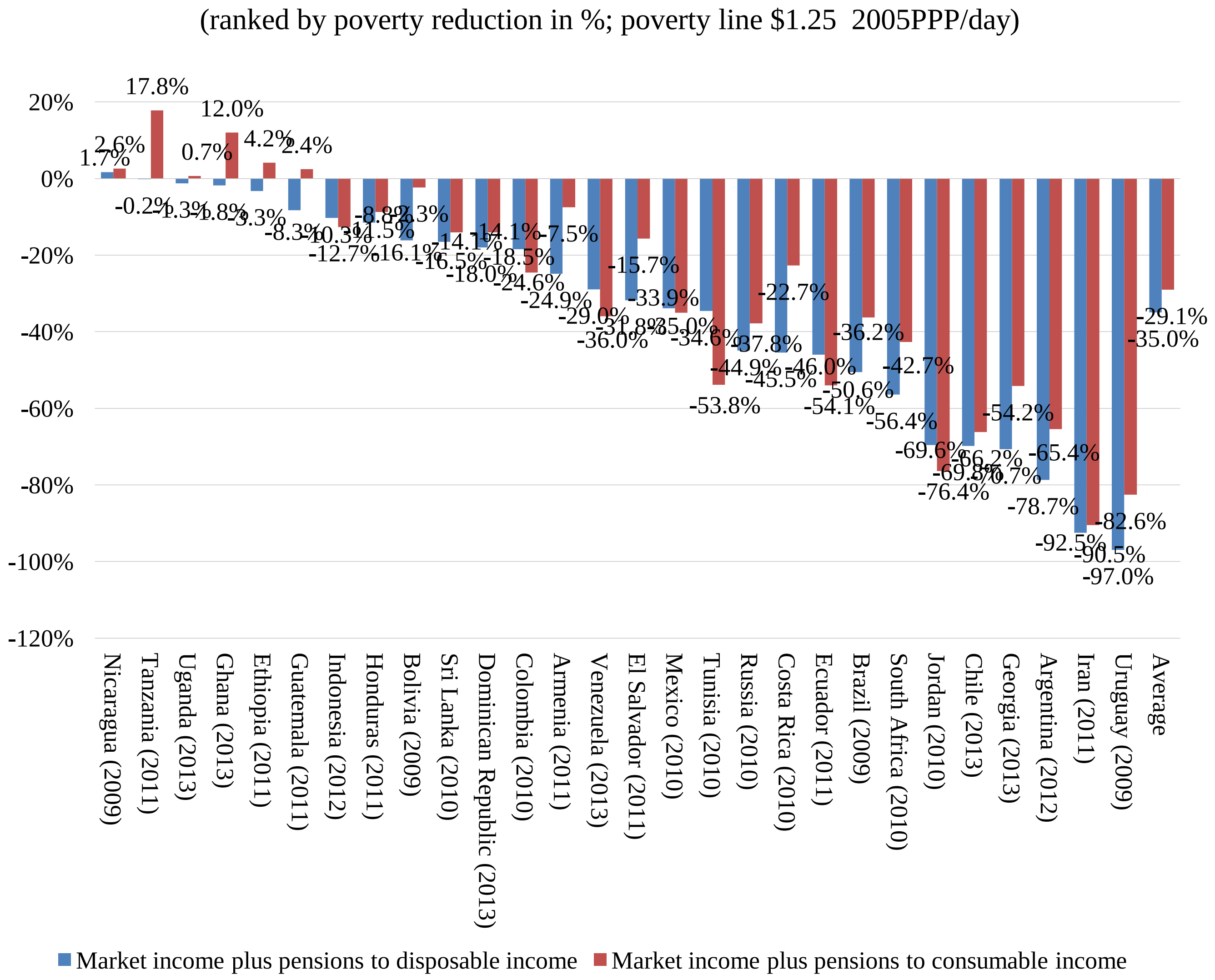
[36] The $1.25 is the World Bank global extreme poverty line until 2015, when it was updated with the 2011 PPP to $1.90 per day. The $2.50 a day poverty line is considered to be a reasonable international extreme poverty line for middle-income countries: for example, in the case of Latin America, this poverty line is close to the average of the local extreme poverty lines.

