



THE REDISTRIBUTIVE IMPACT OF GOVERNMENT SPENDING
ON EDUCATION AND HEALTH EVIDENCE FROM THIRTEEN
DEVELOPING COUNTRIES IN THE COMMITMENT TO
EQUITY PROJECT

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COMMITMENT TO EQUITY

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THE REDISTRIBUTIVE IMPACT OF GOVERNMENT SPENDING ON EDUCATION AND HEALTH: EVIDENCE FROM THIRTEEN DEVELOPING COUNTRIES IN THE COMMITMENT TO EQUITY PROJECT

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ABSTRACT

Here, I examine the level, redistributive impact and pro-poorness of government spending on education and health for thirteen developing countries from the [Commitment to Equity](#) project. Social spending as a share of total income is high by historical standards, and it rises with income per capita and income inequality. Spending on education and health lowers inequality and its marginal contribution to the overall decline in inequality is, on average, 69 percent. There appears to be no “Robin Hood Paradox:” redistribution increases with income inequality, even if one controls for per capita income. Concentration coefficients indicate that spending on pre-school, primary and secondary education is pro-poor in twelve countries. Spending on tertiary education is regressive and unequalizing in three countries, and progressive and equalizing (but not pro-poor) in ten. Health spending is pro-poor in five countries. Of the remaining eight, health spending per capita is roughly equal across the income distribution in three, and progressive and equalizing (but not pro-poor) in five.

JEL Codes: H22, D31, I3

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

¹ Nora Lustig is Samuel Z. Stone Professor of Latin American Economics, Tulane University and nonresident fellow of the Center for Global Development and the Inter-American Dialogue. This paper is part of the Commitment to Equity project (CEQ). Led by [Nora Lustig](#) since 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.commitmenttoequity.org. The paper will be published in an edited volume by Benedict Clements, Mick Keen, Ruud De Mooij (title pending). I am very grateful to Nancy Birdsall, Benedict Clemens, Jean-Yves Duclos, Sanjeev Gupta, Sean Higgins, Peter Lindert and Stephen Younger for their helpful comments and suggestions. I am also very grateful to Luis Munguia and Yang Wang for their excellent research assistantship. All errors and omissions are my sole responsibility.

1 INTRODUCTION

Two key indicators of a government's (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.² Typically, redistributive social spending includes cash benefits³ and benefits in kind such as spending on education and health.⁴ Here, I examine the level, redistributive impact and pro-poorness of government spending on education and health for thirteen developing countries from the [Commitment to Equity](#) (CEQ) project:⁵ Armenia, Bolivia, Brazil, Chile, Colombia, El Salvador, Ethiopia, Guatemala, Indonesia, Mexico, Peru, South Africa and Uruguay.⁶

This paper makes two important contributions. First, results are comparable across countries because the thirteen studies apply a common methodology. Second, because the fiscal incidence analysis is comprehensive, one can estimate the contribution of in kind benefits (in the form of education and healthcare services) to the overall reduction in inequality. In particular, I address the following questions: Does government spending on education and health increase with per capita income and income inequality across the countries included here? Do more unequal societies redistribute more? What is the contribution of spending on education and health to the overall reduction in inequality? How pro-poor is spending on education (total and by level) and health? To answer these questions, I use information from administrative accounts and the fiscal incidence estimates generated in the country studies.

Examining the redistributive impact and pro-poorness of education and health spending requires attaching a value to the benefit to an individual of attending a public school or receiving healthcare in a public facility for free (or almost free). Conceptually, attaching a value to benefits in kind-- free government services-- is complex.⁷ One frequently used (and imperfect) approach is to value services at average cost of provision.⁸ This is the method utilized here. Such an approach ignores the fact that consumers may value services quite

² See, for example, Lindert (2004) and Barr (2012).

³ "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 (e.g., 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 were not included.

⁴ Social spending as a category frequently includes spending on pensions funded by contributions. Following Lindert (1994), here we do not include them. Strictly speaking, one should include the subsidized portion of these pensions as part of redistributive social spending (e.g., 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 transfers 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.

⁵ Led by [Nora Lustig](#) since 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.commitmenttoequity.org.

⁶ The selection of countries included here is not meant to be a representative sample of the developing world. The analysis is based on the country studies that have been undertaken and fully completed under the CEQ project by January 2015. Because the project first started in Latin America, countries from this region make up nine of the thirteen. The authors of the country studies are: Armenia (Younger et al., 2014), Bolivia (Paz-Arauco et al., 2014), Brazil (Higgins and Pereira, 2014), Chile (Jaime Ruiz Tagle and Dante Contreras, 2014), Colombia (Melendez, 2014), El Salvador (Beneke et al., 2014), Ethiopia (Hill et al., 2014), Guatemala (Cabrera et al., 2014), Indonesia (Jellema et al., 2014), Mexico (Scott, 2014), Peru (Jaramillo, 2013), South Africa (Inchauste et al., 2014) and Uruguay (Bucheli et al., 2014).

⁷ See, for example, Lambert (2001).

⁸ This approach goes back quite a long time. See, for example, Meerman (1979), Selowsky (1979), Castro-Leal et al. (1997), Demery (1995 and 1996) and Sahn and Younger (2000).

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.⁹

To calculate the contribution of spending on education and health to the overall reduction in inequality, one also needs estimates of the incidence of the rest of the fiscal interventions: direct and indirect taxes, direct transfers and indirect subsidies. I use the fiscal incidence results analyzed in Lustig, Pessino and Scott (2014) and Lustig (2015).¹⁰ The fiscal incidence method is described in detail in Lustig and Higgins (2013) and follows what is known as the “accounting approach.”¹¹

The progressivity and pro-poorness of education and health spending here is 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.¹² A negative concentration coefficient implies that *per capita* spending tends to be higher the poorer the individual.¹³ 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.

The findings can be summarized as follows. Does government spending on education and health increase with per capita income and income inequality across the countries included here? Total social spending—cash transfers plus education and health spending-- as a share of GDP is high by historical standards and it increases with Gross National Income per capita (GNI). Health spending as a share of GDP increases with GNI per capita while education spending does not. Spending on primary education as a share of GDP is roughly the same at different GNI per capita levels. Spending on secondary education as a share of GDP, however, rises with income per capita. The share of spending on tertiary education declines with GNI per capita. Social spending and spending on education and health as a share of GDP increase with market (pre-taxes and transfers) income inequality.

Do more unequal countries redistribute more? Results suggest that the answer is yes. Consistent with the prediction of the Meltzer-Richard median voter hypothesis,¹⁴ more unequal countries reduce inequality by more whether the latter is measured in absolute (percentage points) or relative (in percent) terms. This is an interesting result, not least because it differs from what has been found by historical research (Lindert, 2004) and some of the contemporary studies (Luebker, 2014). This result is not just driven by the fact that richer

⁹ 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.

¹⁰ See the country specific sources in footnote 3.

¹¹ As with any standard fiscal incidence analysis, the studies do not incorporate behavioral, lifecycle, or general equilibrium effects. However, the fiscal incidence of taxes and benefits is not generated by a mere mechanical application of statutory rates; the analysis incorporates assumptions regarding economic incidence, tax evasion, informality and reach of transfers programs.

¹² Implicit in the rankings is the assumption that concentration curves do not cross.

¹³ 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.

¹⁴ Meltzer and Richard (1981).

countries (in our sample) tend to be more unequal and, because they are richer, these countries also have more capacity to raise revenues and afford higher levels of spending. Regressing the change in the Gini on the Gini before redistribution shows that the coefficient for the latter is positive (albeit, not always significant) even if one controls for GNI per capita.

What is the contribution of spending on education and health to the overall reduction in inequality? The overall reduction in inequality is defined as the difference between the market income Gini and the Gini obtained after direct and indirect taxes, cash transfers, subsidies and in-kind transfers in education and health.¹⁵ In the literature, this is called the redistributive effect of the net fiscal system.¹⁶ Education and health spending (combined) lowers inequality by a significant amount and its marginal contribution to the overall decline in inequality is, on average, 69 percent.

How progressive and, especially, pro-poor is spending on education (total and by level) and health? Total spending on education is pro-poor in nine countries and education spending per capita is roughly the same across the income distribution in three. Only in Ethiopia, by far the poorest and most equal country, education spending is progressive but not pro-poor. Spending on pre-school, primary and secondary education is pro-poor except in Ethiopia. Spending on tertiary education is regressive in three countries and progressive but not pro-poor in ten. Health spending is pro-poor in five countries. Of the remaining eight, health spending per capita is roughly equal across the income distribution in three and progressive (but not pro-poor) in five. There is some evidence that the progressivity and pro-poorness of education and health spending has increased over time.

The paper is organized as follows. In section 2, I analyze the patterns of spending on education and health with respect to income per capita and market income inequality. Section 3 presents a brief description of the fiscal incidence methodology. Section 4 is devoted to analyzing the impact of education and health spending on the overall inequality decline. In section 5, I examine the progressivity and pro-poorness of education and health spending. Conclusions are in section 6.

2 PER CAPITA INCOME, INEQUALITY AND SOCIAL SPENDING

i Education and Health Spending and Per Capita Income

Does government spending on education and health increase with per capita income and income inequality across the countries included here? Figure 1 shows primary spending,¹⁷ total social spending, spending on education and spending on health as a share of GDP on the vertical axis and GNI per capita (in purchasing power parity) on the horizontal axis for the thirteen countries examined here. Note that social spending here is defined as the sum of direct transfers and public spending on education and health (contributory and noncontributory). It does not include housing subsidies. Also, direct transfers here do *not* include contributory pensions from the government social insurance program. In all our analysis presented here, contributory pensions are treated as part of market income. We have also carried out the analysis assuming

¹⁵ In the CEQ project we call this “final income.”

