Out of pocket payments impact in Mexico

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1 Introduction

Health policy makers have long been concerned with the design of health financing policies that protect people from the possibility that ill health will lead to high shares of out-of-pocket payments (OOP) and subsequent impoverishment. The increase in share of OOP payments related to health care impose financial burdens on poor households and individuals, creating barriers to seeking adequate quantity and quality of care. In most of developing countries where access to credit is limited, financial burden can render a household into debt causing an endless cycle of poverty and ill-health.

Adequate financing policies continue to elude most countries. The difficulty in financing policies of the public health system is especially severe in low and middle income countries, in which different health programs struggle with meager and inequitable distributed resources. In term of policies choices, this has involved a movement towards policy instruments which reduce the out-of-pocket health payments among the poor. In this sense, the need for greater evaluation of the distributional impact of policies and programs has also been emphasized. The purpose of this paper is to measure the impact of OOP health payments for different financing policies for the poor households.

The impact of OOP payments as an important consideration on health care has been by now widely recognized in the literature (among others, Pannarunothai and Mills (2003), Lui and Rao et al (2003), Wagstaff and van Doorslaer (2003), Gusstaffson and Li (2004) and van Doorslaer et al (2007)). Most of these contributions analyze the role OOP health payments in causing poverty, that is, the extend of which illness induce impoverishment by answering the question of how many households have become poor due to illnesses. Others, as Wagstaff and van Doorslaer (2003) and van Doorslaer et al (2007) focus on those expenditures that represent catastrophic payments, in the sense that they represent an amount in excess of a substantial fraction of household income causing an impoverishing effect.

We propose the distributional characteristic approach to measure the poverty impact of out-of-pocket health payments. It allows us to measure the impact of OOP health payments using distributional information that gives households different weights according to certain value judgments that relates to income accruing of poor households in different parts of the distribution. It provides an alternative to various approaches in the literature allowing the possibility to

use a wider class of poverty measures by making value judgments underlying the analysis more transparent.

In order to find robust result to the choice of poverty lines and poverty measures we also extend our analysis to the use of the marginal stochastic dominance approach proposed by Yitzhaki and Slemord (1991) for marginal tax reforms and extended by Makdissi and Wodon (2002) for the case of comsumption taxation. We propose a health impact dominance curve approach that imposes only a rather minimal ordinal structure on poverty indices, so it may become possible to identify non-intersecting curves and give some desirable policy changes. There exist many orders of marginal stochastic dominance, each order can be given an ethical interpretation when used in the context of poverty analysis. When two health impact dominance curve of a given order do not intersect, all poverty indices that obey the ethical indices associated with the ethical principles associated to this order gives the same ranking of health financing policies programs.

We present an empirical application of the out-of-pocket health payments for two important health financing policies in Mexico: Seguro Popular and Oportunidades. Seguro Popular is a social insurance system that seeks spreading the risk among a large population group in order to reduce the OOP payments which a household faces when one its member falls sick and hence minimizing the vulnerability to catastrophic and impoverishing effects. Oportunidades, on the other hand, is a conditional cash transfer policy dependent on the uptake of health services. It transfers cash to poor households to ease constraints on household investment in human capital development by reducing out-of-pocket expenditure and opportunity costs.

The paper finds evidence in favor of Seguro Popular policy having a better poverty impact in terms of the methodology proposed, however the marginal dominance approach result is not conclusive. The empirical analysis uses data from Mexico in 2006 and considers international poverty standards of 2$ per person per day.

The structure of the paper is a follows. Section 2 describes the OOP health payments in Mexico and the Seguro Popular and Oportunidades financing policies. Section 3 presents the poverty framework used in the analysis. The impact of out of pocket expenditure is discussed in Section 4. The Section 5 introduces the distributional characteristic approach to measure the impact of OOP. While in Section 5 the marginal dominance approach is discurssed. Section 6 concludes.

2 Poverty measurement framework

Let us suppose that the income distribution is defined on the continuum and represented by $F(y)$, a distribution function for income y. $F(y)$ gives the proportion of the individuals with income less than or equal to y. If a is an income level exceeding the maximum one in any subgroup, then we have $F(a) = 1$. F is nondecreasing and the density function is denoted by $f(y)$.

