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Household's Expenditure in Health and Education: Effects on Poverty and Child Poverty Estimates in Five Middle Income Countries: India, Mexico, South Africa, Russian Federation and Peru

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Abstract

There is a wide agreement among poverty research community that conventional estimates of poverty (i.e., money-metric measures) do not take into account out of pocket payments of health care. Significant household health spending would overestimate total household expenditure, which results in an underestimation of poverty measured in terms of household expenditure. The present working paper uses Luxembourg Income Study Center data to explore the impact of household health payments on poverty and child poverty estimates in five middle-income countries (India, Mexico, South Africa, Russian Federation and Peru). It also extends this analysis to cover education expenditure as well and how it might exert similar effects on these poverty estimates.

Key words: poverty, child poverty, expenditure poverty, out of pocket health expenditure, out of pocket education expenditure, middle-income countries.

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1. Introduction and background

As argued by Doorslaer et al (2006), it is a widely accepted fact that conventional estimates of poverty (i.e., money-metric measures) do not take into account out of pocket payments of health care. A poverty measure based on household expenditure would inevitably consider not-in - poverty any household whose expenditure raise enough above the poverty line, due to a significant health spending in the period of reference. Thus, poverty measures based solely on monetary criteria would underestimate poverty.[1] This paper extends this analysis to cover education expenditure as well and how it might exert similar effects on these poverty estimates.

Obviously, every poverty measure is necessarily grounded in a normative or a philosophical framework against which an assessment of the situation can be made. For example, the neoliberal approaches, look at poverty as a shortfall in terms of financial resources (income or expenditure) below which it is not possible to meet the minimum maintenance and physical efficiency. It is grounded in the neoclassical economics assumptions and the utilitarian normative framework according to which being poor refers to the inability to maximize utility (i.e., lack of income and resources to do so) which is ultimately explained by the inherent low productivity of the poor or the low level of human capital. The latter, in turn, refers to the assumption that investment in education is a "rational individual choice"; that earnings reflect people's education and skills, so a low level of education leads automatically to low wages and hence to poverty (Olsen, 2010) . The issue of (re)distribution of wealth is seen in this tradition as a purely "normative", one that should be addressed in the political and not in the scientific realm (Dini and Lippit, 2009).

[1] For additional discussion on various poverty measures on their limitations see for example Gordon & Spicker (1999) who argue that 'Poverty' as a concept has different overlapping meanings depending on the subject area or discourse. The meaning of the concept is often derived from a given theoretical framework, a philosophical or a political assumption. Laderchi et al (2003) make the point about how different interpretations of reality translate into different poverty measures, and hence different segments of populations identified as 'poor' and these different interpretations reflect different views on what constitutes a 'good' society. It is also recently well recognized that poverty is multidimensional, and any reliable and valid measure of poverty should include several dimensions that are showed to be associated with poverty such as education, health, decent housing, access to information, the quality of food and nutrition, employment and quality of employment, as well as income and expenditure, etc.

Townsend (2006) argues that this approach, given its roots in neoclassical economics, restricts the meaning of poverty to material and physical needs than to also include the non-fulfillment of social roles expected from individuals by the wider society or what Townsend defines as "relative deprivation". Other examples includes the social exclusion approach which looks at how systems and structures produce socially excluded people from both resources and spaces; Capability Approach, which considers that financial resources are not enough to make an appropriate assessment of poverty, but the ability of people to convert such resources into capabilities of various kinds, etc. to cite only these few approaches.

However, It can be argued that one can still use a monetary approach as a proxy of command over resources, but within a normative framework that does not assume poverty to be neither a natural phenomenon (but a social one), nor it is the only responsibility of the poor themselves. Such a framework makes the assumption that what constitute a "good society" is the one which the rights of individuals and groups (civil, political, economic and social) are promoted, protected and fulfilled relative to the average resources available within their societies.

2. Human rights based normative framework

This paper takes international human rights instruments signed and ratified by the five countries included in the analysis as the main normative framework. Such a framework has the advantage of both being accepted by countries included in the study, since a ratification of such instruments involves necessarily a legal obligation to meet its dispositions; as well as making comparison between countries meaningful and relevant.

Health and education are basic human rights to be protected and as such are public goods to be promoted by every state. The convention on the rights of the child -the most widely ratified human rights convention in the history of international human rights law- covers holistically all areas of social, economic cultural and political rights for children: survival, development, participation and non-discrimination. Health and education are necessary to ensure children's development and hence the ability to fully participate in their societies.

According to the convention, every state has the responsibility to ensure the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health **(***Article 24).* The right to social security including social insurance is a condition to make sure

the right to health is fully protected (Art 26)**.** *Article 28* stresses the importance that States Parties recognize the right of the child to education, on the basis of equal opportunity, and make primary education compulsory and available free to all. It also encourages *the development of different forms of secondary education, including general and vocational education, make them available and accessible to every child, and take appropriate measures such as the introduction of free education and offering financial assistance in case of need*.

The international covenant on social, economic and cultural rights also stresses the right of everyone to the enjoyment of the highest attainable standard of physical and mental health (Art 12) as well as the rights of everyone to free and compulsory primary education, progressive free secondary and vocational education as well as equitable access and progressively free to higher education (Art 13).

Education and health are key human rights that determine the future adult life of children. As one of the OECD policy briefs puts it – *a higher level of education means higher earnings, better health, and a longer life. The long-term social and financial costs of educational failure are high. Those without the skills to participate socially and economically generate higher costs for health, income support, child welfare and social security systems. (OECD, 2008).*

When a state fails to protect the rights of its citizens to quality health care, the impact, especially on the poor families is damaging and perpetuates the cycle of poverty. A WHO technical paper highlights this issue as follows *"Households facing large health expenditures, relative to their income, have to borrow, sell their assets or forgo the health services needed and to live (or die) with their illness and suffer the consequences. Moreover, as a result of the dynamic dual interlink between health and poverty, many households will not be able to escape the trap of ill-health and poverty once they fall into it"*. (WHO EMRO, 2004).

Even when adapted social health insurance is made available for the poor in some countries, it does not follow that they get better health outcomes, nor they utilize available health services for the poor. A recent systematic review - on the Impact of national health insurance for the poor and the informal sector in low- and middle-income countries- (Acharya et al, 2012) examined 34 studies on the subject out of which were 19 assessed to be methodologically strong and were used to assess the existing evidence. According to the review, *"there is no strong evidence that social health insurance schemes as a means of increasing financial protection from health shocks or of improving access to health care"*. The review

recommends that health insurance schemes must be designed in a more comprehensive way to ensure the attainment of desirable levels of healthcare utilization and have higher financial protection.

In the area of household spending in education, despite the commitment of the majority of countries to ensure quality free primary education for all, household education spending is globally very high. A recent UNESCO study (Dakar Office) showed that the burden of education financing on household reached almost half of public expenditure (UNESCO, 2012). The study argues that government should finance fully primary education and allow for household contribution rather in secondary and higher education where the return of schooling is higher than earlier education. The argument of the study is that such spending patterns are both inequitable and inefficient for "the representatively of children from the most advantaged social strata is highest in higher education, which nevertheless receives the most public education resources" (UNESCO, 2012:7).

3. Methodology and Methods

We use a similar methodology and method as Wagstaff and Doorslaer (2003); Doorslaer et al (2006) and Donnell et al (2008). The methodology consists at identifying the '*Effect of payments for health care on poverty estimates*, and more generally what is now widely known as "**Out**-of-pocket household health expenditures assessment methodology". The present paper, however, extends the methodology to cover, in addition to health expenditure, education expenditure and assesses the impact of both on child poverty as well.