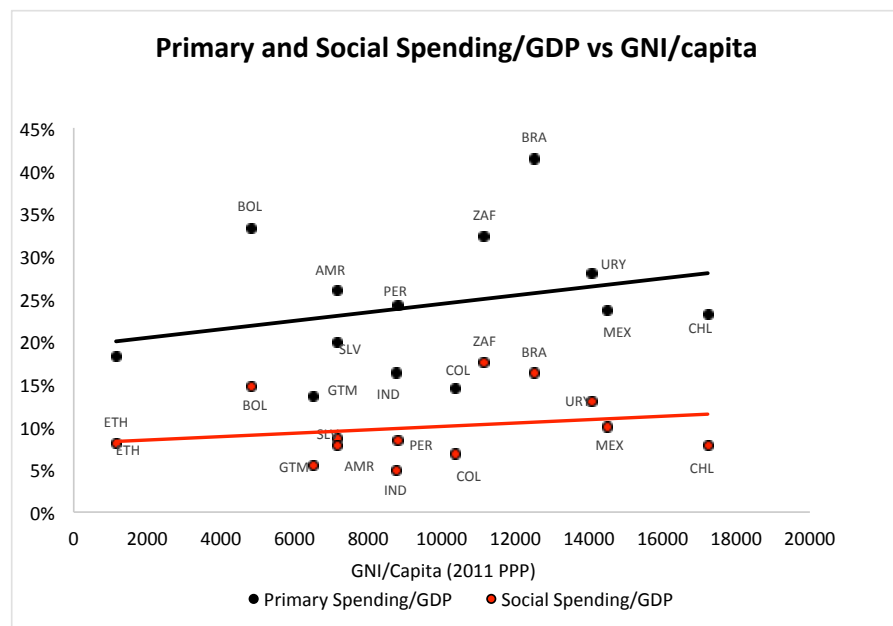
¹⁶ In the absence of reranking, this is identical to the Reynolds-Smolensky index for the net fiscal system. The redistributive effect can be measured using other inequality indicators such as the Theil index or varieties of the “Kuznetz ratio.” The latter are available upon request.

¹⁷ Primary spending equals total government spending minus interest payments on domestic and external public debt.

contributory pensions are a direct government transfer. The results are very similar so I did not include them here.¹⁸

Total social spending and spending on public health as a share of total income rise with GNI per capita (Figure 1). This result is consistent with what has been found in the literature on the evolution of the welfare state.¹⁹ The share of spending on education, however, has a negative slope. This result is mainly driven by Bolivia, an outlier in the bunch; if Bolivia is removed, the slope becomes slightly positive. If one disaggregates by educational level, spending on primary education is roughly the same at different GNI per capita levels. Spending on secondary education, however, rises with income per capita and spending on tertiary education declines.²⁰

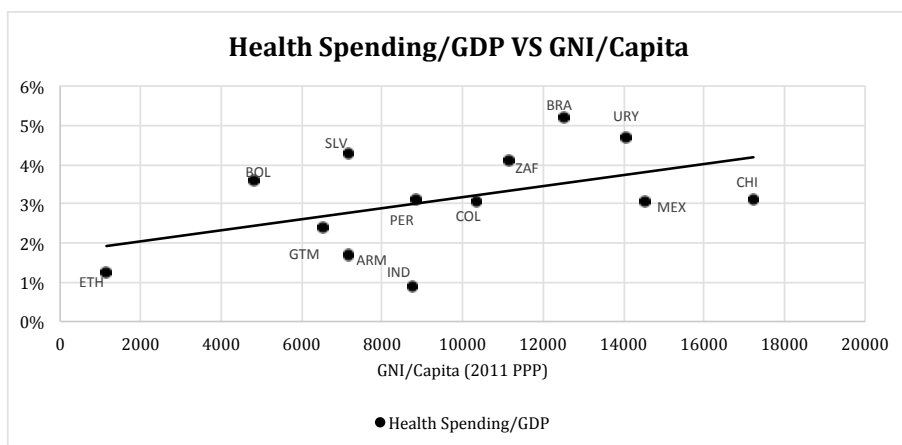
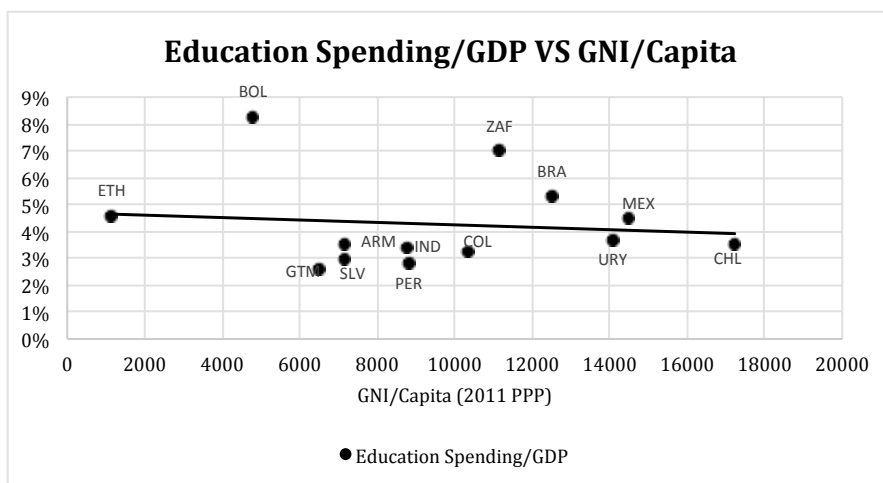
FIGURE 1: PRIMARY, SOCIAL, EDUCATION AND HEALTH SPENDING AND GNI PER CAPITA (CIRCA 2010)



¹⁸ The analysis in which contributory pensions are considered a government transfer is available upon request.

¹⁹ See Lindert (1994) and (2004), for example; and, the work he cites as well.

²⁰ Keeping in mind all the caveats of a single-variable regression and the smallness of the sample, the elasticity of social spending with respect to income per capita equals 1.14; the elasticities for education and health are 0.98 and 1.44, respectively. The coefficients are significant for $p < 0.01$. Note that for this regression, I used a sample of 17 countries for which I had data on social spending. In addition to the 13 analyzed in this paper, the regression included Costa Rica, Ecuador, Jordan and Sri Lanka.



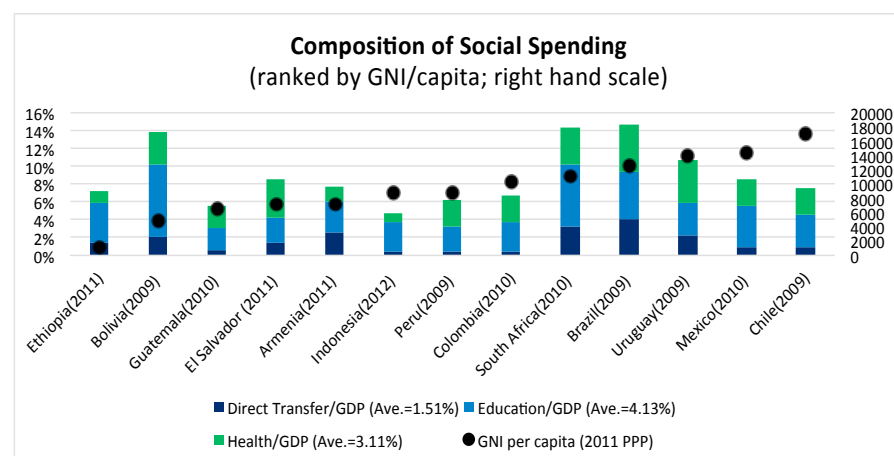
Note: Primary spending equals total government spending minus interest payments on domestic and external public debt. Social spending here is defined as the sum of direct transfers and public spending on education and health (contributory and noncontributory). It does not include housing subsidies. Direct transfers here do *not* include contributory pensions.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014. The spending shares and GNI/capita figures correspond to the year of the household survey, namely: Armenia: 2011; Bolivia: 2009; Brazil: 2009; Chile: 2009; Colombia: 2010; El Salvador: 2011; Ethiopia: 2011; Guatemala: 2010; Indonesia: 2012; Mexico: 2010; Peru: 2009; South Africa: 2010-2011; Uruguay: 2009.

There is quite a bit of heterogeneity across countries both in terms of the size of the total budget (measured here with primary spending/GDP) and social spending. Brazil, South Africa, and, in particular, Bolivia (given its low-middle income status), stand out as countries with a relatively large government and more fiscal resources devoted to social spending. However, these three countries are not the ones that devote the largest shares of their budget (measured by primary spending) to spending on education and health. Colombia, with 43 percent of its budget allocated to education and health, is the leader of this group. In Brazil, in contrast, education and health spending comprises only 25 percent of primary spending, one of the lowest shares allocated to these two items in our group of countries. The country with the lowest share of spending on education and health is Armenia, which allocates just one fifth of its budget. Bolivia and South Africa allocate 36 and 34 percent of their budget to education and health spending, respectively.

There is also quite a bit of heterogeneity in the composition of social spending, with some governments devoting larger shares to education and others to health (Figure 2). For example, while El Salvador spends a larger share of GDP on health (4.3 percent) than education (2.9 percent), Indonesia spends close to nothing on health (0.9 percent).

FIGURE 2: COMPOSITION OF SOCIAL SPENDING (IN %; CIRCA 2010)



Note: Social spending here is defined as the sum of direct transfers and public spending on education and health (contributory and noncontributory). It does not include housing, food, energy or any other subsidies. Direct transfers here do *not* include contributory pensions.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014. The spending shares and GNI/capita figures correspond to the year of the household survey, namely: Armenia: 2011; Bolivia: 2009; Brazil: 2009; Chile: 2009; Colombia: 2010; El Salvador: 2011; Ethiopia: 2011; Guatemala: 2010; Indonesia: 2012; Mexico: 2010; Peru: 2009; South Africa: 2010-2011; Uruguay: 2009.