[37] 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 9 above.

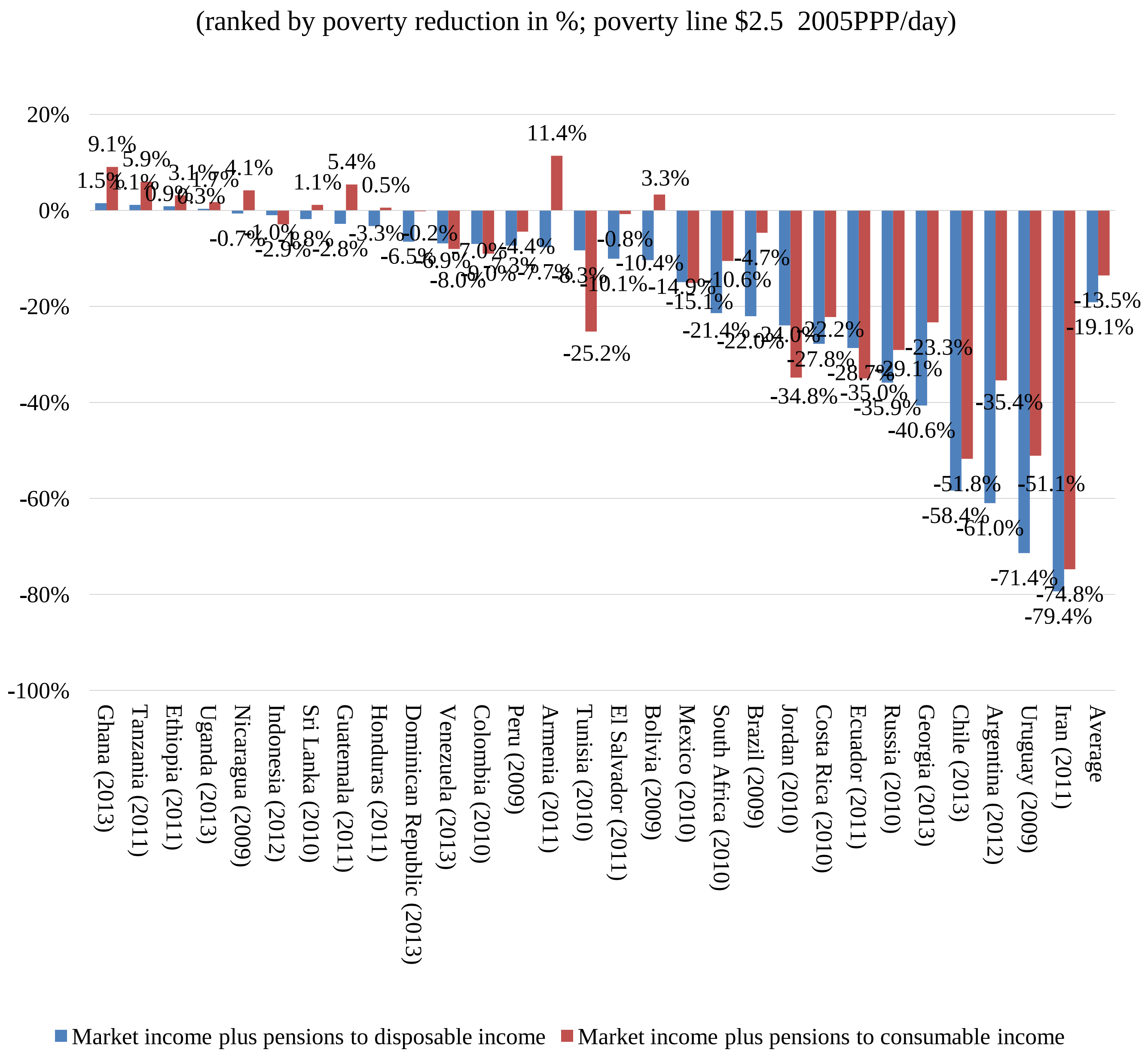
[38] Results for the scenario in which contributory pensions are treated as a pure government transfer are available upon request.