The methods used are simple and easy to interpret. We first set a poverty line using "purchasing power parity dollars" to ensure comparability between countries. We then assess the extent of poverty in general and child poverty in particular using the two simple poverty measures:

1/the head count formula (identifying the number of the poor) and;

2/the poverty gap formula (assessing the distance of poor household's total expenditure from the poverty line, also known as poverty depth).

The assessment of the extent of poverty is done twice, first using the total household expenditure (including health spending), which we call "the pre-payment poverty estimate", and second, we re-estimate poverty after we subtract health spending net of health insurance payments from total household expenditure, which we call "the post-payment poverty estimate".

The impact of health expenditure on poverty is thus simply computed by subtracting the post-payment from the prepayment estimates for both poverty headcount and poverty gap. We proceed in a similar fashion with education expenditure and lastly with both health and education expenditure combined.

Two fundamental aspects of the above methodology could be called into questions. The first one consists of whether it is "legitimate" to proceed with the measurement of post-payment poverty estimate without adjusting downward the poverty line, since avoiding to do so the exercise would seem as of a mechanical nature (i.e., reducing total expenditure by subtracting health (or/and education) spending would necessarily results in a reduction of poverty)?

The second issue is linked to the rationale of doing the same exercise with education spending? This is important in a sense that while there is an abundant literature on the effect of health payment on poverty, there is little if not no literature or theory that would justify the exercise for education.
We address the first aspect in this section while the second has been already addressed in the normative framework section above.

Should poverty line be adjusted downward after taking account of health spending?
Donnell et al (2008) argue that this would be the case if the poverty line takes into account the resources required to cover health care needs. In fact, most of monetary poverty lines only indicate the amount of resources required to meet the subsistence needs only. The authors argue that even in the case of adopting higher poverty line to take account such additional health needs of those living near the threshold of food/subsistence poverty line, the case is complicated by the unpredictable and high variation of health status and needs across households which will not be reflected in the poverty line.

Moreover, while this might be an issue in high-income countries where explicit income transfers to cover the cost of health, it is not the case for low-income and middle-income countries where such protection does not systematically apply. Therefore, a household facing health expenses without protection (transfer or insurance) would have, in order to meet such expenses, force spending on other goods and services below the poverty line.

One exception that the authors consider concerns the case in which higher poverty lines are applied and assumed to make an implicit allowance for health needs, then poverty line can be adjusted downward by the mean of health spending of those households with total expenditure near the poverty line. However, the authors stress, this practice is not advisable in the case of international comparative analysis or comparison over time when the poverty line has not been adjusted to reflect differences in mean health spending of those near the food poverty line. The negative consequences of doing so would be to display lower poverty rates for households and individuals, especially those in low income

countries where the protection against the risk of illness and poor health is not systematic leaving the majority to cope with such risk on the basic of out-of-pocket contributions.

3.1 Source of data: LIS and LIS data

LIS, formerly known as The Luxembourg Income Study, is a data archive and research center dedicated to cross-national analysis. LIS' mission is to enable, facilitate, promote, and conduct cross-national comparative research on socio-economic outcomes and on the institutional factors that shape those outcomes. LIS has two main databases, the Luxembourg Income Study Database, and the Luxembourg Wealth Study Database. UNICEF's collaboration with LIS is focused on issues of children in relation to household level income and consumption data and thus The Luxembourg Income Study Database (LIS) is of primary interest. The LIS database is the largest available database of harmonized micro data collected from multiple countries over a period of decades.

LIS's main office is located in Luxembourg and houses the LIS and LWS Databases alongside a team of professionals who organize data acquisition, harmonization; documentation; technical and provide user support and instruction and the core administrative work of the organization. The New York City office is a satellite located at The Graduate Center of The City University of New York (CUNY), and is home to LIS Director Janet Gornick, Professor of Political Science and Sociology at CUNY. With a small staff, this satellite office is engaged in development work, graduate student instruction, and research. LIS is a non-profit organization registered in Luxembourg, with an international Board of Directors. Funders, data providers and other contributors to LIS are eligible to become members of the Board of Directors. Additionally, there is an Advisory Board, comprised of individuals invited to advise the organization and its directors. LIS is envisioned with an international cooperative model of governance and Board members are charged with upholding this model while promoting LIS on an international level. LIS data is produced from country level household surveys. LIS acquires, harmonizes, and documents the micro data from these surveys from a range of countries around the globe, and makes them publicly available. The databases are stored on secure servers and contain variables on income, employment, household characteristics, expenditures, and wealth. A full set of harmonized and consistent variables produced by LIS can be seen at http://www.lisdatacenter.org/wp-content/uploads/our-lis-documentation-variables-list.pdf

The present paper, $2 a day per capita in purchasing power parity dollars ($PPP) for countries under consideration as well as other relative thresholds for particular countries. We use this metric not an end in itself but as a "heuristic device" to assess households' expenditure on health and education and its impact on poverty and on child poverty.

3.2 Variables used in the analysis and their definitions

Health consumption

Consumption of health, including medical products, appliances and equipment, outpatient services, and hospital services. Payments for health insurances are excluded expect for Peru

where monetary and non-monetary expenditure for health were not separated (see the full definition in appendix 2)

Education consumption

Consumption of education, including pre-primary and primary education, secondary education, post-secondary non-tertiary education, tertiary education, and education not definable by level.

4. Data presentation and analysis

4.1 A summary of descriptive statistics

As shown in appendix 1, the surveys of our countries of interest were conducted in 2004 for India and in 2010 for Mexico, Peru, South Africa and Russia. Over 80% of the households in all countries have children except in Russia where households with children are of 53% only. Households with spending in health (whatever the level of spending was) represent 71% in India, 51% in Mexico, 73% in Russia, 15% in South Africa and 90% in Peru. As far as households with spending in education, they reach 62% out of the total population in India, 56% in Mexico, 85% in Peru, 39% in South Africa and 24% in Russia.

As table 1 shows, the mean health expenditure relative to household total expenditure is of 16% in India, 2% in Mexico, 4% in Peru, 5% in Russia and 1% in South Africa. Table 2 shows that the mean education expenditure represents lower proportions compared to health; it reached 4% out of household total expenditure in India, 6% in Mexico, 4% in Peru, 3% in South Africa and 1% in Russia.

Taken together (table3), the mean household expenditure in both health and education out of total expenditure reaches 20% in India, 8% in Mexico, 8% in Peru, 6% in Russia and 4% in South Africa.

Table 1 : Out of pocket health payment for health care as a percentage of total household expenditure per country

	India	**Mexico**	**Peru**	**Russia**	**South Africa**
Mean	16%	2%	4%	5%	1%
CV	1.2	2.5	1.4	1.6	3.7
Median	8%	0.06	2%	2%	0

Source: Authors calculations using LIS data

Table 2 : Out of pocket Education payment as a percentage of total household expenditure per country

Mean	4%	6%	4%	1%	3%
CV	1.75	1.5	1.2	2.5	2.5
Median	1%	2%	2%	0	0

Table 3: Out of pocket health and education payment for health care as a percentage of total household expenditure per country

Mean	20%	8%	8%	6%	4%
CV	1	1.37	1	1.3	2.09
Median	14%	4%	6%	4%	0

In all three cases, the mean largely exceeded the median resulting in a skewed distribution and relatively large coefficient of variation (CV: calculated by the SD over the mean) , indicating that many households incurred small proportions out of total expenditure but a few others spend large proportions out of their total expenditure in health and education.