To assess the impact of oop health payments we use an index of the general

additive separable form:

$$P = \int_0^a p(y,z) f(y)\,\mathrm{d}y \tag{1}$$

where z is the poverty line (which is given exogenously) and $p(y,z)$ is the individual contribution to aggregate poverty of a household with equivalent income y. This function is assumed to be non-negative and zero at and above the poverty line. The additive separable form captures a wide class of measures: in particular, the non-normalised formulation of the measure proposed by Foster *et al.* (1984) where $p(y,z) = (\frac{z-y}{z})^\alpha$ for $\alpha \geq 1$. Then the poverty measure in (1) can be expressed as

$$P^\alpha(z) = \int_0^a \left(\frac{z-y}{z}\right)^\alpha f(y)\,\mathrm{d}y. \tag{2}$$

This family of measures contains several well known and commonly used poverty indices as special cases. For instance, when $\alpha = 0$,

$$P^0(z) = \int_0^a f(y)\,\mathrm{d}y = H,$$

it becomes the head count measure (incidence of poverty) which is simply the share of the population living with income below the poverty line. When $\alpha = 1$, $P^1(y;z)$ becomes the poverty gap that captures the distance that separates the poor from the poverty line. The severety of poverty is for $\alpha = 2$, then $P^2(y;z)$ takes into the account both the difference between the poor and the poverty line and the inequality among the poor. This means that a transfer from richer to poorer individuals increases welfare (and therefor, reduces poverty), this implies that $P_\alpha(y;z)$ satisfies the Pigou-Dalton principle of transfers. Finally when $\alpha \to \infty$, $P_\infty(y;z)$ approches the Rawlsian maximim justice and the well-being of the poorest dictate the overall picture of poverty.

We can also instead on focusing on a particular poverty measure to analyze poverty indices that belog to the classess Π^s, $s = 1, 2, 3, ...$For that purpose we require that the function $p(y,z)$ defined in the general additive function in (1) to be a continuous function and s-times differentiable over $[0,a]$, such that

$$(-1)^v p^v(y,z) \geq 0 \quad \forall v = 1, 2, \ldots, s, \tag{3}$$

where $p^s(y,z)$ is the s-th derivative of the function $p(y,z)$ with respect to its first argument.

It is useful at this point to provide a normative interpretation of the different classes of poverty measures Π^s. Then for $s = 1$, other things being the same, an increase (decrease) in a poor person's income should reduce (increase) the overall poverty level. That is to say, this indices are Paretian but they also obey the symmetry axiom, in the sense that interchanging any two household's incomes leaves unchanged the poverty measure and enable us to use and ordered income distribution. Ordering two distributions of living standards over the first-order

classes of indices is equivalent to making the living stantards parade simultaneously one against each other, and verifying if one parade weakly dominates the other, this is know in the literature as the Pen-parade since was first proposed by Pen (1971). When $s = 2$, this implies that an equalising transfer (from a richer person to a poorer person) should decrease the poverty value, that is they must respect the Pigou-Dalton principle of transfers. When $s = 3$ the poverty measures must also be sentitive to favourable composite transfers. These transfers refer to two simultaneous transfers, one favorable Pigou-Dalton transfer within the lower part of the distribution accompanied by an adverse Pigou-Dalton within the upper part of the distribution, both will decrease poverty. As s increases, then the poverty measure becomes more sensitive to a drop in a poor person's income giving that the weight assigned to the effect of transfers ocurring at the bottom of the distribution increases.

3 Impoverishment and Catastrophe in OOP health payments

Wagstaff and van Doorslaer (2003) proposed two approaches to evaluate the impact of health care payments distinct to the mainstream literature which has focused more on the impact of health care on income inequality. The first approach sets a minimum in terms of the absolute level of income and the concern is that OOP health payments do not push households into poverty or make them poorer. On the other hand, the second approach concern is to ensure that households do not spend more than a pre-specified fraction of their living standards on OOP, since spending above that limit will be labeled catastrophic.