Figure 9: (Panels A and B): Fiscal Policy and Poverty Reduction (circa 2010): Change in Headcount Ratio from Market to Disposable and Consumable Income; in Percent (Contributory Pensions as Deferred Income)

Panel A: Poverty Line $1.25 (2005 PPP/day).



Panel B: Poverty Line $2.50 (2005 PPP/day)



Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).

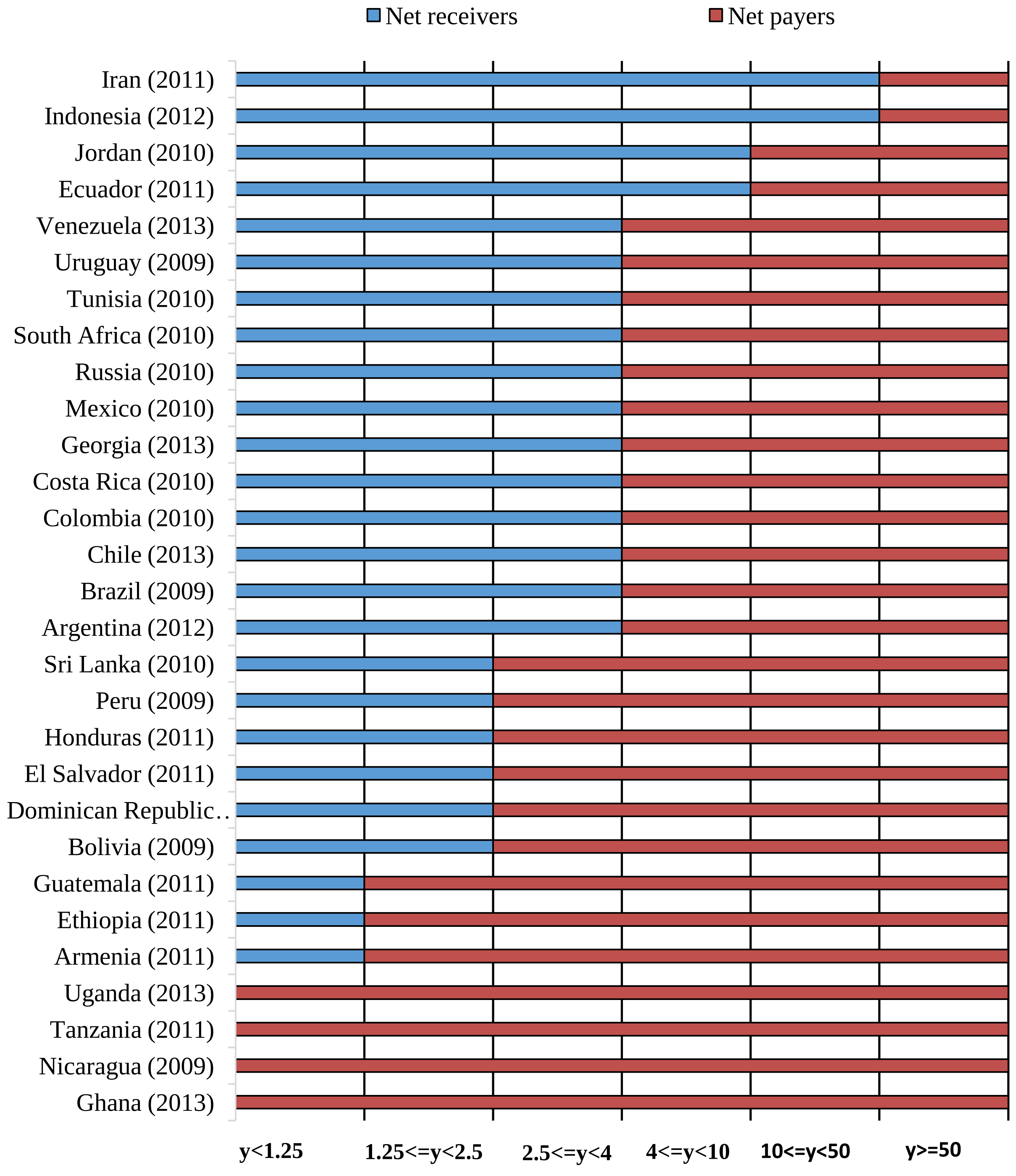
Notes: Percentage of poverty reduction is defined as percentage change in headcount ratio from market income (or market income plus contributory pensions) to consumable income. Also, see notes on figure 3.