If we break down these by a few explanatory variables such as the poverty status, the milieu of residence, presence of kids in the households and by expenditure top and lower deciles, additional data that is more informative can be obtained.

As shown in table 4 below, in India the mean health expenditure (16%) is almost equally distributed among the poor (15%) and the non-poor (18%); in Mexico (2%), the non poor (2%) spend twice more than the poor (1%). Similar patterns are observed in Peru data where the mean health expenditure (4%) represents two times for the non-poor (4%) compared to the poor (2%), Russia (5%) and South Africa (1%) display the same patterns. However, if generally the non-poor spend more than the poor do (except in India) the poor still spend a

non-negligible proportion out of their total expenditure in health, which should be taken into account when measuring poverty in terms of household expenditure.

In terms of distribution of health expenditure by milieu of residence, it is more widespread in rural areas in India (17%) than in urban areas (11%). The same is observed in Mexico where the household living in rural areas spend twice as those living in urban areas (2% against 1%), for the rest of countries, the urban household spend slightly more than their rural counterparts do, with 4% against 3% in Peru, 6% against 5% in Russia and 1.4% against 0.4 in South Africa. Moreover, the mean health expenditure is almost equally distributed between households having children and those without children in India with 16% for the former and 15% for the latter, 1.6% against 2% in Mexico, 4% against 3.6% in Peru, 1% against 2% in South Africa whereas in Russia households without children spend more in Health care with 7% against 4% for those with children.. In terms of health expenditure distribution relative to the level of command over resources, the table shows that the top 10% of the population in terms of household expenditure distribution spend twice or more than the lower 10% in India (18% against 9%), In Mexico (3% against 1%), in Peru (5% against 2%), in South Africa (5% against 0.07%) and in Russia (7% against 5%). Whereas there gap in terms of total household expenditure is significantly large, the difference in terms health care spending is not so different in terms of proportions of health care spending out of total expenditure.

As far as education spending out of total household expenditure is concerned, table 5 shows that in all countries, although the difference are not huge, the non poor spend more than the poor, the urban more than the rural, households with children more than those without children, and the top expenditure decile more than the lower.

When both health and education expenditure are combined, they constitute 20% out of total household expenditure in India, 8% in Mexico, 8% in Peru, 6% in Russia and 4% in South Africa. Table 6 shows that in India, the poor household have a mean of health and education expenditure of 19% against 24% for the non-poor; 5% against 8%, in Mexico, 4% against 8% in Peru, 4% against 7% in Russia and 3% against 5% in South Africa. When this mean is broken down in terms of the area of residence, it reaches 20% in rural area against 16% in Urban area for India, 7% against 8% in Mexico, 5% against 9% in Peru, 6% against 7% in Russia and 4% against 5% in South Africa. Households with children in India spend than those without children in both education and health with a mean of 20% for the former and 17% for the latter, 9% against 5% in Mexico, 8% against 7% in Peru, 7% for both groups in

Russia and 5% against 3% in South Africa. Last but not the least, when this mean is compared between the top and the lower deciles, it reaches 24% for the top decile against 11% for the lower decile in India, 12% against 5% in Mexico, 11% against 4% in Peru, 8% against 6% in Russia and 10% against 2% in South Africa.

Table 4 : Mean Health Expenditure by Poverty status ($2), Milieu, presence of kids and expenditure decile

		By Poverty Status		**By Milieu**		**By presence of kids**		**By expenditure decile**	
	total	Poor	Not poor	Rural	Urban	with children	Without children	Top decile	Lower decile
India	16	15	18	17	11	16	15	18	9
Mexico	2	1	2	2	1	1.6	2	3	1
Peru	4	2	4	3	4	4	3.6	5	2
Russia	5	3	5	5	6	4	7	7	5
South Africa	1	0.1	2	0.4	1.4	1	2	5	0.07

Table 5 : Mean Education Expenditure by Poverty status ($2), Milieu, presence of kids and expenditure decile

		By Poverty Status		By Milieu		By presence of kids		By expenditure decile	
	total	Poor	Not poor	Rural	Urban	with children	Without children	Top decile	Lower decile
India	4	4	6	3	6	4	2	6	2
Mexico	6	4	7	5	7	8	2	10	4
Peru	4	3	4	3	5	4	3	6	3
Russia	1	1.1	1.3	1	2	2	0.05	1	0.7
South Africa	3	2.9	3.3	3	3.2	4	1	4	1.5

Table 6 : Mean Health and Education Expenditure combined by Poverty status ($2), Milieu, presence of kids and expenditure decile

		By Poverty Status		By Milieu		By presence of kids		By expenditure decile	
	total	Poor	Not poor	Rural	Urban	with children	Without children	Top decile	Lower decile
India	20	19	24	20	16	20	17	24	11
Mexico	8	5	8	7	8	9	5	12	5
Peru	8	4	8	5	9	8	7	11	4
Russia	6	4	7	6	7	7	7	8	6
South	4	3	5	4	5	5	3	10	2

The national poverty rate using the threshold of $2 in purchasing power parity reached 89% in India, 6% in Mexico, 18% in Peru, 45% in South Africa and 3% in Russia. Measuring child poverty in the same countries using the same measure yields higher poverty rates. Thus, 93% of Indian children are poor using this definition, 9% in Mexico, 23% in Peru, 56% in South Africa and 4.41% in Russia.

4.2 The effects of Health and Education expenditure on poverty and on child poverty estimates

This section is the core of the paper. It assesses the effects of households expenditure in health and education on poverty and on child poverty, especially for the poor and the near poor households. We use $2 a day per person for all countries in a first step, and we apply the regional poverty lines in a second step especially for Mexico and Peru with $4 and Russia with $5. The $2 a day display low poverty rate in these countries, which does not **reflect** the actual incidence of poverty in these countries.

4.2.1 The effect of health expenditure on poverty headcount

As shown in the table 7 below, using a poverty threshold of $2 dollars a day per person, and after taking account of health expenditure (i.e., subtracting health expenditure from total household expenditure), the rate of overall poverty in India increased by almost three points. In Peru it increased by one point, whereas in Mexico, Russia and South Africa, the overall poverty rate increased only by less than one point. This would mean that in the case of India, although poverty rate is very high, the near poor who dropped below the poverty line after the subtraction of health payment represent still a relatively high percentage of 3%. For South Africa, it just reflects the low level of household's expenditure among the near poor, hence the limited impact of health expenditure on the overall poverty rate. For the rest of countries that are Russia, Mexico and Peru, it shows that the $2 per day per person under-estimates the incidence of poverty. When adapted regional poverty lines are applied ($4 in Latin America and $5 in Russia poverty per capita thresholds), this gives for overall poverty one point change in Mexico and Russia and two points change in Peru. The relative percentage change, that is the post payment poverty to the prepayment poverty rates, are much higher reaching for example up to 25% change for Peru for overall poverty when the $2 poverty line is applied. The relative change also doubles (from 7 to 15%) in Russia for overall poverty between the $2 and $5 thresholds for overall poverty.