One interesting fact is that Ethiopia—a low-income country and by far the poorest and most equal of the thirteen—devotes over seven percent of its GDP to social spending. This is in stark contrast to how much redistributive spending occurred in the now developed world when it was as poor as Ethiopia today. Based on Angus Maddison's estimates, Western Europe was as poor as today's Ethiopia (in per capita 1990 Geary-Khamis international dollars) somewhere around the seventeenth century. According to Lindert (2004), by the end of the XVIIIth century, today's rich countries spent close nothing on social programs:

“In 1776, (...) the modern age of social spending had not yet dawned. People paid hardly any taxes for the social programs that take such a large tax bite from paychecks today. Most poor people received negligible help from anybody. The elderly received no public pensions, mainly because few people survived to be elderly and average working income were too low to support many dependents. Most children did not go to school, and parents had to pay for those who did.” (Lindert, 2004, p.7)

Around 2010, the range of public education spending to GDP goes from 2.6 percent in Guatemala to 8.3 percent in Bolivia. Ethiopia, the poorest country in our sample, devotes 4.6 percent of its GDP. The

countries that spend the least are Guatemala, Peru and El Salvador: 2.6, 2.8 and 2.9 percent of GDP, respectively. According to Angus Madison's estimates, in 1990 international dollars, El Salvador's GDP/capita in 2008 was similar to the US in 1880 and Guatemala's and Peru's to the US around 1900. The United States, a pioneer country in terms of public education, devoted 0.74 percent of GDP/capita in 1880 and 1.24 percent in 1900 (Lindert, 2004, Appendix C). That is, the three lowest spenders on public education 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 when Sweden spent 1.26 percent in public education, or about half as much as El Salvador today.

Government spending on health circa 2010 ranges from 0.9 percent in Indonesia to 5.2 percent in Brazil; the figure for Ethiopia is 1.25 percent. When the US (around 1900) was as rich as Indonesia in the early twenty-first century (2008), it spent around 0.17 percent in government subsidies for health care (Lindert, 1994, Table 1D, p. 13). When the US was as rich as Brazil in 2008, it spent 0.4 percent.²¹

Lindert argues that the three main forces behind the rise of tax-based social spending from the late nineteenth century onward can be "...linked to three other great social transformations: the transition to fuller democracy, the demographic transition..., and the onset of sustained economic growth." (Lindert, 2004, p. 20). The fact that social spending is comparatively higher in the thirteen developing countries analyzed here indicates that the (socially? politically? economically?) acceptable floor has been raised. One clear difference is that all the thirteen countries here have universal suffrage while when present-day rich countries were equally poor, women were not allowed to vote (or, there were restrictions to their vote). Thus, our findings are consistent with one of Lindert's explanatory variables for the rise in tax-based social spending: i.e., fuller democracy. However, the world experienced another change during the twentieth century: the rise in domestic and external government borrowing and in official and private foreign aid. Ethiopia, for example, receives around 3 percent of GDP in grants.

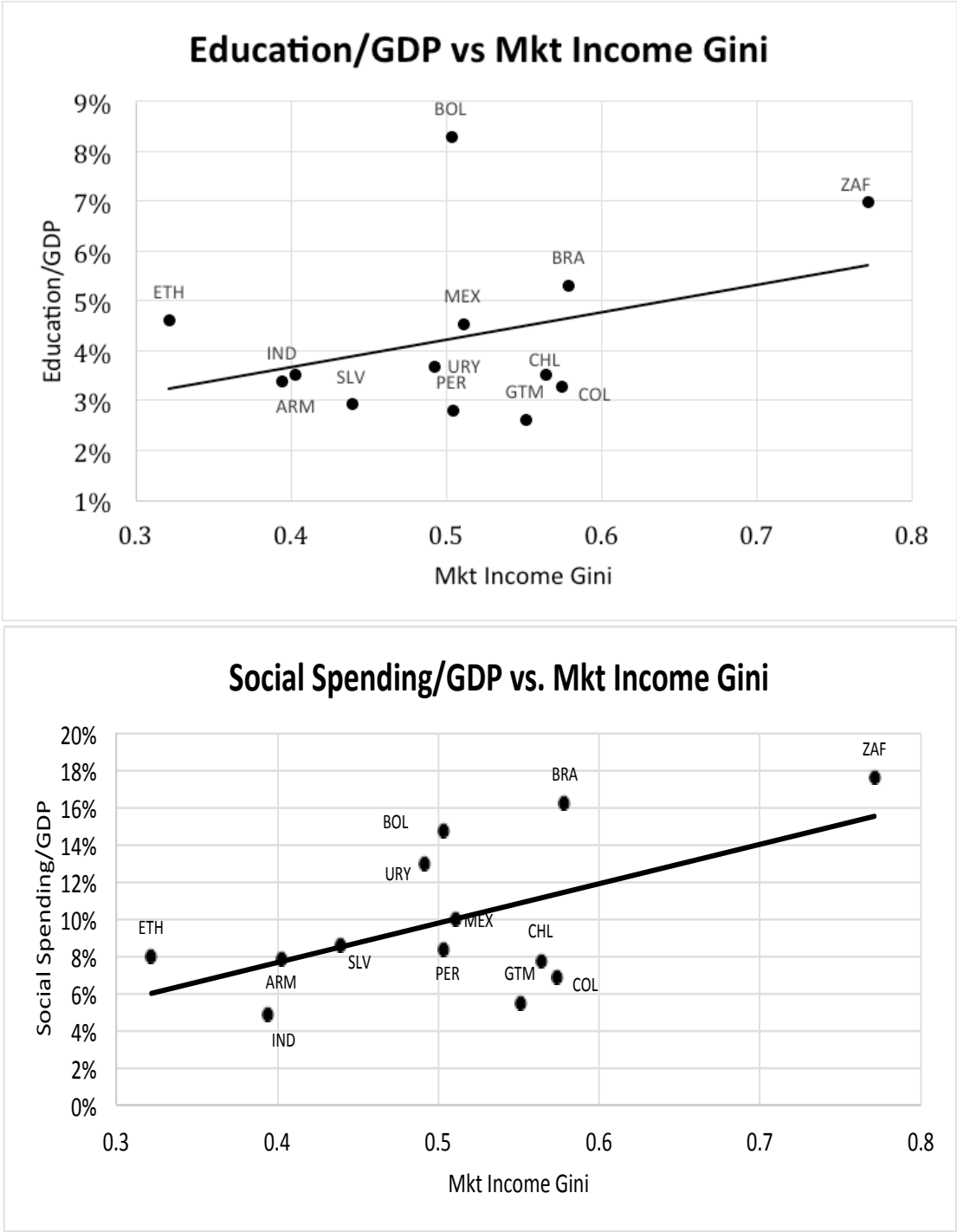
ii Social Spending and Inequality

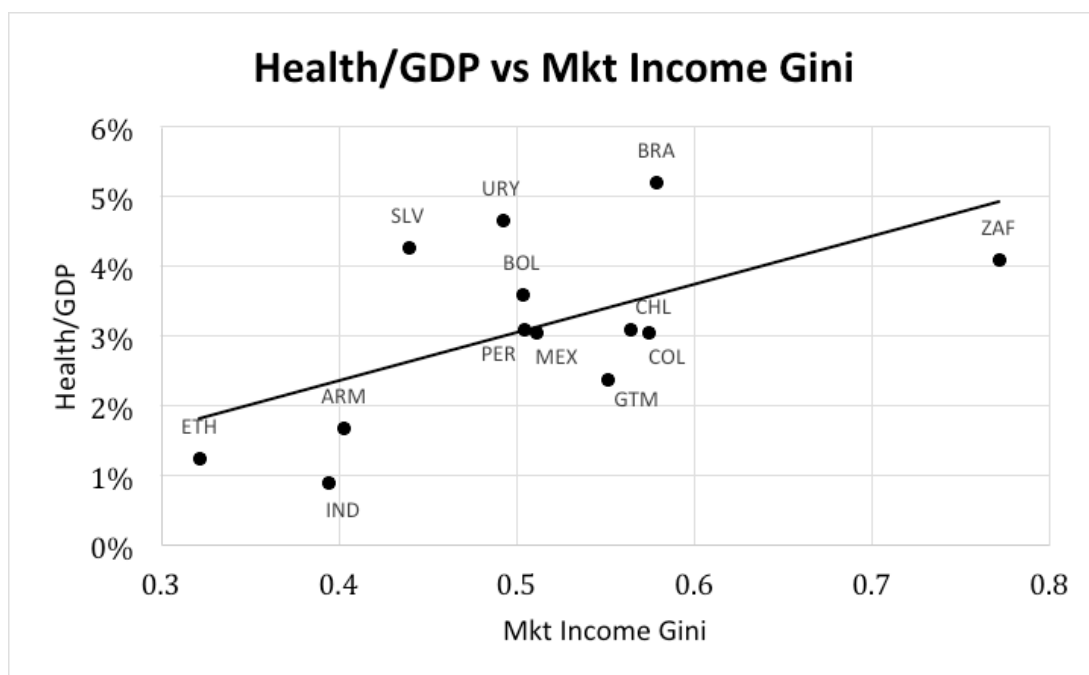
One of Peter Lindert's most important findings in his path-breaking work is that both across countries and over time, resources devoted to the poor are lower in the nations where poverty and inequality are greater.²² As shown in Figure 3, total social spending and spending on education and health as a share of GDP increase with income inequality (measured here by the Gini coefficient). This would seem to contradict earlier findings discussed by Lindert. Are the results mainly driven by South Africa? If one removes South Africa, total social spending's line becomes flatter, the education spending's line becomes horizontal and the health spending's line stays more or less the same. In addition, a larger share of resources devoted to education and health does not imply that governments are spending more resources on the poor. This will depend on the distribution of this spending, a question to which we turn below.

²¹ The US was as rich as Brazil in 2008 around 1925. The health spending figure corresponds to 1920 (Lindert, 1994; Table 1D).