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 10 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).[39] In Ghana, Nicaragua, Tanzania, and Uganda, net payers to the fiscal system begin in the "ultra-poor" income category with $US0-$US1.25/day in purchasing power parity. In Armenia, Ethiopia and Guatemala, net payers begin in the "extreme poor" income group with $US1.25-$US2.50/day. In Bolivia, Dominican Republic, El Salvador, Honduras, Peru and Sri Lanka, 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 12 countries; the net payers start in the group known as "vulnerable." In Iran and Indonesia, only the "rich" are net payers to the fiscal system (on average).[40] If contributory pensions are considered a government transfer (not shown), net payers to fiscal system start in extreme poor income group in Guatemala and Nicaragua, and moderately poor group in Armenia, Bolivia, Dominican Republic, El Salvador, Honduras and Peru.

[39] Note that this graph presents a non-anonymous 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.

[40] These income categories are based on Lopez-Calva and Ortiz-Juarez (2014) and Ferreira and others (2012).

Figure 10: Net Payers to the Fiscal System by Income Groups (Contributory Pensions as Deferred Income)



Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and

Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).
Note: See notes on figure 3.

Using the measures discussed in Higgins and Lustig, as can be seen in table 1, the proportion of poor (nonpoor) people who were made poorer (poor) of the by fiscal policy as a share of the total population and, in particular, the consumable income poor is nontrivial.[41] Moreover, this is so even though in the majority of countries shown on the table, the fiscal system is inequality and poverty reducing as revealed by the change in the headcount ratio and the Gini coefficient.

Table 1: Fiscal Impoverishment (circa 2010): Contributory Pensions as Deferred Income; in Percentage

Country (survey year)	Market income plus contributory pensions Poverty headcount (%)	Change in poverty headcount (p.p.)	Market income plus contributory pensions inequality (Gini)	Reynolds-Smolensky	Change in inequality (▲Gini)	Fiscally impoverished as % of population	Fiscally Impoverished as % of consumable income poor
Panel A: Upper-middle income countries, using a poverty line of $2.5 PPP 2005 per day							
Brazil (2009)	16.8	-0.8	57.5	4.6	-3.5	5.6	34.9
Chile (2013)	2.8	-1.4	49.4	3.2	-3.0	0.3	19.2
Ecuador (2011)	10.8	-3.8	47.8	3.5	-3.3	0.2	3.2
Mexico (2012)	13.3	-1.2	54.4	3.8	-2.5	4.0	32.7
Peru (2011)	13.8	-0.2	45.9	0.9	-0.8	3.2	23.8
Russia (2010)	4.3	-1.3	39.7	3.9	-2.6	1.1	34.4
South Africa (2010)	49.3	-5.2	77.1	8.3	-7.7	5.9	13.3
Tunisia (2010)	7.8	-0.1	44.7	8.0	-6.9	3.0	38.5
Panel B: Lower-middle income countries, using a poverty line of $1.25 2005 PPP per day							
Armenia (2011)	21.4	-9.6	47.4	12.9	-9.3	6.2	52.3
Bolivia (2009)	10.9	-0.5	50.3	0.6	-0.3	6.6	63.2
Dominican Republic (2013)	6.8	-0.9	50.2	2.2	-2.2	1.0	16.3
El Salvador (2011)	4.3	-0.7	44.0	2.2	-2.1	1.0	27.0
Ethiopia (2011)	31.9	2.3	32.2	2.3	-2.0	28.5	83.2
Ghana (2013)	6.0	0.7	43.7	1.6	-1.4	5.1	76.6
Guatemala (2010)	12.0	-0.8	49.0	1.4	-1.2	7.0	62.2
Indonesia (2012)	12.0	-1.5	39.8	1.1	-0.8	4.1	39.2
Sri Lanka (2010)	5.0	-0.7	37.1	1.3	-1.1	1.6	36.4
Tanzania (2011)	43.7	7.9	38.2	4.1	-3.8	50.9	98.6