In general, whereas the difference between poverty rates estimated using total households expenditure without taking into account the health payments incurred by households, is relatively lower in middle income countries compared to low income countries, such difference is still important especially for highly populated countries like India and to a lesser extent Mexico and Russia where 1% change means a few millions of the population considered as non-poor while they actually are poor. For example, this group which was not classified as poor when health spending was included in total household expenditure, reached 27 millions and half in India, a quarter million in Mexico, and about 80000 in Peru and 100000 in Russia. When adapted regional poverty lines are used, this group reaches half a million in Mexico, about 800000 in Peru and a bit over one million in Russia for 2 or less points change only. In Sum, if we apply to each country the appropriate poverty threshold ($2 in India and South Africa, $4 in Latin America and $5 in Russia) without taking account for out of pocket health care expenditure we end up with 27 million and half additional poor people in India only, and around 2 million and half in the rest of countries.

This fact is also corroborated by the descriptive statistics in the previous section, which shows that in many cases, households classified as poor do actually spend a non-negligible parts of their total expenditure on health care, and sometimes the mean health expenditure relative to total expenditure for the poor was not largely different from its counterpart in rich households.

Table 7:The effect of health payments on poverty headcount

	Change in poverty Headcount (All)		Difference		
	Prepayment headcount	Post payment headcount	Number of additional poor people	% change point change	%relative change
India	89.77	92.53	27.496.685	2.76	3.07
Mexico	6.12	6.35	253850	0.23	3.75
Mexico $4	26	27	482041	1	3.84
Peru	4	5	77896	1	25%
Peru $4	21	23	784198	2	9.52
Russia	0.89	0.96	95549	0.07	7.86
Russia $5	7	8	1140704	1	14
South Africa	44.97	45.05	32371	0.08	0.17

Source: Calculated by the authors based on LIS data

In terms of child poverty, as shown in table 8 below, after subtracting health care spending, the child poverty rate increased by almost two points in India , that is almost 8 million children which did not count as poor before taking account of health care spending. In Mexico, even if the percentage point change is barely 0.32%, this represents, nonetheless,

around a half quarter million of children counted as additional poor, this number reached 38268 children in Peru, 0 change in Russia and South Africa for the $2 poverty threshold. When adapted poverty lines are applied to Latin America and Russia, these numbers increase reaching a quarter million additional poor children in Mexico, more than 320,000 children in Peru, and 178638 children in Russia.

Table 8: The effect of health expenditure on child poverty headcount

	Change in Child Poverty Headcount			**Difference**	
	Prepayment headcount	Post payment headcount	Number of additional poor children	% point change	% relative change
India	93	94.83	7836007	1.83	1.96
Mexico	9.19	9.51	126215	0.32	3.48
Mexico $4	34	35	278382	1	2.34
Peru	6	7	38268	1	16.66
Peru $4	29	32	320721	3	10.34
Russia	1.12	1.12	0	0	0
Russia $5	8	9	178638	1	12.5
South Africa	56	56	0	0.08	0.14

Source: Authors calculation using LIS data

4.2.2The effect of health expenditure on poverty gap

The poverty gap expresses the average amount of money that poor households need to get out of poverty (i.e. the average distance from poverty line). The relative percentage change is calculated by subtracting the post-payment gap from the prepayment gap divided by prepayment gap whereas the normalized poverty gap is calculated by dividing the difference between prepayment and post payment gap by the poverty line and multiplied by 100. The results display additional interesting patterns than does the headcount measure only. For example in India, the percentage change, that is the average amount needed to get poor households above the poverty line is 6% of the amount of poverty line or an average of $485 compared to $441 before health payment was subtracted from total household expenditure, assuming that this amount would hypothetically be covered by a medical insurance or a social protection scheme, that is an average of $44 dollar is spent by households on health care, which put them just above the poverty line while actually they were poor. For the rest of countries, while the relative change between pre- and post-payment gaps is sometimes significant reaching 15% in Russia (using $5 as poverty threshold) and 33% in Peru (using $2 poverty threshold), the normalized poverty gap, that is the percentage of the poverty line needed to get the households out of poverty is 1% in Peru (using the $4 poverty threshold), and less than 1% in all other countries. (table9).

Table 9: The effect of health expenditure on poverty gap

			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	441	485	44	10 %	6.02 %
Mexico	12	13	1	8 %	0.13%
Mex $4	125	129	4	3.2%	0.20%
Peru	6	8	2	33%	0.27%
Peru $4	95	110	15	16%	1.02%
Russia	2.68	2.90	0.22	8.20%	0.03%
Russia $5	53	61	8	15.09%	0.5%
South Africa	144.32	144.63	0.31	0.21 %	0.04 %

Source: Calculated by the authors based on LIS data

4.2.3 Impact on poverty gap for households with children only

The same is true for households with children only (table 10) where the normalized poverty gap represents 1% in Peru and less than 1% in the rest of countries. These small percentages are averages, which means that while a small amount of money is needed to get all households with health care expenditure just above the established poverty line, for a few others this amount might be important. This is reflected in the difference between the poverty headcount before and after health care payment as outlined in tables 7 and 8 above. However, we note that the relative change in poverty gap after subtracting health payments, reached 29% for Peru (using $2 threshold), 16% in the same country using the $4 threshold and 10% in Russia using the $5 poverty threshold as shown in table 10 below.

Table 10: the effect of health payments on poverty gap estimates for households with children only

			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	457	500	4	1%	0.54%
Mexico	15	16	1	7%	0.13%
Mexico $4	149	154	5	3.35%	0.34%
Peru	7	9	2	29%	0.27%

Peru $4	109	126	17	16%	1.16%
Russia	3.30	3.41	0.11	3.3%	0.02%
Russia $5	62	68	6	10%	0.34%
South Africa	172	173	1	0.58%	0.14%

4.2.4The impact of education expenditure on poverty headcount estimates

Given the lower levels of households education expenditure compared to health expenditure, the percentage change before and after payment is not very large in almost all countries. The highest percentage point change is in Mexico when the $4 poverty threshold is applied is 3% and only 1% using the $2 threshold, 1% in India, 1.5% in South Africa and one to less than 1 point in the rest of countries. The numbers of additional poor after subtracting education spending are, however, non-negligible. These reach almost 10 million in India, over one million in Mexico (using the $2 threshold), and almost 4 million when the $4 threshold is used, about half a million additional poor in Peru (using the $4 threshold) and half a million in South Africa, whereas the additional poor are limited to a few thousands in Peru ($2 threshold) and Russia but reaching almost 100000 additional individuals when the $5 threshold is used. The relative change is very high in Peru when the post payment headcount is compared to the prepayment headcount reaching 25%, followed by 17% in Mexico ($2) and 12% for the ($4 threshold) and 11% in Russia using the $2 threshold, whereas the relative change in South Africa reached a bit above 3%.

Table 11: the effect of education payment on poverty headcount estimates

	Change in poverty Headcount (All)			**Difference**	
	Prepayment headcount	Post payment headcount	Number of people	% point change	%relative change
India	90	91	9889196	1	1.11
Mexico	6	7	1039211	1	17%
Mexico $4	26	29	3780727	3	12%
Peru	4	5	93799	1	25%
Peru $4	21	22	502870	1	5%
Russia	0.89	0.90	21565	0.1	11%
Russia $5	7	7.10	91881	0.10	1%
South Africa	44.97	46.47	599749	1.5	3.34%

Source: Calculated by the authors based on LIS data

4.2.5The effects of education expenditure on child poverty headcount estimates

If we consider the effect of education payments on child poverty estimates only, except for Russia where the numbers of additional poor children represents a few tens of thousands, the percentage points changes are higher than in health care payments case. Thus in Mexico, using the $4 threshold the change reached 5% of additional poor children equating almost 2 million children which were not counted as poor before taking into account household education spending. When the $2 threshold is applied, this number decreases in Mexico to about half a million children. In India, the 2 points

percentage change reflects almost 3 million and half additional poor children, a quarter million in Peru using the $4 threshold and above a quarter million in South Africa.