²² Lindert (2004).

FIGURE 3: SOCIAL SPENDING AND INCOME INEQUALITY (IN %; CIRCA 2010)





Note: The spending shares and the Gini coefficients correspond to the year of the household survey, namely: Armenia: 2011; Bolivia: 2009; Brazil: 2009; Chile: 2009; Colombia: 2010; El Salvador: 2011; Ethiopia: 2011; Guatemala: 2010; Indonesia: 2012; Mexico: 2010; Peru: 2009; South Africa: 2010-2011; Uruguay: 2009. The Gini coefficients for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014. The spending shares and Gini coefficients correspond to the year of the household survey, namely: Armenia: 2011; Bolivia: 2009; Brazil: 2009; Chile: 2009; Colombia: 2010; El Salvador: 2011; Ethiopia: 2011; Guatemala: 2010; Indonesia: 2012; Mexico: 2010; Peru: 2009; South Africa: 2010-2011; Uruguay: 2009.

3 FISCAL INCIDENCE ANALYSIS: METHODOLOGICAL HIGHLIGHTS²³

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 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. Transfers include both cash transfers and benefits in kind such as free government services in education and healthcare.

In general, fiscal incidence exercises are carried out using household surveys and this is what was done here.²⁴ As with any fiscal incidence study, let's start by defining the basic income concepts. Here I use three:

²³ This section is based on Lustig and Higgins (2013).

²⁴ The surveys used in the country studies are the following: Armenia: Integrated Living Conditions Survey, 2011 (I); Bolivia: Encuesta de Hogares, 2009 (I); Brazil: Pesquisa de Orçamentos Familiares, 2009 (I); Chile: Encuesta de Caracterización Social (CASEN), 2009 (I); Colombia: Encuesta de Calidad de Vida, 2010 (I); El Salvador: Encuesta De Hogares De Propósitos Múltiples, 2011 (I); Ethiopia: Ethiopia Household Consumption Expenditure Survey and Ethiopia Welfare Monitoring survey, 2011 (C); Guatemala: Encuesta Nacional de Ingresos y Gastos Familiares, 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); Uruguay: Encuesta Continua de Hogares, 2009 (I). The letters "I" and "C" indicate that the study used income or consumption data, respectively. For more

market, post-fiscal and final income.²⁵ *Market income*²⁶ 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,²⁷ imputed rent for owner occupied housing, private transfers (remittances and other private transfers such as alimony), and retirement pension benefits from the contributory social insurance system.²⁸ *Post-fiscal income* is defined as market income minus direct personal income taxes on all income sources (included in market income) that are subject to taxation and all contributions to social security (except for the portion going towards pensions), plus direct government transfers (mainly cash transfers but can include food transfers, free textbooks and school uniforms) and indirect subsidies, minus indirect taxes (e.g., value added tax, sales tax, 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 minus co-payments or user fees, when they exist.²⁹

Once these income concepts are generated, households are ranked by per capita market income. Next, one proceeds to calculate inequality and poverty indicators for the three income concepts. Given that the valuation of government services at cost of provision is not equivalent to “cash,” I do not calculate poverty levels for final income. If not free, it is unlikely that, for instance, the poor would be willing to pay for these services at their cost. With the inequality indicators on hand, one can calculate the contribution of government spending on education and health to the fiscal policy-induced change in inequality. Having allocated the education and health benefits to individuals, one can also calculate indicators of fiscal progressivity, such as cumulative shares, concentration coefficients and Kakwani indexes for spending on education (total and by level) and health (total and, when possible, by contributory and noncontributory systems, for example). The method applied here to value the benefit to an individual of going to a public school or receiving healthcare in a public facility is equivalent to using a simple binary indicator of whether or not the individual uses the government service.³⁰

An important limitation is that implicit in monetizing benefits at the average cost of provision is that all who use a service or participate in a program receive the same benefits, which is obviously not correct. This approach is likely to introduce “...a systematic bias in the results. Viewed from the supply side, the poor probably attend lower-quality schools and receive lower-quality healthcare.” (Sahn and Younger, 2000, p.

details, see the country studies cited in the introduction.

²⁵ In the cases of Ethiopia and Indonesia, the surveys do not have income data so the incidence analysis is based on assuming consumption equals disposable income.

²⁶ Market income is sometimes called primary or original income.

²⁷ Except in the cases of Bolivia and South Africa whose data on auto-consumption (also called own-production or self-consumption) was not considered reliable.

²⁸ One area in which there is no agreement is how pensions from a pay-as-you-go contributory system should be treated. Arguments exist in favor of both treating contributory pensions as part of market income because they are deferred income or as a government transfer especially in systems with a large subsidized component. Since this is an unresolved issue, the country studies were done for a benchmark case in which contributory pensions are part of market income and a sensitivity analysis in which pensions are classified under government transfers. The latter are available upon request.

²⁹ 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.

³⁰ 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.

331). Interestingly, the quality of education and healthcare may be lower even in the cases in which governments spend more in per capita terms in poor remote areas, more costly to reach.

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. 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; and, 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.

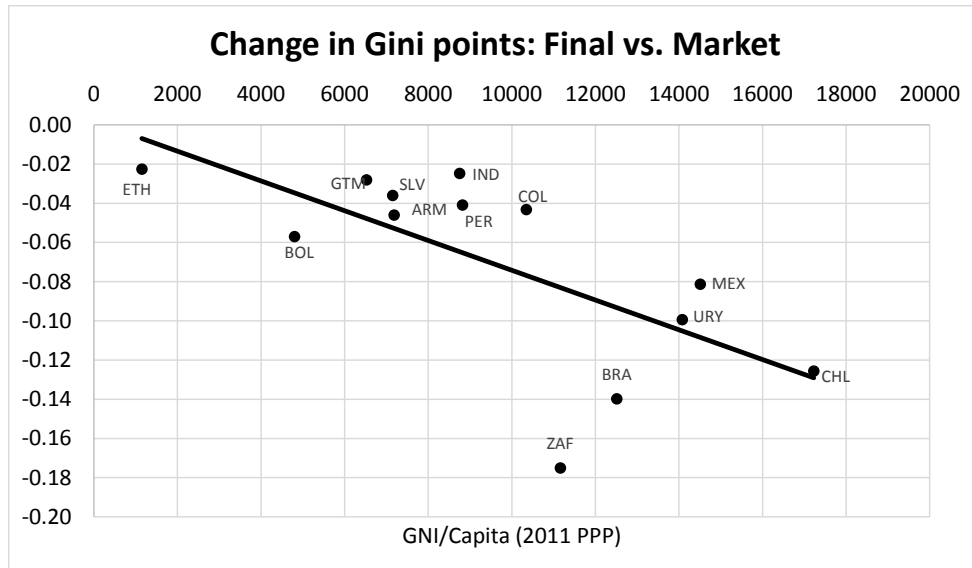
4 REDISTRIBUTIVE EFFECT AND THE MARGINAL CONTRIBUTION OF EDUCATION AND HEALTH SPENDING

In order to measure the impact of fiscal interventions on inequality—that is, the redistributive effect--, I compare the Gini coefficient for final income with the Gini for market income. In Figure 4, one can observe that the reduction in inequality ranges from 17.5 Gini points in South Africa³¹ to 2.3 Gini points in Ethiopia, and that its absolute value rises with GNI per capita.³²

³¹ South Africa's market income Gini may appear higher than usual. However, published inequality figures use disposable income (or expenditures, such as in the World Bank's World Development Indicators), and not market income. In our study for South Africa (Inchauste et al., 2015), the Gini for per capita disposable household income is 0.6944, in line with other sources. For example, Leibbrandt et al. (2010) show a Gini of 0.70 for 2008 (Table 2.6, p. 32).

³² It should be noted, however, that in the cases of Ethiopia and Indonesia—due to the characteristics of the household surveys--the Gini coefficient is measured using consumption per capita while income per capita is used for the rest. A well-known fact is that consumption is less unequally distributed than income.

FIGURE 4: REDISTRIBUTIVE EFFECT AND GNI/CAPITA (CIRCA 2010)



Note: The Gini coefficients correspond to the year of the household survey, namely: Armenia: 2011; Bolivia: 2009; Brazil: 2009; Chile: 2009; Colombia: 2010; El Salvador: 2011; Ethiopia: 2011; Guatemala: 2010; Indonesia: 2012; Mexico: 2010; Peru: 2009; South Africa: 2010-2011; Uruguay: 2009. The Gini coefficients for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita.

Source: Lustig (2015) based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

According to Lindert (2004),

“... 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.” (Lindert, op. cit., p. 15)

As discussed in Lustig (2015) –and, in contrast to Lindert’s findings-- in this group of thirteen developing countries there is no “Robin Hood” paradox. On the contrary, redistribution from rich to poor is greater in countries where inequality before fiscal interventions is higher (Figure 5), a result that seems consistent with the prediction of the Meltzer and Richard (1981) median-voter hypothesis. The redistributive effect ranges from 17.5 Gini points in South Africa—the country with the highest market income inequality—to 2.3 Gini points in Ethiopia—the country with the lowest market income inequality. This result is (graphically) robust even if one takes South Africa out (an outlier in terms of the size of redistribution measured in percentage points). The result is also (graphically) robust if one measures the redistributive effect as a percentage change instead of Gini points. Some preliminary estimates suggest that the result that more unequal countries tend to redistribute more is not driven by the fact that more unequal countries tend to be richer and –therefore–have higher capacity to raise revenues and afford higher levels of spending. Regressing the

change in the Gini (in percentage points) on GNI/capita and the market income Gini shows that the coefficient for the latter is 0.257;³³ that is, positive and significant even if one controls for GNI per capita.³⁴ The coefficient for GNI per capita is significant but small: 0.000004.³⁵ The regression-based results, however, are not robust to removing South Africa. While the coefficient for the market income Gini still comes out positive, it is no longer significant.³⁶

What is the contribution of public spending on education and health to the decline in final income inequality? There are several ways of calculating the contribution of a particular fiscal intervention to the change in inequality (or poverty): the marginal contribution, the sequential contribution and the total contribution. The marginal contribution of spending on education and health to the reduction in final income inequality is calculated by comparing the inequality indicators with this type of spending included and without it: that is, as the difference between the final income and the post-fiscal Gini coefficients.³⁷ This method is equivalent to asking the question: “what if” the government had not spent at all on education and health?³⁸

The results are shown in Table 1. The marginal contribution of public spending on education and health as a proportion of the total reduction in (final income versus market income) inequality ranges from as low as 12 percent in Ethiopia to as high as one hundred percent in Bolivia and Guatemala.³⁹ The simple average equals 69 percent.