Source: Higgins and Lustig (2016).

8. Education and Health Spending[42]

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

[41] Higgins and Lustig (2016).
[42] Section based on Lustig (2015).

(also called quasi-Ginis).[43] 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 benefits from that spending as a share of market income *tend* to rise with market income.[44] 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.[45] Any time spending is pro-poor or neutral in absolute terms, by definition it is progressive. The converse, of course, is not true.[46] The taxonomy of transfers is synthesized in figure 4 in Lustig and Higgins (2017).

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 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.

Table 2 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 (that is, per capita spending declines with income) in upper-middle-income and high-income countries except for South Africa and Iran, where it is (approximately) neutral in absolute terms. Total per capita spending on education tends to be the same (neutral in absolute terms) across different income groups in low-income and lower-middle-income countries, except for Armenia and El Salvador where it is pro-poor, and Ethiopia, Ghana, Tanzania, and Uganda where it is progressive only in relative terms. Pre-school tends to be pro-poor in all countries for which there is data except for Georgia. Primary school is pro-poor in all countries other than Ethiopia. For secondary school, spending is pro-poor in all upper-middle-income countries for which there is data except for Ecuador, where it is (approximately) neutral in absolute terms. In Mexico, lower secondary is pro-poor and upper secondary is progressive only in relative term. Secondary school spending is neutral in most low-income and lower-middle-income countries other than Bolivia (pro-poor), and Ethiopia, Ghana and Uganda (progressive only in relative term). Government spending on

[43] 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; 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 $2\int_0^1 \left(p - \mathrm{C}(p)\right) dp$.

[44] 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.

[45] This case is also sometimes called progressive in absolute terms.

[46] As mentioned above, care must be taken not to infer that any spending that is progressive (regressive) will automatically be equalizing (unequalizing).

tertiary education is regressive in Ethiopia, Ghana, Guatemala, Indonesia, Uganda, and Tanzania, and progressive only in relative terms in various degrees in the rest.

Table 2: Progressivity and Pro-Poorness of Education and Health Spending, Summary of Results

	Education Total			Pre-school			Primary			Secondary			Tertiary				Health		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	D	A	B	C
Argentina (2012)	+			+			--			--					+		+		
Armenia (2011)	+			+			+			--					+			+	
Bolivia (2009)		+		+			+			+					+			+	
Brazil (2009)	+			+			+			+					+		+		
Chile (2013)	+			+			+			+					+		+		
Colombia (2010)	--			+			+			+					+		--		
Costa Rica (2010)	--			+			+			+					+		--		
Dominican Republic (2013)	+			+			+			--					+		+		
Ecuador (2011)	+			--			+					+	--				+		
El Salvador (2011)	+			+			+				+				+				+
Ethiopia (2011)			+	--				+				+				+			+
Georgia (2013)		+			+		+			--					+		+		
Ghana (2013)			+	+			+					+				+		+	
Guatemala (2011)		+		+			+				+					+			+
Honduras (2011)		+		+			+				+				+			+	
Indonesia (2012)		+		--			+				+					+			+
Iran (2011)		+		--			+			+					+			+	
Jordan (2010)	+			+			+			+					+				+
Mexico (2010)	+			+			+					+			+			+	
Nicaragua (2009)		+		+			+				+				+			+	
Peru (2009)	+			+			+			+					+				+
Russia (2010)	+			--			--			--			--					+	
South Africa (2010)		+		+			+			+					+		+		
Sri Lanka (2010)		+		+			--				--				+			+	
Tanzania (2011)			+	+			+					+				+			+
Tunisia (2010)		+		--			--			--					+			+	
Uganda (2013)			+	--			+					+				+		+	
Uruguay (2009)	+			+			+			+					+		+		
Venezuela (2013)	+			+			+			+				+			+		