Wagstaff and van Doorslaer (2003) pointed out that the impoverishment caused by health payments may not be captured by the standard approach to the measurement of poverty that compares total household expenditures to a poverty line. It might be the case that households make great sacrifices in order to meet vital health care, in which case it would be risky to categorize such households as non-poor simply because high medical expenses rises its total expenditure above the poverty line. To overcome such limitation they proposed to measure the impact of health payments as the difference between poverty estimates derived from household expenditures gross and net of OOP health payments.

Lets assume that a househod with income y, who is paying an OOP health payment $h(y)$ will see his income reduced by

$$y_N = y - h(y)$$

Let y be the pre-payment income and y_N the post-payment povety income. They proposed two candidates for the poverty line. One is to define an absolute poverty line for both income distributions in terms of the cost of reaching a given amount of calories a day. The second option is to define a different poverty line, z_y and z_{y_N} for each income distributions. The difference between z_y and z_{y_N} is

an amount corresponding to heath spending. This poverty line poses a difficulty since for the case of extreme poverty lines it necessarily means that poverty will be higher after health spending than before, even for the cases where individuals have spend nothing on health care or they spend less that the amount considered in the poverty line.

For the case of the FGT poverty measure defined in (2) the poverty impact measure of OOP health payments (PI_α) is simply defined as the difference between pre-payment and post-payment poverty measure, that is,

$$\begin{aligned} PI_\alpha &= P_\alpha(y_N; z_{y_N}) - P_\alpha(y; z_y) \\ &= \int_0^a \left(\frac{z_{y_N} - y}{z_{y_N}}\right)^\alpha f(y_N)\,\mathrm{d}y_N - \int_0^a \left(\frac{z_y - y}{z_y}\right)^\alpha f(y)\,\mathrm{d}y \end{aligned} \tag{4}$$

when $\alpha = 0$ becomes the poverty impact of health payments in terms of poverty headcount measure. This measure will capture the impact in terms of the proportion of individuals that become poor due to OOP health payments. Clearly, the headcount measure ignores the depth as well as the distribution of poverty that OOP health payments is causing. By using $\alpha = 1$ we obtain the poverty impact in terms of average porverty gap, based on the total or percapita, shortfall of poor households' incomes from the poverty line. The average poverty gaps adds another dimension to the picture of poverty, that is the depth of poverty. However, like the headcount poverty measure, the average poverty gap measure are best seen as partial indicators of poverty since both ignore the distribution of income among the poor. Hence in order to make the poverty impact of OOP health payments distributional sensitive it suffice with give α values larger than one.

The catastrophic impact of OOP health payments follows a different approach. The idea is that households with severe medical needs might spend large proportions of their incomes on health care reducing considerably the disposable income for basic needs. This amount of resources spend on medical needs may be labeled catastrophic if they cross some pre-specified threshold share of household income.

For this purpose, we define a threshold level, z_{CAT}, as fraction of household's income on health care by which OOP health payments are not "catastrophic". For a given distribution of the ratio to health care to pre-transfer income, T/x, the catastrophic payment headcount is given by:

$$H_{CAT} = \frac{1}{n}\sum_{i=1}^{n} E_i$$

where $E_i = 1$ if $O_i > 0$.The O_i is a function that represents the catastrophic 'overshoot' defined as,

$$O_i = \frac{T}{x} - z_{CAT}$$

Therefore, the catastrophic poverty gap is given by,

$$G_{CAT} = \frac{1}{n}\sum_{i=1}^{n} O_i.$$

One limitation of this approach is that it does not recognize whether the household that exceeds the threshold level is a poor household in terms of income or a better off household. In order to capture the distributional ranking of the households they define a weighted version of H_{CAT}. Formally,

$$W^E_{CAT} = \frac{1}{n}\sum_{i=1}^{n} w_i E_i$$

where w_i is the household weight defined as $w_i = 2\left[\frac{n+1-r_i}{n}\right]$. This weighting scheme allows to re-express W^E_{CAT} as,

$$W^E_{CAT} = \mu_E \cdot (1 - C_E)$$

where C_E is the concentration index of the binary indicator of the catastrophic overshoot, E_i. The weighted catastrophic payments headcount is simply the catastrophic payment headcount multiplied by the complement of the concentration index. Then if the households that exceed on OOP health payments tend to be poor, the concentration index C_E will be negative, resulting in W^E_{CAT} being higher than μ_E. While for the case of less poor households exceeding the threshold the C_E will be positive, giving the opposite result.