Table 12: the effect of education payments on child poverty estimate

	Change in Poverty Headcount (age <18)			**Difference**	
	Prepayment headcount	Post payment headcount	Number of poor children	% point change	% relative change
India	93	94	3312285	2	2.15
Mexico	9	11	548393	2	22%
Mexico $4	34	39	1895744	5	15%
Peru	6	7	55068	1	17%
Peru $4	29	31	243146	2	7%
Russia	1.12	1.16	10049	0.04	4%
Russia $5	8	8.22	31317	0.22	3%
South Africa	55.72	57.71	272159	2	3.57 %

Source: Authors calculation using LIS data

4.2.6The effects of education expenditure on poverty gap estimates

As shown in table 12, although in terms of normalized poverty gap, the impact of education expenditure displays less than 1% in Mexico, Peru and Russia and a bit more than 1% in both India and South Africa, the absolute point change and the relative change are higher in many cases. Thus, in India, after taking account of education expenditure, an average of 10 dollars per household is needed to get them just above the poverty line; two dollars in Mexico (using 2$ threshold) and $19 dollars per household when using the $4 poverty threshold. The difference is around 1 dollar only for Peru when using the 2$ threshold but reaches 10 dollars when the regional adapted poverty threshold is used. The effect of education payments on the poverty gap in Russia is almost absent using the $2 threshold and reaches one dollar shortfall compared to poverty line when the $5 threshold is used. However, in South Africa, the change in poverty gap reaches almost 8 dollars to get poor households just above the poverty line, which also represents the amount they spend in education, causing them to not appear as poor household before this amount is subtracted from total household expenditure.

Table 13: The impact of education expenditure on poverty gap

			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	441	451	10	2.26 %	1.37 %
Mexico	12	14	2	17 %	0.27 %
Mexico $4	124	143	19	15 %	1.30 %
Peru	6	7	1	17%	0.14%
Peru $4	95	105	10	11%	0.68 %
Russia	2.68	2.77	0.09	3%	0.01%
Russia $5	53	54	1	2%	0.05%
South Africa	144.32	152.16	7.84	5.43 %	1.07 %

Source: Calculated by the authors based on LIS data

As far as the effect of education payments on normalized poverty gap for households with children only is concerned, some similar patterns with the previous table are observed with some important changes for some countries. Thus, for India and South Africa, the effect of education payment is almost the same for all households and for households with children only, whereas, slight increases in normalized poverty gap in Mexico both for $2 and $4 thresholds, as well as in Peru when the $4 threshold is used. A very small increase is also observed in Russia especially when the $5 threshold is used. The relative change on poverty gap between post and pre payments is higher in Mexico for households with children only reaching 20% when using $2 threshold, compared to 17% for all households, and lesser in Peru for the same poverty threshold (14.28% compared to 17%). However, the relative change in Russia for households with children only is higher than that observed for all households (5% compared to 3% for $2 threshold and 3% to 2% for $5 threshold). For South Africa, the relative change for households with children only is much higher than the one for all households (16% compared to 5%).

Table 14: Impact of education payments on poverty gap for households with children only

			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	457	467	10	2.18 %	1.37 %
Mexico	15	18	3	20 %	0.41 %
Mexico $4	149	172	23	15.43 %	1.51 %
Peru	7	8	1	14.28 %	0.14 %
Peru $4	109	122	13	11.92 %	0.89 %
Russia	3.30	3.47	0.17	5.15 %	0.02 %
Russia $5	62	64	2	3.22 %	0.11 %
South Africa	172	182	10	16.12 %	1.37 %

Source: Authors calculation using LIS data

4.3 The impact of health and education expenditure combined on poverty headcount estimates

When we combine both health and education expenditure under the assumption that they constitute public goods that should be free and not be paid for by households, the percentage change in poverty head count - after substracting such payments from total household expenditure- increases in India by 3%, that is more than 36 million and half additional poor, by 1% in Mexico under $2 poverty threshold, representing about one million and half, and 4% using the regionally adapted poverty threshold reaching more than 4 million and half additional poor. In Peru, using the $2 threshold, that is about 175000 additional poor and 4% using the regionally adapted poverty threshold reaching 1 million and 350 thousands additional poor. For Russia, though the percentage change using $2 threshold is low representing 0.09% only the numbers of additional poor exceed 100000 and exceeds 1

million and a quarter million using the Eastern Europe adapted poverty line of $5 a day per person. In South Africa, the poverty percentage change increased 2% representing more than half a million additional poor.

Table 15:the effect of health and education payments combined on poverty estimates

	Change in poverty Headcount (All)			**Difference**	
	Prepayment headcount	Post payment headcount	Number of people	% change point change	%relative change
India	90	93	36822660	3	3.33
Mexico	6	7	1410143	1	17
Mexico $4	26	30	4717090	4	15
Peru	4	6	175251	2	50
Peru $4	21	25	1348652	4	19
Russia	0.89	0.98	117113	0.09	10
Russia $5	7	8	1251047	1	14
South Africa	44.97	46.58	639102	2	4.45

Source: Calculated by the authors based on LIS data

As shown in table 16, the effect of health and education payments on child poverty estimates is reflected on both percentage change and number of additional poor as well as the relative change observed between pre and post-payment estimates. Thus in India 2.65% change is observed representing more than 11 million additional poor children, 2% in Mexico representing about three quarters a million using the $2 threshold and 6% change when the Latin America regional poverty threshold is used reaching 2 million and a quarter million additional poor children. In Peru, the $2 threshold gives 3% change with about 100000 additional poor children whereas the regional adapted threshold gives 6% reaching more than half a million additional poor. In Russia, more than 10 thousands additional poor resulted from a slight percentage change of 0.04% using $2 threshold and 1% change reaching about a quarter a million additional poor children. Finally, in Russia the 2% observed percentage change gives more than a quarter million additional poor. The most important relative change was observed in Peru using the $4 threshold reached 50% change compared to the initial estimate followed by Mexico with 22% change using $2 threshold and 18% using the $4 threshold. The lowest relative change was observed in India with 2.85%.

Table 16 : :the effect of health and education payments combined on child poverty estimates

	Change in Poverty Headcount (age <18)			Difference	
	Prepayment headcount	Post payment headcount	Number of children	% point change	% relative change
India	93	95.65	11005830	2.65	2.85
Mexico	9	11	737249	2	22
Mexico $4	34	40	2226074	6	18
Peru	6	9	97028	3	50
Peru $4	29	35	589669	6	21
Russia	1.12	1.16	10049	0.04	3.57
Russia $5	8	9	219321	1	12.5
South Africa	55.72	57.84	289020	2	3.59

Source: Authors calculation using LIS data

4.3.1The impact of health and education expenditure combined on poverty gap

In terms of the impact of health and education payments on poverty gap estimates, tables 17 shows that the poverty gap, that is the amount by which households fell short below poverty line reached an average of 51 dollar per household in India, $3 in Mexico , $4 in Peru, $0.31 in Russia and $7.84 In South Africa. When the regional adapted poverty lines are applied, such gap reached $22 in Mexico, $28 in Peru and $9 in Russia. The relative change in poverty gap between pre-payment and post-payment represents an increase of 11.56% in India, 25% in Mexico, 67% in Peru, 11.56% in Russia and 5.43% in South Africa. When the upper bound regional poverty lines are applied, such relative change reached 17.6% in Mexico, 29% in Peru and 17% in Russia. In terms of the normalized poverty gap, that is the poverty gap divided by poverty line allows better comparability. Hence India comes in the top with 7% normalized poverty gap, followed by Peru with 2% (using the $4 threshold), then Mexico with 1.5% (using the $4 threshold), South Africa with 1.07% and Russia with 0.5% (using the $5 threshold).