Source: CEQ Data Center on Fiscal Redistribution. Based on the following Master Workbooks of Results. Argentina (Rossignolo, 2017b); Armenia (Younger and Khachatryan, 2014); Bolivia (Paz-Arauco and others, 2014b); Brazil (Higgins and Pereira, 2017); Chile (Martinez-Aguilar and Ortiz-Juarez, 2016); Colombia (Melendez and Martinez, 2015); Costa Rica (Sauma and Trejos, 2014b); Dominican Republic (Aristy-Escuder and others, 2016); Ecuador (Llerena and others, 2017); El Salvador (Beneke, Lustig, and Oliva, 2014); Ethiopia (Hill, Tsehaye, and Woldehanna, 2014); Georgia (Cancho and Bondarenko, 2015); Ghana (Younger, Osei-Assibey, and Oppong, 2016); Guatemala (Cabrera and Moran, 2015a); Honduras (Castaneda and

Espino, 2015); Indonesia (Afkar, Jellema, and Wai-Poi, 2015); Iran (Enami, Lustig, and Taqdiri, 2017b); Jordan (Abdel-Halim and others, 2016); Mexico (Scott, 2013); Nicaragua (Cabrera and Moran, 2015b); Peru (Jaramillo, 2015); Russia (Malytsin and Popova, 2016); South Africa (Inchauste and others, 2016); Sri Lanka (Arunatilake and others, 2016); Tanzania (Younger, Myamba, and Mdadila, 2016b); Tunisia (Jouini and others, 2015); Uganda (Jellema and others, 2016); Uruguay (Bucheli and others, 2014b) and Venezuela (Molina, 2016).
Notes:
A= Pro-poor, concentration coefficient is negative. B= Same per capita for all, concentration coefficient equals zero. C= Progressive, concentration coefficient positive but lower than market income plus contributory pensions Gini. D= Regressive, concentration coefficient positive and higher than market income plus contributory pensions Gini.
-- not available
Notes: If the Concentration Coefficient is higher or equal to -0.5 but not higher than 0.5, it was considered equal to 0. Also, see notes on figure 3.

Health spending is pro-poor (that is, per capita spending declines with income) in Argentina, Brazil, Chile, Dominican Republic, Ecuador, Georgia, South Africa, Uruguay, and Venezuela. In Armenia, Bolivia, Ghana, Honduras, Iran, Mexico, Nicaragua, Russia, Sri Lanka, Tunisia, and Uganda, the per capita benefit is roughly the same across the income scale. In El Salvador, Ethiopia, Guatemala, Indonesia, Jordan, Peru, and Tanzania health spending per person is progressive in only relative terms.

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 (for example, mostly the middle-classes and the rich benefitting from free tertiary education), [47] 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 (the poor have more children and, therefore, poor households receive higher benefits in the form of basic education transfers) or frequency of illness (the poor have worst health than the non-poor) versus the "opting-out" of the middle-classes and the rich.