³³ This regression should be viewed with caution because since the Gini coefficients are measured with error, and the error is likely to be smaller the richer the country, the coefficient may be biased.

³⁴ The coefficient is significant for $p < 0.05$.

³⁵ The coefficient is significant for $p < 0.10$.

³⁶ Lustig (2015).

³⁷ 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.

³⁸ In this particular instance, the marginal and sequential contributions are equivalent. 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.

³⁹ When the marginal contribution of education and health spending equals one hundred percent it means that the other fiscal interventions combined had no effect on inequality.

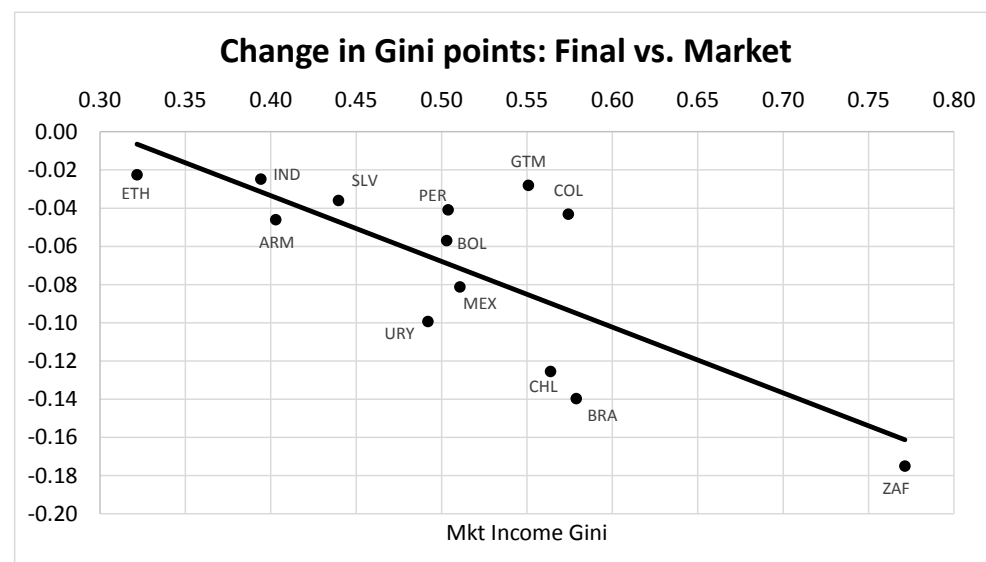
TABLE 1: CONTRIBUTION OF SPENDING ON EDUCATION AND HEALTH TO OVERALL REDISTRIBUTIVE EFFECT (CIRCA 2010)

	ARMENIA (2011)	BOLIVIA (2009)	BRAZIL (2009)	CHILE (2009)	COLOMBIA (2010)	EL SALVADOR (2011)	ETHIOPIA (2011)	GUATEMALA (2010)	INDONESIA (2012)	MEXICO (2010)	PERU (2009)	SOUTH AFRICA (2010)	URUGUAY (2009)
Gini of Market Income	0.4030	0.5030	0.5788	0.5637	0.5742	0.4396	0.3217	0.5509	0.3942	0.5107	0.5039	0.7712	0.4920
Gini of Post-fiscal	0.3744	0.5028	0.5455	0.5251	0.5673	0.4294	0.3019	0.5508	0.3911	0.4809	0.4892	0.6946	0.4590
Gini of Final Income	0.3569	0.4460	0.4390	0.4381	0.5309	0.4036	0.2991	0.5227	0.3694	0.4294	0.4630	0.5961	0.3926
Marginal contribution of spending on education and health													
Difference between Final & Post-fiscal	-0.0175	-0.0568	-0.1065	-0.0869	-0.0364	-0.0258	-0.0028	-0.0281	-0.0217	-0.0515	-0.0262	-0.0985	-0.0663
As a share of difference between final and market	38%	100%	76%	69%	84%	72%	12%	100%	88%	63%	64%	56%	67%

Note: Year of survey in parenthesis. The Gini coefficients for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita. For methodology, see Lustig and Higgins (2013) and text.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

FIGURE 5: REDISTRIBUTION AND MARKET INCOME GINI (CIRCA 2010)



Note: The Gini coefficients for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita.

Source: Lustig (2015) based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

5 THE PROGRESSIVITY AND PRO-POORNESS OF GOVERNMENT SPENDING ON EDUCATION AND HEALTH

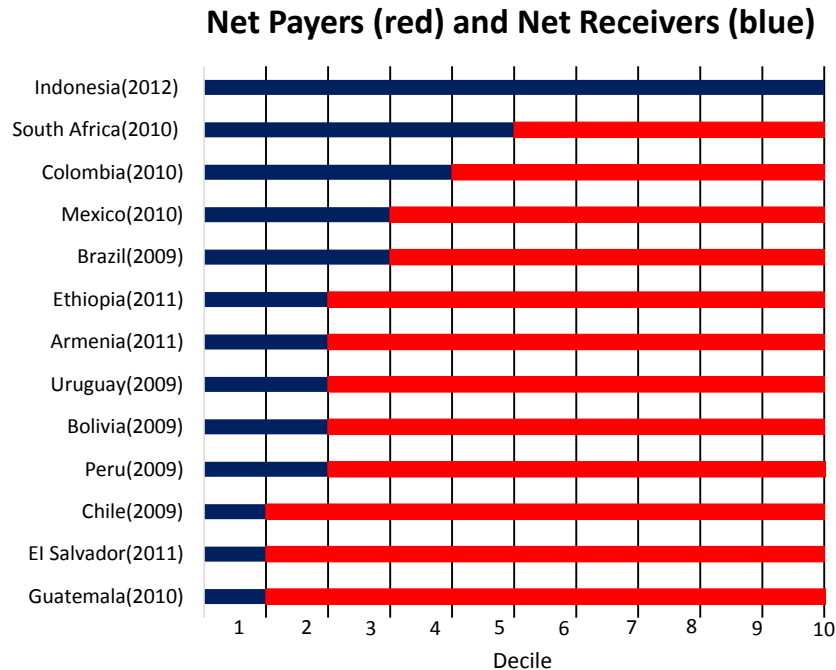
When analyzing the impact of fiscal interventions on living standards, it is useful to distinguish between the net benefits in cash from the benefits received in the form of free government services in education and health. The cash component is measured by post-fiscal income, equal to market income plus direct cash transfers, minus direct taxes (mainly, personal income taxes), minus indirect taxes (mainly, consumption taxes), plus indirect subsidies. 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.

Lustig (2015) shows that in Chile, El Salvador and Guatemala, on average, net receivers include individuals in the bottom decile only (Figure 6). In Armenia, Ethiopia, Bolivia, Peru and Uruguay, only the bottom 20 percent is composed of net receivers in cash, on average. Using the US\$2.50 ppp/day international poverty line, the extreme poor are net payers, on average, in Armenia, El Salvador, Ethiopia, Guatemala and Peru.⁴⁰ In Ethiopia, the poor are net payers even when using the lower international poverty line of US\$1.25 ppp/day. Using the US\$2.50 ppp/day international poverty line, the incidence of post-fiscal income poverty (after direct cash transfers, direct taxes and net indirect taxes) is higher than market income poverty in these countries except for Chile, and it is also higher in Bolivia and Brazil (in Ethiopia, this result occurs with the \$1.25 poverty line as well).⁴¹

⁴⁰ These figures and the following ones not shown here. See Lustig (2015).

⁴¹ Governments must raise taxes to function, and those taxes may make the poor poorer even if they are quite progressive in the usual sense.

FIGURE 6: NET PAYERS AND NET RECEIVERS TO THE FISCAL SYSTEM BY DECILE (CIRCA 2010)



Note: Year of the survey in parenthesis. The data for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita.

Source: Lustig (2015) based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

To what extent are the poor—especially in the countries in which they are net payers and/or post-fiscal income poverty is higher--benefitting from government spending on education and health? I measure the progressivity of public spending on education and health using concentration coefficients (also called quasi-Ginis).⁴²

In keeping with conventions, I define spending 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.⁴³ 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, I define spending as neutral in absolute terms -- spending per capita is the same across the income distribution--

⁴² 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 $2 \int_0^1 (p - C(p)) dp$.

⁴³ 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.