Table 17:The impact of health and education payments combined on poverty *gap*

			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	441	495	51	11.56	7
Mexico	12	15	3	25	0.41
Mexico $4	125	147	22	17.6	1.5
Peru	6	10	4	67	0.5
Peru $4	95	123	28	29	2
Russia	2.68	2.99	0.31	11.56	0.04

Russia $5	53	62	9	17	0.5
South Africa	144.32	152.16	7.84	5.43	1.07

Source: Calculated by the authors based on LIS data

When we focus the analysis on households with children only, the post payment poverty gap is slightly higher in India reaching an average of $54 to get those household just above the poverty line, this amount represent $4 in both Mexico and Peru for the lower bound poverty threshold ($2), $0.17 in Russia and $10 in South Africa. When the upper bound poverty threshold are applied to Latin America countries ($4) and to Russia ($5), this gives $28 in Mexico and $33 in Peru to get households with children just above the poverty line and $2 in Russia. The relative change between prepayment and postpayment poverty gap was highest in Peru using $2 threshold reaching 57% and 30% using the $4 threshold. The next highest relative change concerns Mexico reaching 26.6% sung the $2 threshold and 19% using the $4 threshold. The relative change in Russia reached 5% using the $2 threshold and 3% using the $5 threshold. Lastly, the relative change in South Africa reached about 6%. To allow comparability, the normalized poverty gap, that is the average percentage of the poverty gap to poverty line reached 7.39% in India, almost 2% in Both Mexico and Peru using the $4 threshold, and 1.37% in South Africa, whereas it only reached 0.2% in Mexico.

Table 18: Impact of health and education payments combined on poverty gap for estimates for households with children only

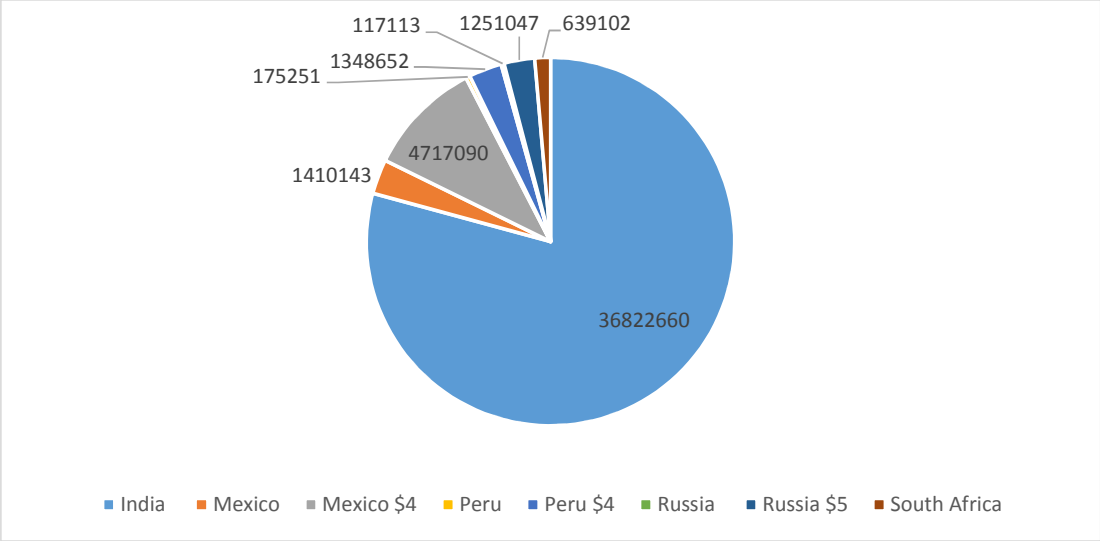
			Difference		
	Prepayment Gap (1)	Post payment Gap (2)	Absolute (3)= (2)-(1)	Relative [(3)/(1)] *100	Normalized poverty gap change [(3)/Povline] *100
India	457	511	54	11.81	7.39
Mexico	15	19	4	26.6	0.55
Mexico $4	149	177	28	18.79	1.91
Peru	7	11	4	57	0.55
Peru $4	109	142	33	30.27	2.26
Russia	3.30	3.47	0.17	5.15	0.02
Russia $5	62	64	2	3.22	0.2
South Africa	172	182	10	5.81	1.37

Source: Authors calculation using LIS data

5. Discussion and conclusions

This cross-national comparison between five middle-income countries showed a non-negligible effect of out of pocket health and education payments made by hosueholds on poverty estimates. If poverty is measured in terms of household consumption, then it is very likely that such measure underestimate the extent of monetary poverty. Spending by households on public goods that are non-immediately productive such as health and education show many of them above major poverty lines used in developing and middle income countries, while they are actually under those poverty line if we substract such payments from total hosueholds expenditure. The following figure shows additional poor when spending in health and education is taken into account. These reach almost 37 million in India, about one million and half in Mexico using the lower bound poverty threshold of $2 per day and about 4 million additional poor when the upper bound poverty threshold of $4 per day per person is applied. Numbers of additional poor in Peru reached almost 200 000 person using $2 threshold and almost one million and half suing the $4 threshold. In Russia these numbers reached more than 100 000 person using the $2 per day and more than one million and a quarter million using the upper bound threshold of $5 a day per person. Lastly, in South Africa the number of additional poor reached more than half a million even if the poverty rate is more than 50% in this country using the $2 threshold only.

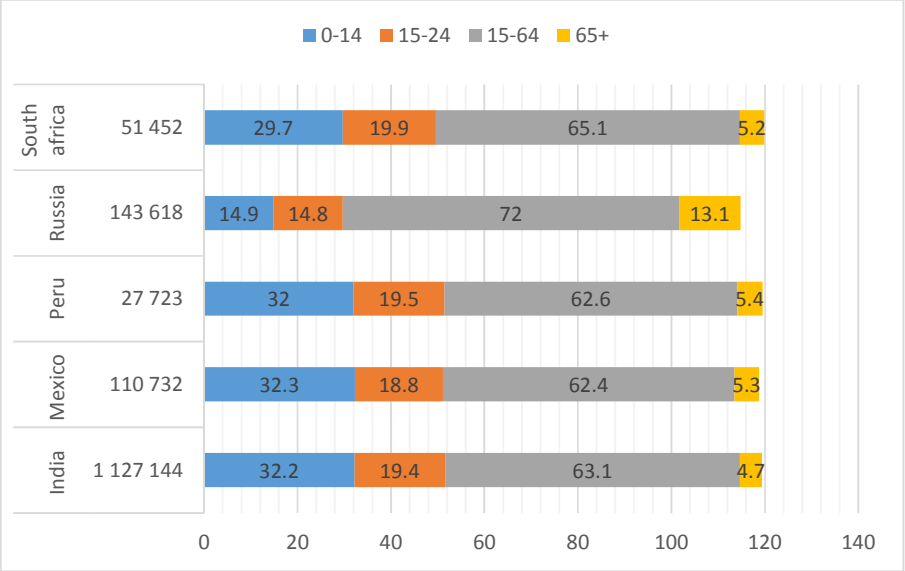
Figure 1: numbers of additional poor people after substracting health and education payments combined



Source: Calculated by the authors based on LIS data

If we take into account the demographic structure in the five countries as shown in figure 2 below, In all countries more than half of the population is between 0 and 24 in 2012 (more than 32% in Russia). This suggests the strategic choice to invest in health and education as public goods and not as commodities, if any genuine social transformation is to be expected in the future.