9. Conclusions

In order to analyze the impact of fiscal policy on income inequality it is useful to separate the "cash portion" of the system. The cash portion includes direct taxes, direct transfers, indirect taxes, and indirect subsidies. The noncash or "in kind" portion includes 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 in the 29 countries analyzed here is quite heterogeneous. Redistributive success is broadly determined primarily by the amount of resources and their combined progressivity. Net direct taxes are always equalizing. The effect of net indirect taxes is equalizing in nineteen of the twenty-nine countries.

While the cash portion of the net fiscal system is always equalizing, the same cannot be said for poverty. In Ethiopia, Ghana, Guatemala, Nicaragua, Uganda, and Tanzania, for instance, the headcount ratio measured with the international extreme poverty line of US$1.25 (PPP 2005 per day) is higher for

[47] 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.

consumable income than for market income. In these countries, fiscal policy *increases* poverty, meaning that a larger number of the market income poor (non-poor) are made poorer (poor) by taxes and transfers than the number of people who escape poverty.[48] This startling result is primarily the consequence of high consumption taxes on basic goods.

Turning now to the in-kind portion of the fiscal system, spending on education and health is equalizing and its contribution to the reduction in inequality is rather large. This result is not surprising given that the use of government services is monetized at a value equal to average government cost. 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.

An important result to note is that there is no evidence of a "Robin Hood paradox:" the more unequal countries tend to spend more on redistribution and show a higher redistributive effect. However, regression-based analysis indicates that this last result is not robust across the board when one controls for income per capita, leaves out the "outliers," or measures redistribution in percent change instead of Gini points. While the sign of the slope shows that the more unequal the more redistribution more often than not, the coefficient is often not statistically significant.

There are a few lessons that emerge from the analysis. Let's start with those pertaining to the diagnostic of fiscal redistribution. First, the fact that specific fiscal interventions can have countervailing effects underscores the importance of taking a coordinated view of both taxation and spending rather than pursuing a piecemeal analysis. Efficient regressive taxes (such as the value added tax) when combined with generous well-targeted transfers can result in a net fiscal system that is equalizing. Even more, because a net fiscal system with a regressive tax could be more equalizing than without it (Lambert's conundrum), policy recommendations --such as eliminating the regressive tax-- based on a piecemeal analysis could be flatly wrong. Second, to assess the impact of the fiscal system on people's standard of living, it is crucial to measure the effect of taxation and spending not only on inequality but also on poverty: the net fiscal system can be equalizing but poverty-increasing.

Regarding policy prescriptions, one fundamental lesson emerges: governments should design their tax and transfers system so that the after taxes and transfers incomes (or consumption) of the poor are not lower than their incomes (or consumption) before fiscal interventions. Leaving out in-kind transfers, the so-called cash portion of the fiscal system should not impoverish the poor (or make the non-poor poor). The results indicate that, on average, the ultra-poor in Ghana, Nicaragua, Tanzania, and Uganda, the extreme poor in Armenia, Ethiopia, and Guatemala and the moderate poor in Bolivia, Dominican Republic, El Salvador, Honduras, Peru and Sri Lanka are net payers into the fiscal system. In the case of Brazil, the cause is the high consumption taxes paid on staple goods. In the case of Peru, cash transfers

[48] Higgins and Lustig (2016).

are too small to compensate for what the poor pay in taxes. Furthermore, as shown in Higgins and Lustig[49], fiscal impoverishment can be quite pervasive and, in low-income countries, larger in magnitude than fiscal gains to the poor.

The current policy discussion (and the literature) focuses primarily on the power of fiscal policy to reduce inequality and much less (and often not at all) on the impact of fiscal policy on the standard of living of the poor. If the policy community is seriously committed to eradicating income poverty, governments will need to explore ways to redesign taxation and transfers so that the poor do not end up as net payers. This could become an overriding principle in the design of fiscal systems that could be explicitly added to the frameworks proposed by Atkinson[50] and Stiglitz[51] to build more equitable societies.

[49] Higgins and Lustig (2016).
[50] Atkinson (2015).
[51] Stiglitz (2012).

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