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.⁴⁴ Any time spending is pro-poor or neutral in absolute terms, by definition it is progressive. The converse, of course, is not true.⁴⁵

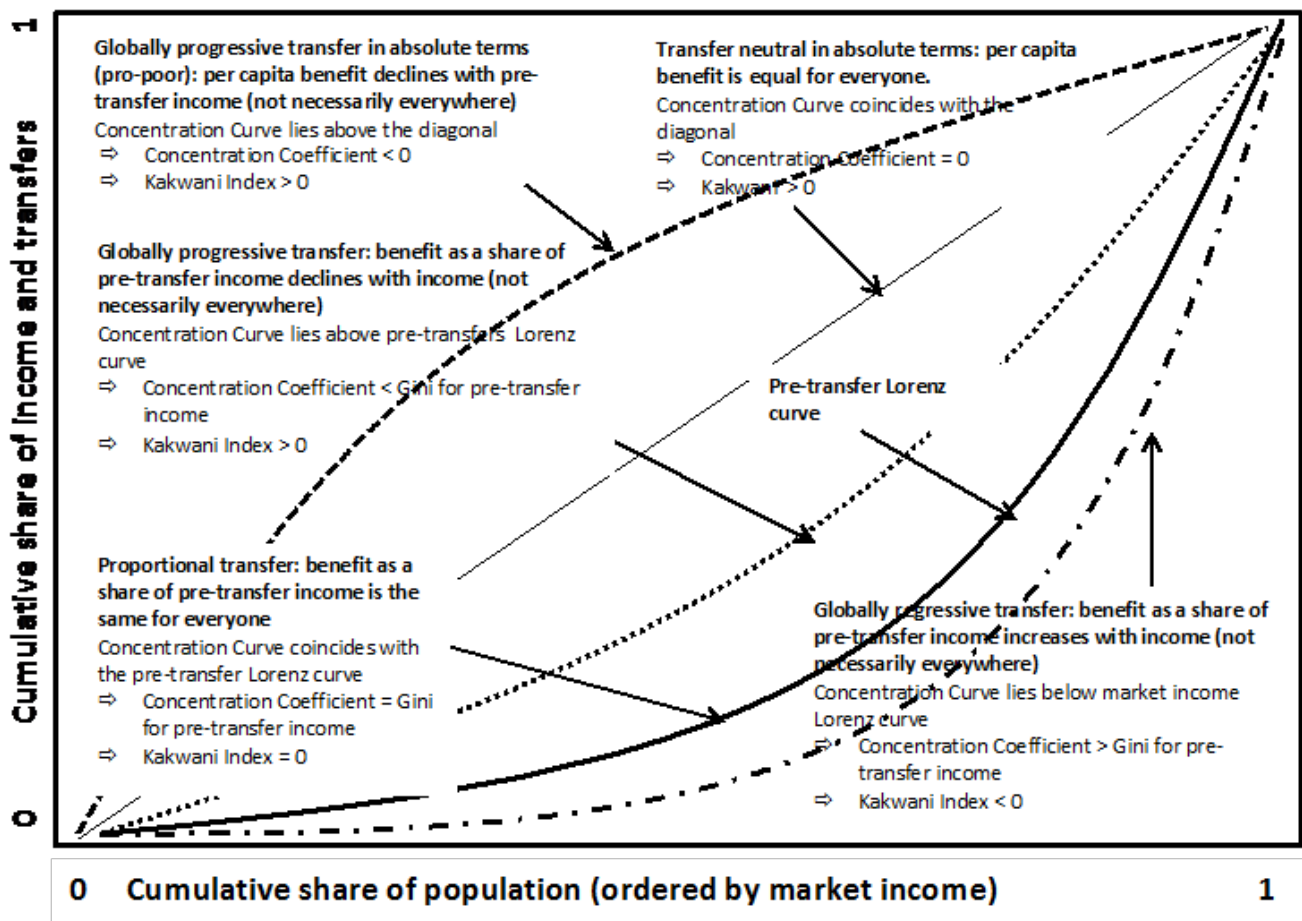
Using the concentration coefficient to determine the progressivity of transfers, however, has one important drawback. A concentration coefficient may indicate that spending is progressive, for example, even if the concentration curve crosses the Lorenz curve for market income. To check whether there are crossings, one should compare concentration curves (or cumulative concentration shares). For a benefit that is globally regressive, the concentration curve will lie everywhere *below* the market income Lorenz curve. In the case of globally progressive transfers, the concentration curve will lie everywhere *above* the market income Lorenz curve. When the cumulative concentration curve coincides with the diagonal, spending per capita is the same across the income distribution, or neutral in absolute terms. In the case of pro-poor spending, the concentration curve lies everywhere *above* the diagonal.

The above classification is summarized in Figure 7. In the results presented below, there are no crossings (at the decile level) so there is broadly no ambiguity introduced when relying just on the concentration coefficients. In regards to total spending on education and health, the conclusions are the same whether we rely on the concentration shares (concentration curves) or the concentration coefficients.

⁴⁴This case is also sometimes called progressive in absolute terms.

⁴⁵ Care must be taken not to infer that any spending that is progressive (regressive) will automatically be equalizing (unequalizing). Once one leaves the world of a single fiscal intervention, it is no longer possible to infer whether the impact of a specific intervention is inequality-increasing or inequality-reducing by just looking at the level and progressivity (or lack thereof) of the intervention in question (Lambert, 2001, pp. 277-8).

FIGURE 7: DEFINITIONS OF PROGRESSIVITY FOR TAXES AND TRANSFERS



Source: Lustig (2015).

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-pooriness 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.

iii Education

The (cumulative) concentration shares for education spending as a whole are shown in Table 2. As one can observe, education spending is pro-poor or neutral in absolute terms in all countries with the exception of Ethiopia where the richest twenty percent captures 35 percent of education spending.⁴⁶ Education spending is the most pro-poor (measured by the cumulative share accruing to the bottom 20 percent) in Brazil, Uruguay and Peru.

⁴⁶ Given that Ethiopia is the poorest country and one with a high rural population, this is not surprising. Education and health coverage in today's middle-income countries was low among the rural poor when the countries were poorer.

Now, let's examine progressivity by education level. In Table 3, one can observe the concentration coefficients for education disaggregated by level. Total education spending is pro-poor in all countries but Bolivia, Guatemala and Indonesia, where it is (approximately) neutral in absolute terms and Ethiopia where it is very progressive but only in relative terms. Pre-school tends to be pro-poor in all countries for which there is data (and pre-school), particularly so in South Africa. Primary school is pro-poor in all countries except for Ethiopia in which it is neutral in absolute terms. For secondary school, the pattern is quite heterogeneous. It is (roughly) neutral in absolute terms in El Salvador and Mexico, progressive only in relative terms in Ethiopia, Guatemala, Indonesia and Uruguay and pro-poor in the rest. Government spending on tertiary education is regressive in Ethiopia, Guatemala and Indonesia, distribution neutral in El Salvador and (roughly) Uruguay, and progressive in various degrees in the rest, but never pro-poor. Compared with their respective levels of market income inequality, spending on tertiary education is most progressive in South Africa followed by Colombia and Chile.

What narratives can one extrapolate from the distributional patterns of education spending just described? As a low-income country with a large rural population (over 80 percent of the total), it is not surprising that education spending in Ethiopia is not "pro-poor." From the thirteen countries, Ethiopia is the one that is likely to have the biggest challenges in terms of coverage of education at all levels, including the most basic ones. The Ethiopian government spends on tertiary education a higher share of social spending than other countries. Public spending on tertiary education, in general, is done more for growth than redistributive purposes. A critical mass of tertiary-educated citizens can also be important for strengthening local democratic institutions and the ability to deliver public services in education and health to the population at large.

TABLE 2: DISTRIBUTION OF MARKET INCOME AND CUMULATIVE CONCENTRATION SHARES OF EDUCATION SPENDING BY DECILE (IN %; CIRCA 2010)

Decile	Armenia (2011)		Bolivia (2009)		Brazil (2009)		Chile (2009)		Colombia (2010)		El Salvador (2011)		Ethiopia (2011)		Guatemala (2010)		Indonesia (2012)		Mexico (2010)		Peru (2009)		South Africa (2010)		Uruguay (2009)	
	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational	Mkt Income	Educational
1	1.2%	13.7%	0.7%	10.0%	0.7%	15.7%	1.0%	12.4%	0.9%	12.4%	1.8%	12.5%	3.0%	6.5%	1.3%	10.1%	3.1%	9.4%	1.1%	11.5%	1.2%	13.8%	0.1%	10.6%	1.2%	14.4%
2	4.3%	25.5%	2.8%	19.9%	2.4%	29.1%	3.3%	24.8%	2.8%	24.4%	5.0%	25.3%	7.9%	15.3%	3.4%	20.5%	7.3%	19.3%	3.5%	22.7%	3.5%	26.7%	0.3%	22.1%	3.6%	27.0%
3	9.1%	36.8%	6.3%	30.0%	5.0%	41.1%	6.3%	36.9%	5.7%	35.8%	9.2%	37.4%	13.8%	23.5%	6.3%	30.7%	12.1%	28.8%	7.0%	34.0%	6.9%	39.5%	0.7%	33.2%	7.1%	38.0%
4	15.2%	47.0%	11.0%	40.6%	8.5%	52.1%	10.2%	47.7%	9.5%	46.3%	14.5%	48.9%	20.8%	31.3%	10.2%	40.8%	17.7%	38.3%	11.5%	45.1%	11.4%	51.6%	1.6%	44.6%	11.7%	48.3%
5	22.7%	58.6%	17.1%	50.6%	13.2%	61.4%	15.1%	58.2%	14.2%	56.9%	21.0%	60.3%	28.7%	38.9%	15.1%	51.1%	24.2%	48.4%	17.1%	56.3%	17.1%	62.9%	3.1%	54.8%	17.5%	57.8%
6	31.6%	67.7%	24.7%	60.5%	19.4%	70.2%	21.1%	68.1%	20.2%	66.7%	28.8%	70.5%	37.6%	46.8%	21.4%	59.8%	31.9%	58.6%	24.1%	67.0%	24.4%	72.6%	5.8%	64.2%	24.9%	66.7%
7	42.3%	75.9%	34.2%	72.0%	27.4%	78.2%	28.8%	77.4%	27.9%	77.2%	38.3%	79.8%	47.7%	55.7%	29.5%	69.9%	41.1%	68.4%	32.9%	76.7%	33.6%	81.0%	10.3%	73.1%	34.2%	75.1%
8	55.2%	84.6%	46.1%	83.1%	38.4%	85.9%	38.9%	86.1%	38.3%	86.6%	50.3%	88.2%	59.5%	65.4%	40.3%	80.7%	52.6%	78.4%	44.3%	85.7%	45.4%	89.3%	18.6%	81.3%	46.3%	83.9%
9	71.5%	93.5%	62.8%	92.6%	54.7%	92.7%	53.7%	94.2%	53.6%	94.8%	66.7%	95.6%	73.9%	77.9%	56.6%	90.7%	68.2%	88.9%	60.6%	93.9%	61.7%	96.0%	36.3%	89.8%	63.3%	92.9%
10	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Year of survey in parenthesis. The data for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita. For methodology, see Lustig and Higgins (2013) and country studies sources.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