Figure 2 : Population size by age groups

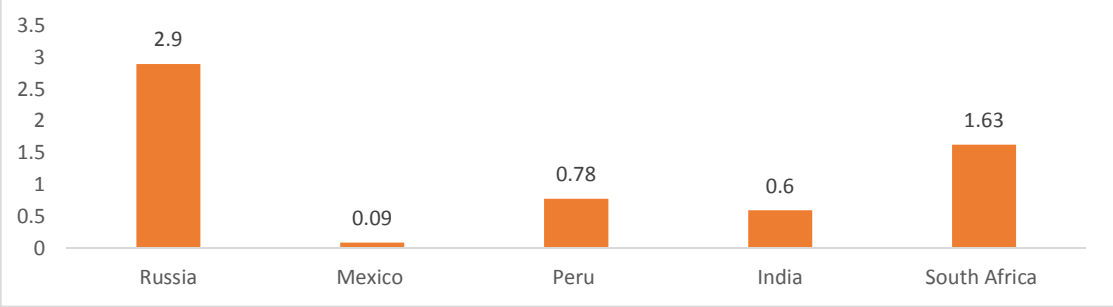


Source: aggregated by the authors based on UNDESA, World Population Prospect, 2012

Public expenditure in the five countries on social protection is very low in terms of %GDP hence very unlikely to absorb the deficit in a dominant private services and private insurances schemes. While in Europe for example, expenditure in Social protection reach up to 30% of GDP[2], the following figure shows the highest share of GDP in terms of social benefits for the economically active is observed in Russia with almost 3% of GDP followed by South Africa with 1.63%, whereas it is under 1% in Mexico, India and Peru.

[2] See for example http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Expenditure_on_social_protection,_2002%E2%80%9312_%28%25_of_GDP%29_YB15.png

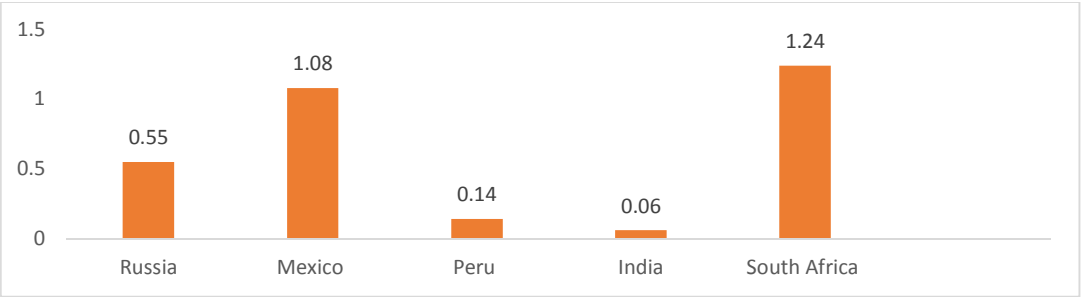
Figure 3: Social benefits for persons of active age (excluding general social assistance) in 2014



Source: World Social Protection Report, ILO, 2014

The public spending on social protection for children is even lower. The highest share of GDP is observed in South Africa with 1.24%, followed by Mexico with 1.08% and under 1% for Russia, Peru and India.

Figure 4: Public social protection expenditure for children (% of GDP)



Source: World Social Protection Report, ILO, 2014

Conclusion

In the light of the findings of the analysis of the effects of health and education payments on poverty estimates as well as the brief overview of the national macro context in our countries of interest, it can be said that education and health expenditure have an important **Impoverishing effect on the population.** A large proportion of poor households- at least in India, Peru and South Africa (the later to a lesser extent)- display health and education expenditure while their expenditure in vital areas fall below the subsistence poverty line. Rural and households with children are especially more likely to endure such risks. Although the richest quintiles spend more than the poorest, the effect of expenditure for the near poor and the poor has visible impoverishing effect unlike the richest resulting in thousands and sometimes millions of additional poor compared to the standards poverty measures which capture only subsistence levels of living. Moreover, the impact of health and education spending considered separately using the $2 a day can at first seem low but given the size of the population especially in India, Mexico and Russia, and given the poverty gap levels (expressed in average terms only), the resources needed to get people above the poverty line can be high. When both health and education payments are considered together, there is in general an average of 1 to 3% of the population that goes below the poverty line, and poor households becoming even poorer. The upper bound poverty line for Mexico and Peru ($4) and Russia ($5) display more reasonable estimates, in terms of poverty headcount, and larger poverty gaps and lesser relative change than when using the $2.

To conclude this paper, there is clear evidence that poverty and child poverty estimates should be adjusted to take account of both health and education spending. The policy recommendations toward poverty reduction change significantly in scope after such adjustment has been made.

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Appendix 1: Descriptive Statistics

Main Descriptives

	Survey year	Sample size	Hh with kids (%)	% of hh with health exp	% of hh with edu exp	$2 ppp poverty headcount (weighted)	$2 ppp child poverty headcount (weighted)	Ppp exchange rate
India	2004	215,704	86	71	62	89	93	15.47
Mexico	2010	91,738	78	51	56	6	9	8.90
Peru	2004	78,834*	86	90	85	18	23	1.68
South Africa	2010	23,259**	87	15	39	45	56	5.72
Russia	2010	15159***	53	73	24	3****	4.41	16.75

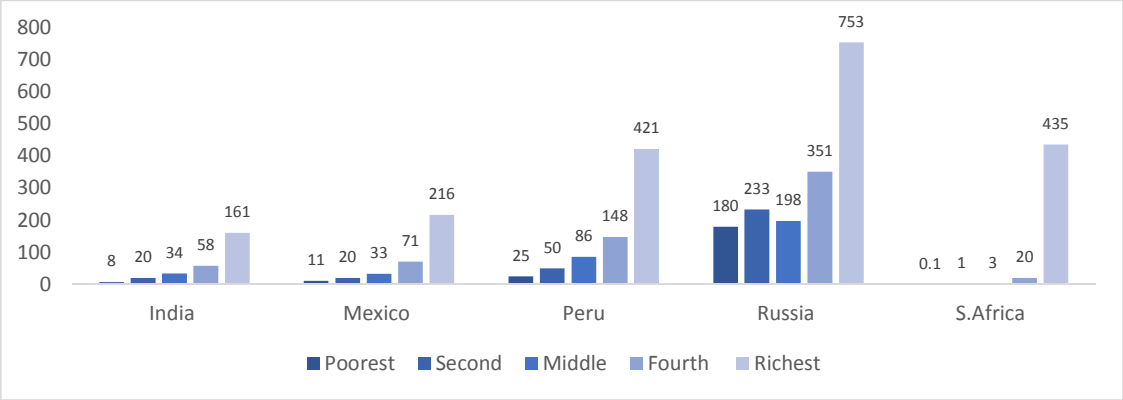
a. *original N=86,455 before missing data was removed