One recognized disadvantage is to define the thresholds by which expenditures on health become catastrophic. A partial solution to the problem is defining catastrophic payments with respect to health as results of net expenditures of spending on basic necessities. This approach was referred as "non-discretionary expenditure approach" by Wagstaff and van Doorslaer or "capacity to pay" by Xu et al. (2003). For practical purposes, one common approach is to use expenditure net of food expenditure as non-discretionary approach.

Another limitation of the analysis above is that is based solely on an income rankings of households ignoring important information regarding differences in incomes and the potential poverty gains in reducing OOP in the poorest households. Even in the case of poverty impact in formula (4), value judgements concerning the relative weight given to income accruing to households in different parts of the income distribution is not very transparent.

4 The distributional poverty impact of out-of-pocket payments

The objective of this section is to develop an alternative measure of poverty impact and catastrophic impact out-of-pocket health payments to the ones developed above. The idea is to provide a simple framework to use all income information directly by computing *distributional characteristics* to analyze the poverty effects of changes in OOP health payments by making explicit distributional judgements. The approach followed is adapted from the theory of marginal tax reform developed by Feldstein (1972), Ahmad and Stern (1984) and recently applied by Coady and Skoufias (2004) to transfer analysis in poverty reforms.

Following the definition in (2), the impact on poverty of OOP health payments is:

$$\begin{aligned}\frac{\partial P_\alpha(y_N;z)}{\partial h_i^j} &= \int_0^a \frac{\partial P_\alpha(y_N;z)}{\partial p(y_N;z)}\frac{\partial y_N}{\partial h} f(y)dy \\ &= \int_0^a \frac{\alpha}{z}\left(1-\frac{y_N(y)}{z}\right)^{\alpha-1}\frac{\partial y}{\partial h}f(y)dy \\ &= \int_0^a \beta^i \frac{\partial y}{\partial h}f(y)dy\end{aligned} \tag{5}$$

where $\beta^i(y_E;z,\alpha)=\frac{\alpha}{z}\left(1-\frac{y_E(q,y)}{z}\right)^{\alpha-1}$ is the household i poverty weight and can be interpreted as the marginal utility of extra income to househols i, and is commonly referred in the welfare literature as "social marginal utility of income". This weight is higher for lower income households when $\alpha > 1$, which reflects a concern for income inequality. Therefore, the formula in (**??**) says that the impact of a the health payments change is approximated by the sum over poor households of the social marginal utilities of incomes weighted by the actual health payments. Therefore, the impact of out-of-pocket health payments will depend on both the amount of out-of-pocket health payments and its distribution among the poor population.

In order to define the distributional characteristic we assume that the objective of the "social planner" is to choose among alternative health financing policies j, with different levels of health payments across poor households, dh^j, subject to a total amount of private OOP health payments that results from poor households being part of a giving policy program, that is $H = \sum_{i\in\{y_i\le z\}} h^i$. The planner's problem is given by:

$$\min \mathcal{L} = P_\alpha(...,p^i(y,z)...) + \lambda\left(H - \sum_{i\in\{y_i\le z\}} h^i\right)$$

where λ is the social valuation of extra private health payment. The poverty impact of any given health financing policy is given by,

$$\begin{aligned}d\mathcal{L} &= \int_0^a \frac{\partial P_\alpha(y_N;z)}{\partial p(y_N;z)}\frac{\partial y_N}{\partial h}f(y)dy = \lambda \sum_{i\in\{y_i\le z\}} dh^i \\ &= \int_0^a \beta^i \frac{\partial y_N}{\partial h}f(y)dy = \lambda \sum_{i\in\{y_i\le z\}} dh^i\end{aligned} \tag{6}$$