TABLE 3: CONCENTRATION COEFFICIENTS AND BUDGET FOR EDUCATION SPENDING BY LEVEL (CIRCA 2010)

	ARMENIA (2011)		BOLIVIA (2009)		BRAZIL (2009)		CHILE (2009)		COLOMBIA (2010)		EL SALVADOR (2011)		ETHIOPIA (2011)		GUATEMALA (2010)		INDONESIA (2012)		MEXICO (2010)		PERU (2009)		SOUTH AFRICA (2010)		URUGUAY (2009)	
	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share
Education	-0.1075	44.7%	-0.0184	59.4%	-0.1539	36.2%	-0.113	45.6%	-0.1033	61.5%	-0.1388	31.2%	0.1831	48.7%	-0.0099	45.1%	0.0234	68.3%	-0.0866	52.2%	-0.1689	44.1%	-0.1102	48.6%	-0.1103	34.8%
Pre-School	-0.0508	3.6%	-0.2065	1.4%	-0.3263	2.0%	-0.2246	5.0%	-0.2708		-0.2028	2.7%	na	na	-0.1004	5.0%	na	na	-0.2426	6.0%	-0.2486	3.8%	-0.4467			
Primary	-0.1765	10.2%	-0.2544	24.5%	-0.3113	16.1%	-0.1896	22.3%	-0.3125		-0.2208	22.1%	-0.0280	21.5%	-0.1806	24.0%	-0.0772	22.2%	-0.2499	18.1%	-0.3445	16.8%	-0.4305	17.2%	-0.4296	13.7%
Secondary School	-0.1383	17.4%	-0.1153	6.0%	-0.2121	2.6%	-0.1395	11.9%	-0.1704	47.9%	0.0189	3.9%	0.2774	12.7%	0.0256	10.2%	0.0028	36.4%	0.0850	18.7%	-0.2009	14.7%	-0.1200	13.0%	-0.1223	8.9%
Lower Secondary	-0.1806	12.1%									-0.0148	7.6%	-0.0306	27.5%	-0.1625	10.9%									-0.2623	5.4%
Upper Secondary	-0.0412	5.3%													0.1505	2.5%	0.1064	8.9%	0.0232	7.8%					0.0966	3.5%
Tertiary	0.2461	2.2%	0.2974	26.2%	0.4367	5.6%	0.2924	6.4%	0.2854	13.5%	0.4369	2.4%	0.4098	14.6%	0.5866	6.0%	0.4788	9.8%	0.3193	9.5%	0.2542	8.8%	0.4698	11.1%	0.3130	7.6%
Market Income Gini	0.4030		0.5030		0.5788		0.56		0.5742		0.4396		0.3217		0.5509		0.3942		0.5107		0.5039		0.7712		0.4920	

Note: Year of survey in parenthesis. CC: concentration coefficient. Budget as a share of Social Spending. The concentration coefficients for total spending on education for Chile were calculated as the weighted average of spending by level with their respective budget shares as weights. The Gini coefficient for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita. For methodology, see Lustig and Higgins (2013) and country studies.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

In the large middle-income countries of Brazil and South Africa and also in Uruguay, a pattern emerges. Spending on pre-primary and primary education is highly pro-poor (large negative concentration coefficients) while spending on tertiary education tends to be more “pro-rich.” One possible explanation is that the middle-classes and the rich opt out of public schooling at lower levels due to their poor quality and benefit later from the free high quality tertiary education to which the publicly educated children cannot access because they lack the preparation and skills.

iv Health

Table 4 shows the (cumulative) concentration shares for government health spending. As one can observe, health spending benefits more the poorest twenty percent in Chile, Colombia and Uruguay, while it benefits relatively more the richest twenty percent in El Salvador, Ethiopia, Guatemala, Indonesia and Peru. Using the concentration coefficients, health spending is pro-poor in Brazil, Chile, Colombia, South Africa and Uruguay; roughly neutral in absolute terms in Armenia, Bolivia and Mexico; and, progressive in only relative terms in the rest (Table 5). Compared to their market income inequality, the lowest progressivity is found in Ethiopia, Indonesia, El Salvador and Peru (see the Kakwani coefficients). In the case of Ethiopia, again, the pattern may be due the large share of rural population, which makes giving access to health services more challenging.

TABLE 4: DISTRIBUTION OF MARKET INCOME AND CUMULATIVE CONCENTRATION SHARES OF HEALTH SPENDING BY DECILE (IN %; CIRCA 2010)

Decile	Armenia (2011)		Bolivia (2009)		Brazil (2009)		Chile (2009)		Colombia (2010)		El Salvador (2011)		Ethiopia (2011)		Guatemala (2010)		Indonesia (2012)		Mexico (2010)		Peru (2009)		South Africa (2010)		Uruguay (2009)	
	Mkt Income	Health	Net Mkt Income ^b	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health	Mkt Income	Health
1	1.2%	8.2%	0.7%	9.6%	0.7%	10.5%	1.0%	23.9%	0.9%	15.7%	1.8%	7.2%	3.0%	8.9%	1.3%	5.6%	3.1%	7.3%	1.1%	9.1%	1.2%	5.7%	0.1%	10.2%	1.2%	12.4%
2	4.3%	19.8%	2.8%	19.8%	2.4%	21.8%	3.3%	43.7%	2.8%	30.9%	5.0%	15.0%	7.9%	17.8%	3.4%	12.0%	7.3%	15.5%	3.5%	18.4%	3.5%	12.0%	0.3%	20.6%	3.6%	24.4%
3	9.1%	30.5%	6.3%	33.6%	5.0%	33.4%	6.3%	59.7%	5.7%	44.4%	9.2%	23.3%	13.8%	26.4%	6.3%	18.8%	12.1%	23.9%	7.0%	27.8%	6.9%	18.9%	0.7%	31.2%	7.1%	36.1%
4	15.2%	39.4%	11.0%	43.6%	8.5%	45.6%	10.2%	73.7%	9.5%	57.0%	14.5%	32.3%	20.8%	35.8%	10.2%	27.3%	17.7%	33.3%	11.5%	37.5%	11.4%	27.1%	1.6%	42.0%	11.7%	47.2%
5	22.7%	48.5%	17.1%	53.8%	13.2%	57.4%	15.1%	86.3%	14.2%	68.0%	21.0%	41.7%	28.7%	44.5%	15.1%	36.6%	24.2%	42.8%	17.1%	47.3%	17.1%	36.5%	3.1%	53.1%	17.5%	57.8%
6	31.6%	58.3%	24.7%	64.6%	19.4%	69.0%	21.1%	95.0%	20.2%	78.3%	28.8%	51.3%	37.6%	54.7%	21.4%	47.4%	31.9%	52.5%	24.1%	57.5%	24.4%	46.6%	5.8%	64.2%	24.9%	67.6%
7	42.3%	70.8%	34.2%	74.3%	27.4%	80.8%	28.8%	100.0%	27.9%	86.4%	38.3%	61.9%	47.7%	64.3%	29.5%	58.4%	41.1%	62.8%	32.9%	67.8%	33.6%	58.2%	10.3%	75.3%	34.2%	76.8%
8	55.2%	79.8%	46.1%	82.9%	38.4%	90.3%	38.9%	102.2%	38.3%	92.5%	50.3%	73.3%	59.5%	74.4%	40.3%	71.3%	52.6%	73.0%	44.3%	78.1%	45.4%	70.6%	18.6%	85.9%	46.3%	85.2%
9	71.5%	90.5%	62.8%	91.5%	54.7%	97.2%	53.7%	102.1%	53.6%	97.1%	66.7%	86.0%	73.9%	85.6%	56.6%	85.2%	68.2%	85.2%	60.6%	89.0%	61.7%	85.1%	36.3%	95.0%	63.3%	93.0%
10	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Year of survey in parenthesis. Budget as a share of Social Spending as defined here. The data for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita. The concentration shares for Peru do not include spending on contributory health programs while the concentration coefficient in Table 5 does. For methodology, see Lustig and Higgins (2013) and country studies sources.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Jaime Ruiz Tagle and Dante Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

TABLE 5: CONCENTRATION COEFFICIENTS AND BUDGET FOR HEALTH SPENDING BY LEVEL (CIRCA 2010)

	ARMENIA (2011)		BOLIVIA (2009)		BRAZIL (2009)		CHILE (2009)		COLOMBIA (2010)		EL SALVADOR (2011)		ETHIOPIA (2011)		GUATEMALA (2010)		INDONESIA (2012)		MEXICO (2010)		PERU (2009)		SOUTH AFRICA (2010)		URUGUAY (2009)	
	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share	CC/Gini	Budget Share
Health	0.0075	21.3%	-0.0447	25.9%	-0.1188	35.5%	-0.4800	40.1%	-0.2433	35.5%	0.1178	44.0%	0.0773	20.4%	0.1775	41.2%	0.1111	23.1%	0.0356	35.1%	0.1798	48.3%	-0.1026	28.6%	-0.1020	44.0%
Market Income	0.4030		0.5030		0.5788		0.56		0.5742		0.4396		0.3217		0.5509		0.3942		0.5107		0.5039		0.7712		0.4920	
Gini																										
Kakwani	0.3955		0.5477		0.6976		1.0437		0.8175		0.3218		0.2444		0.3733		0.2831		0.4751		0.3241		0.8738		0.5940	

Note: Year of survey in parenthesis. CC: concentration coefficient. Budget as a share of Social Spending as defined here. The Gini coefficient for Ethiopia and Indonesia are calculated using expenditures per capita; for the rest of the countries, they are calculated with income per capita. For methodology, see Lustig and Higgins (2013) and country studies sources.