b. **original N=29,430 before missing data was removed

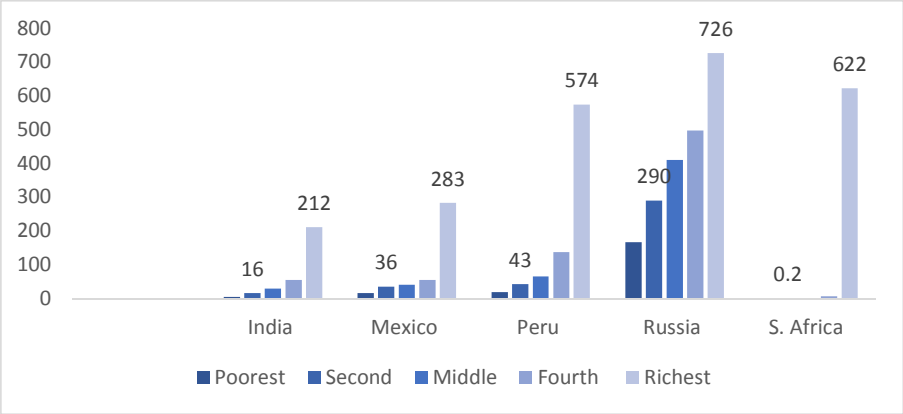
c. *** Original N=16,867 before missing data was removed

d. **** using disposable household income

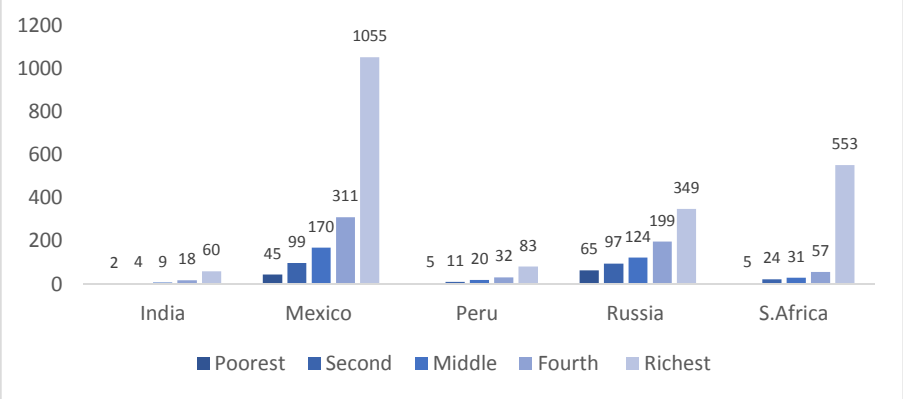
Mean Health expenditure by expenditure quintile and households with children (by income quintile for Russia)



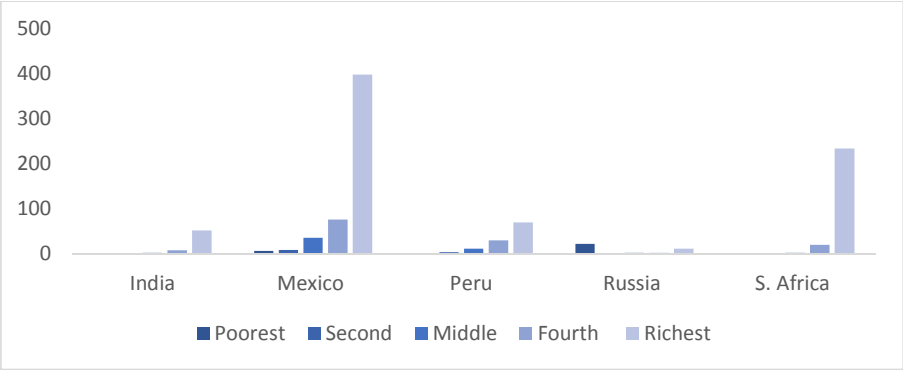
Mean Health expenditure by expenditure quintile and households without children (by income quintile for Russia)



Mean Education expenditure by expenditure quintile and households with children (by income quintile for Russia)



Mean Education expenditure by expenditure quintile and households without children (by income quintile for Russia)



Appendix 2 : varibales definitions

	Health expenditure	Education expenditure	
Peru	- medical consultations, medicaments, other medical	- monetary and non-monetary expenditures	

	inputs, analyses, exams, consumed by the household (whether paid for or not – including own consumption, gifts from other households, transfers from private or public institutions, covered by the social security system) in the last month (annualized by LIS by multiplying by 12) - dental services and related, ophthalmologist services and related, vaccines, medical controls for children, contraceptives, other medical appliances, consumed by the household (whether paid for or not – including own consumption, gifts from other households, transfers from private or public institutions, covered by the social security system) in the last 3 months (annualized by LIS by multiplying by 4) - hospitalization, surgical interventions, pregnancy controls, childbirth attentions, consumed by the household (whether paid for or not – including own consumption, gifts from other households, transfers from private or public institutions, covered by the social security system) in the last 12 months	consumed by the household (whether paid for or not – including own consumption, gifts from other households, transfers from private or public institutions, covered by the social security system) in the last 12 months, on: -registration fees - school parents' associations - other education expenditures (photocopies, extraordinary fees, etc.)	
South Africa			
India	o medical expenses on outpatient services paid by the household over the past 30 days (annualized by LIS by multiplying by 12) o medical expenses on in-patient services paid by the household over the past 365 days expenses on therapeutic appliances (includes glass eye, hearing aids, orthopedic equipment, etc.) paid by the household over the past 365 days	- expenditures on school / private tuition fees (includes private tutor, school / college fees) paid by the household over the past 365 days	
Russia	payments in the last 30 days (annualized by LIS by multiplying by 12) for: o treatment or examination in inpatient hospitals, military hospitals, or clinics, not including medicine o treatment or examination in polyclinics, not including	payments in the last 30 days (annualized by LIS by multiplying by 12) on child support and fees for children's attendance at preschools, schools, clubs, societies, payment for private lessons, tutors, including gifts for teachers	

	medicine o dental treatment, dentures, false teeth, not including medicine o medicines, including vitamins and other drugs		
Mexico	- **monetary expenditures** on health paid by the household in the last 3 months (annualized by LIS by multiplying by 4), including doctor consultations (both in and out-patient), hospitalization costs, clinical analyses, medicines and various services (ambulance, dialysis, oxygen, etc.), orthopedic and therapeutic appliances, health insurance - **non-monetary expenditures** on health, including doctor consultations (both in and out-patient), hospitalization costs, clinical analyses, medicines and various services (ambulance, dialysis, oxygen, etc.), orthopedic and therapeutic appliances, health insurance, consumed but not paid by the household (including own-consumption, in-kind earnings from the employer, gifts from other households and in-kind transfers from private organisations, government, political parties, etc.) in the last 3 months (annualized by LIS by multiplying by 4) -	- monetary expenditures on education (including enrollment fees, tuition fees and scholarly material) for pre-school, primary, secondary, preparatory, professional or postgraduate, or technical education, paid by the household in the last month (annualized by LIS by multiplying by 12) - value of the education goods and services for pre-school, primary, secondary, preparatory, professional or postgraduate, or technical education, consumed but not paid by the household (including own-consumption, in-kind earnings from the employer, gifts from other households and in-kind transfers from private organisations, government, political parties, etc.) in the last month (annualized by LIS by multiplying by 12)	