Solving for λ, we get the distributional characteristic for each financing policy j, that is

$$\lambda_j = \frac{\int_0^a \beta^i \frac{\partial y}{\partial h_j} f(y)dy}{H} \tag{7}$$

The equation (7) is the *distributional characteristic* that is a measure of how concentrated the OOP health payments on the socially deserving (those with high marginal values of consumption β^i). The value of λ_j will be different according to different health programs due to differences in weights across househols and because of the difference in the structure of health care payments across programs. The greater the proportion of the total health payment paid by the poorest households (those with higher values of β) the lower the distributional characteristic. The distributional power is that an extra health care payment income by the low income (or poor) households is less socially valuable than an extra health care payment by high income (or non-poor) households.

One difference with the use of the concentration coefficient, which aggregate incomes shares based on household rankings in the income differences, is that for the concentration index the only thing that matters is the position of the household in the income scale and makes no distinction of the size of the income differences. Another distinction is that value judgments are more transparent and sensibility analysis of results of these value judgments can be simply implemented. The additive decomposable property defined in (1) allow us to understand the distributional effects of OOP health payments across socioeconomic groups (for example, by region or ethnic group) and having access to a wider class of poverty measures in the analysis.

*no necesita uno establecer dos lineas de pobreza, ni identificar el gasto discrecional.

One limitation of the approach that is shared with the previous approaches is that it just identify the households that incur in OOP health payments and ignore those that cannot meet these expenditures and so forgo treatment. The households that do not have access and can not pay privately for health care treatments will suffer health deterioration and probably suffer a greater welfare loss than those incurring in OOP health payments.

5 The marginal poverty dominance approach

One can argument about the elusive components in measuring heath impact in terms of the distributional charactetristic because of its incorporation of value judgements in the social weights. Yitzhaki and Slemrod (1991), Yitzhaki and Lewis (1995), Mayshar and Yitzhaki (1995, 1996), have developed an approach to the standard theory of marginal tax reform that is related to the concepts of stochastic dominance developed by Hanoch and Levy (1969) and extended to income distribution comparisons by Atkinson (1970).

The basic idea of the theory is to work out necessary and sufficient conditions to make value of judgments independent of the choice of social weights. Using this framework we can identify health financing policies that are poverty dominant, in the sense that an increase in poverty due to health payments is the lowest for all poverty indices $P(z) \in \Pi^s(z)$ and for all poverty lines up to z. For that purpose we define the stochastic dominance curves that results from

the repeated integrals of a given cummulative distribution function as,

$$D^s(y) = \frac{1}{(s-1)!}\int_0^z (z-y)^{s-1} dF(y) \tag{8}$$

for order of dominance $s = 1, 2, 3, ...$The dominace curves are the sum of powers of poverty gaps. For $s = 1$, $D^1(y)$ is the head-count for poverty line z. For $s = 2$, $D^2(y)$ is the average poverty gap for poverty line z. The larger the value of s, the larger the weight on the largest poverty gaps.

Duclos and Makdissi (2004) show that a necessary and sufficient condition for poverty to decrease when moving from A to B, for all $P(z) \in \Pi^s(z)$, for all $z \in [0, z]$ and for any given $s \in \{1, 2, 3, ...\}$ is given by,

$$D^s_A(y) \geq D^s_B(y)$$

which implies that dominance of order $s = 1$ implies dominance of at all higher orders. The D^s curves represent a class of poverty indices defined in Π^s, however we can notice there is a relationship between (8) and the FGT poverty measure defined in (2).

$$P^\alpha(z) = (\alpha)! z^{-\alpha} D^{\alpha+1}(z)$$

In the context for marginal program impact, this necessarily and sufficient conditions becomes the health impact dominance curve

$$\begin{aligned} HD^s_j(z) &= \frac{\partial D^s(y)}{\partial h_j} dh_j \leq 0 \qquad (9) \\ HD^s_j(z) &= \begin{cases} h_j(z) f(y) & \text{if } s = 1 \\ (s-1) z^{1-s} \int_0^z (z-y)^{s-2} dh_j(y) dF(y) & \text{if } s > 1 \end{cases} \end{aligned}$$

The $HD^s_j(z)$ curves decribes changes in ethically weighted sums of deprivation, they can be interpreted as the ethically weighted cost in terms of OOP health payments of program j. For the $HD^1_j(z)$ is the density of health payments of households in program j that is payed by households with income z.