Source: author's based on Armenia: Younger et al., 2014; Bolivia: Paz-Arauco et al., 2014; Brazil: Higgins and Pereira, 2014; Chile: Ruiz-Tagle and Contreras, 2014; Colombia: Melendez, 2014; El Salvador: Beneke et al., 2014; Ethiopia: Hill et al., 2014; Guatemala: Cabrera et al., 2014; Indonesia: Jellema et al., 2014; Mexico: Scott, 2014; Peru: Jaramillo, 2013; South Africa: Inchauste et al., 2014; Uruguay: Bucheli et al., 2014.

Table 6 summarizes the results regarding the pro-poorness of government spending on education (total and by level) and health. Spending on education is more pro-poor in Armenia, Brazil, Chile, Colombia, Mexico, Peru and Uruguay. This is so because a larger share of the education budget is allocated to education levels (especially primary and, in middle-income countries, secondary) that are progressive in absolute terms: i.e., pro-poor. In the case of Ethiopia, the results should not be read as a lack of commitment on the part of the government to equalize opportunities and reduce poverty and social exclusion. With a Gini coefficient of around 0.3, Ethiopia is a very equal country to begin with. Because it is a low-income country, almost the entire population lives under the (middle-income) international poverty line of US\$4 a day and 80 percent of the population lives in rural areas (Hill et al., 2014). When today's middle-income countries were poorer, as indicated above, their spending on education and health was much less progressive and often not pro-poor. In fact, as discussed in section 2, judged by the share of total income devoted to social spending, Ethiopia appears quite committed to social progress: its level of spending is much higher than it was in today's rich countries when their income per capita levels were as low as in Ethiopia today.

TABLE 6: 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 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	Regressive 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
Armenia (2011)	+				+		+			+					+			+	
Bolivia (2009)		+		+			+			+					+			+	
Brazil (2009)	+			+			+			+					+		+		
Chile (2009)	+			+			+			+					+		+		
Colombia (2010)	+			+			+			+					+		+		
El Salvador (2011)	+			+			+				+				+				+
Ethiopia (2011)			+	na				+				+				+			+
Guatemala (2010)		+		+			+				+					+			+
Indonesia (2012)		+		na			+				+					+			+
Mexico (2010)	+			+			+			+					+			+	
Peru (2009)	+			+			+			+					+				+
South Africa (2010)	+			+			+			+					+		+		
Uruguay (2009)	+			+			+			+					+		+		

*CC is almost equal to market income Gini coefficient

Notes: Year of survey in parenthesis. CC: concentration coefficient. If the Concentration Coefficient is higher or equal to -0.05 but not higher than 0.05, it was considered equal to 0.

Source: Tables 3 and 5.

6 CONCLUSIONS

In this paper, I have analyzed the level, redistributive impact and pro-poorness of government spending on education and health in thirteen developing countries that are part of the Commitment to Equity project: Armenia, Bolivia, Brazil, Chile, Colombia, El Salvador, Ethiopia, Guatemala, Indonesia, Mexico, Peru, South Africa and Uruguay.⁴⁷ In particular, I addressed the following four questions: Does government spending on education and health increase with per capita income and income inequality? Do more unequal societies redistribute more? What is the contribution of spending on education and health to the overall reduction in inequality? How pro-poor is spending on education and health?

⁴⁷ For sources, see Introduction.

Social spending as a share of GDP ranges from 17.6 percent in South Africa to 4.9 percent in Indonesia. Government spending on education ranges from 2.6 percent of GDP in Guatemala to 8.3 in Bolivia; and, spending on health ranges from 0.9 percent of GDP in Indonesia to 5.2 percent in Brazil.⁴⁸ Spending levels are generally above what today's rich countries spent when they were as poor as some of the lowest spenders in my sample are today. Clearly, there must have been forces at play that led the developing world to devote more resources to social spending. One key difference is universal suffrage. When today's rich countries were as poor as today's developing countries, women and other groups were not universally allowed to vote.

Social spending as a share of total income increases with Gross National Income per capita (GNI). Health spending increases with GNI per capita while education spending does not, a result mainly driven by Bolivia. Spending on primary education is roughly the same at different GNI per capita levels. Spending on secondary education, however, rises with income per capita and spending on tertiary education declines, a result that requires further research. Social spending and spending on education and health increase with market (pre-taxes and transfers) income inequality.

To measure the redistributive impact and pro-poorness of education and health spending requires attaching a value to the benefit to an individual of using free public education and health services. Here, education and health services were valued at average cost of provision. Individuals were allocated the average cost of provision based on usage of the service. A well-known limitation of such an approach is that it 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. To calculate the redistributive effect and pro-poorness of education and health spending, household income per capita was calculated after the values for education and health transfers were added to income net of direct taxes, indirect taxes, direct transfers and indirect subsidies. The new Gini coefficient was compared with the Gini for market income. To assess the pro-poorness of education and health spending, I used concentration coefficients and cumulative shares.

Education and health spending lowers inequality by a significant amount and its marginal contribution to the overall decline in inequality is, on average, 69 percent. There is no "Robin Hood" paradox in the countries covered here. On the contrary, redistribution from rich to poor is more present in countries where inequality before fiscal interventions is higher.

Total spending on education is pro-poor in all countries except for Bolivia, Guatemala and Indonesia, where it is (approximately) neutral in absolute terms and Ethiopia where it is progressive only in relative 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 except for Ethiopia in which it is neutral in absolute terms. For secondary school, the pattern is quite heterogeneous. It is (roughly) neutral in absolute terms in El Salvador and Mexico, progressive only in relative terms in Ethiopia, Guatemala, Indonesia and Uruguay and pro-poor in the rest. Government spending on tertiary education is regressive in Ethiopia, Guatemala and Indonesia, distribution neutral in El Salvador and (almost so in) Uruguay, and progressive in various degrees in the rest. Compared with their respective levels of market income inequality, spending on tertiary education is most

⁴⁸ Data is for around 2010. See Introduction for specific years by country.

progressive in South Africa followed by Colombia and Chile. Health spending is pro-poor in Brazil, Chile, Colombia, South Africa and Uruguay; roughly neutral in absolute terms in Armenia, Bolivia and Mexico; and, progressive in only relative terms in El Salvador, Ethiopia, Guatemala, Indonesia and Peru. Compared to their market income inequality, the lowest progressivity is found in Ethiopia, Indonesia, El Salvador and Peru.

Although the subject of comparing the evolution of the progressivity of education and health spending over time is beyond the scope of this paper, it is interesting to note that spending on education and health appears to have become more pro-poor. Based on the data reported by Tanzi (2008), the share of education and health spending accruing to the bottom 20 percent for most Latin American countries was lower around 2000 than around 2010.⁴⁹ Although the studies used by Tanzi are not strictly comparable with those reported here, this result seems to indicate that the pro-poorness of government spending on education and health in Latin America has increased during the last decade. Another example of this trend can be found in South Africa. Comparing the results in this paper with those by Sahn and Younger (2000),⁵⁰ spending on secondary education and health spending became pro-poor while it was not before.⁵¹

In spite of this progress, given that in Bolivia, El Salvador, Ethiopia, Guatemala and Peru, the poor are (on average) net payers to the fiscal system and/or post-fiscal income poverty is higher than market income poverty, the fact that spending on education, health or both is not pro-poor is of greater concern. A less than universal access and ability to use free (or quasi-free) government services in education and health for the poor (especially the extreme poor), however, should be of concern even if spending is pro-poor by the measures conventionally used and even if the poor are net receivers from the fiscal system in cash terms (total taxes paid minus direct transfers and subsidies). Governments should emphasize universalizing access to free services for those who cannot afford private schools and private medical services. A subject for further research is to examine the access and usage of government services in education and health by income group, and assess to what extent the coverage for the poor is not universal.

Guaranteeing access and facilitating usage of public education and health services for the poor, however, 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),⁵² such as those observed in Brazil, South Africa and Uruguay, 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. This is another topic for further research.

⁴⁹ Compare Tables 2 and 4 above with Tables 4 and 5 in Tanzi (2008).

⁵⁰ Compare results on Tables 3 and 5 above with their Table 1 (Sahn and Younger, p. 335)

⁵¹ In Sahn and Younger, the concentration curves crossed the 45-degree line. That is, one could not reject the null hypothesis that per capita income was the same for all.

⁵² 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.

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<http://www.commitmenttoequity.org>



WHAT IS CEQ?

Led by Nora Lustig since 2008, the Commitment to Equity (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 project's main output is the CEQ Assessment, a methodological framework designed to analyze the impact of taxation and social spending on inequality and poverty in individual countries. The main objective of the CEQ is to provide a roadmap for governments, multilateral institutions, and nongovernmental organizations in their efforts to build more equitable societies.

Since its inception, the CEQ has received financial support from Tulane University's Center for Inter-American Policy and Research, the School of Liberal Arts and the Stone Center for Latin American Studies as well as the Bill & Melinda Gates Foundation, the Inter-American Development Bank (IADB), the World Bank, the United Nations Development Programme's Regional Bureau for Latin America and the Caribbean (UNDP/RBLAC), the Development Bank of Latin America (CAF), the African Development Bank, the International Fund for Agricultural Development (IFAD), the Canadian International Development Agency (CIDA), the Norwegian Ministry of Foreign Affairs, and the General Electric Foundation.
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The CEQ logo is a stylized graphical representation of a Lorenz curve for a fairly unequal distribution of income (the bottom part of the C, below the diagonal) and a concentration curve for a very progressive transfer (the top part of the C).