The $HD^2_j(z)$ curve represents the cummulative OOP health payments paid by poor households in program j whose income is less than z. This results by posing weaker assumptions than for the case $s = 1$, it says, in term of our analysis above, that one can, a priori, rank households relative less deserving rich poor (low β^h) or as relative more deserving poor (high β^h). From the health payments impact on social welfare in equation (**??**), considering the situation of just two households, the welfare impact is,

$$\begin{aligned} \partial P(z) &\approx [\beta^1 dh^1 + \beta^2 dh^2] \\ &= [\beta^1 dh^1 + \beta^2 dh^2] \\ &= [(\beta^1 - \beta^2) dh^1 + \beta^2 (dh^1 + dh^2)] \qquad (10) \end{aligned}$$

Since households can be socially ranked according to the social poverty weight, we have that $\beta^1 > \beta^2$, i.e. higher positive weight is attached to household with

lower levels of income, therefore the first term in equation (10) is negative if $dh^1 \leq 0$. For the second term, we know that $\beta^1 > 0$ and $\beta^2 > 0$, so we have that $\beta^2(dh^1 + dh^2) < 0$, then $dh^1 \geq 0$ and $dh^1 + dh^2 \geq 0$ is a sufficient condition to have $\partial P < 0$. Therefore, generalising to all households, a testable necessary and sufficient conditions for poverty reducing oop health impact is (9) when s=2, that is,

$$HD_j^2(z) = z^{-1} \int_0^z dh_j(y) dF(y)$$

The difference between $HD_j^2(z)$ and an concentration curve is that, $HD_j^2(z)$ integrates over incomes, while for an standard concentration curves we integrate over population percentiles. Makdissi and Wodon (2002) pointed out that one advantages of the health impact dominance curves over the concentration curves is that it allows us to test on higher dominance order, while the concentration curve can only be tested for $s = 2$. For higher oder health impact dominance curves, greater weight is given to the oop health payments of those with higher poverty gaps.

Therefore in order to compare two health policy impacts we have

$$HD_j^s(y) - HD_k^s(y) \leq 0$$

gives the necessary and sufficient condition for a health financing program , to be s-order poverty efficient, that is to decrease poverty weakly for all $P(z) \in \Pi^s(z)$ and for all $z \in [0, z^+]$ and for a given $s = 1, 2, 3, ...$

6 Application to Out-of-pocket paymenst in Mexico

Table 2 presents the mean consumptio ratio at every decile and the out-of-pocket health payments of different subpopulations associated to each of the three different health program alternatives. We can see that the cummulative oop health payments is lower for households in *Seguro Popular* that the other two subpopulations and that difference is higher for the second, third and fourth lower deciles in the distribution. The cummulative oop health payments of *Oportunidades* beneficiaries and the beneficiaries that belong to *Oportunidades* and *Seguro Popular* is very similar, and this may be due to the fact that a common practice of local governments is to authomatically subscribe households that participate in *Oportunidades* to the *Seguro Popular* program without letting them know about the benefits of the programme.

Table 1. Decile expenditure ratio and cummulative oop health payments

Income decile	Mean consumption ratio	Health programs and cummulative out-of pocket health payments		
		Oportunidades	*Seguro Popular*	*Oportunidades & Seguro Popular*
1	1.00	0.08	0.05	0.09
2	1.81	0.18	0.13	0.21
3	2.47	0.31	0.23	0.35
4	3.17	0.42	0.33	0.46
5	4.01	0.50	0.42	0.58
6	5.00	0.63	0.59	0.68
7	6.35	0.71	0.68	0.76
8	8.22	0.84	0.83	0.91
0	11.61	0.91	0.88	0.95
10	26.53	1.00	1.00	1.00

Source. Autors' own elaboration from ENIGH (2006)

In order to compare the imporverishment effect of the Seguro Popular and Oportunidades policies we consider a single poverty measure, the official food poverty line in (World Bank, 2004). This poverty line is an estimate of the income required to purchase a food basket to satisfy minimum nutrional requirements for rural areas[1]. The real poverty line z is of 598.70 mexican pesos (MXP) and is close to standardized poverty lines of approximately two dollars a day, at 1993 Purchasing Power Parities (Chen and Ravallion, 2004) despite following different methodologies.

In Table 3 we represent the poverty estimates for the poverty measure defined in (**??**) for the three subpopulations in the analysis and for two inequality aversion parameters. By comparing these values we can get a sense of the impoverishment effect, whether in terms of the proportion of poor (when $\alpha = 1$) or the extend of poverty (when $\alpha = 2$). We can notice that poverty is highests in among the beneficiaries from Oportunidades, followed by the group of Seguro Popular and the group of Seguro Popular and Oportunidades, this result is independent of the inequality aversion parameter, α. This is an obvious result since Oportunidades program has many control indicators for the selection process in order to reach the poorest households in the population. On the other hand, Seguro Popular which is in principle intended to reach the households in the lowest two decile of income, it is actually available for a broader audience than Oportunidades. The table shows that among Oportunidades beneficiaries oop payments increase the head-count ratio by 9.01% while 7.01% was the poverty change of those belonging to Seguro popular. The differences in poverty changes is more significant when we use the average poverty gap, Oop payments increse the poverty gap by 51% for those belonging to Oportunidades while the increase was 39% for the Seguro Popular beneficiaries.

[1]The bundle is based upon the food spending patterns of households who just satisfy minimum nutrient requirements, assuming all spending was on food. Then, the food poverty line is deflated using food specific consumer price index.

Poverty impact of OOP	alpha=1			alpha=2		
	Pre-payment poverty	Post-payment poverty	Poverty change	Pre-payment poverty	Post-payment poverty	Poverty change
Beneficiaries of Seguro Popular	0.145	0.2151	0.0701	0.0207	0.4127	0.392
Beneficiaries of Oportunidades	0.1216	0.2133	0.0917	0.0636	0.5827	0.5191
Beneficiaries of Seguro Popular and Oportunidades	0.0762	0.1416	0.0654	0.0354	0.1732	0.1378

This estimates has its limitations since not always OOP payments are completely non-discretionary and this estimate cannot always be interpreted as the change in poverty that would result from some policy that eliminated out-of-pocket health payments. This is due to the fact that some households may borrow to cover health care expenditures making that household expenditure gross of out-of-pocket expenditure does not correspond to the resources that would be available in the absence of those payments.

Table 2 reports the distributional poverty impact of the programs for the three level of inequality aversion chosen ($\varepsilon = 1, \varepsilon = 2$ and $\varepsilon = 5$). The table shows that the ranking of d_j is rather insensitive to the level of inequality aversion. At $\varepsilon = 2$, there is substantial differentiation across the programs Seguro Popular and Oportunidades. However, the distributional poverty impact for the Oportunidades' beneficiaries and those belonging to Oportunidades and Seguro Popular is very similar. For the case of $\varepsilon = 1$ and $\varepsilon = 2$, the ranking is the same suggesting that the choice of ε is not particular critical for the evaluation of the health programs. The program ranking is similar to the one found in Table 1 for the cummulative oop health payments.

Table 2. Poverty impact of OOP health payments

	Distributional Poverty Impact of OOP		
Program	= 1	= 2	= 5
Oportunidades	0.00042	0.00046	0.08036
Seguro Popular	0.00038	0.00025	0.10322
Oportunidades & Seguro Popular	0.00059	0.00047	0.01051

Figure 1 shows the results of the comparison of the cummulative oop health payments for the Seguro Popular beneficiaries and Opportunidades beneficiaries. The cummulative oop health payments of SP are never higher than oop health payments of Oportunidades, however the marginal dominance test is not conclusive because the curves coincide in the lower decile of the distribution.

In the lower decile of the distribution there is not clear distinction whether Seguro Popular beneficiares reduced their health payments compared to the other subpopulations in the sample.

Figure1. Concentration curves for Seguro Popular ans Oportunidades

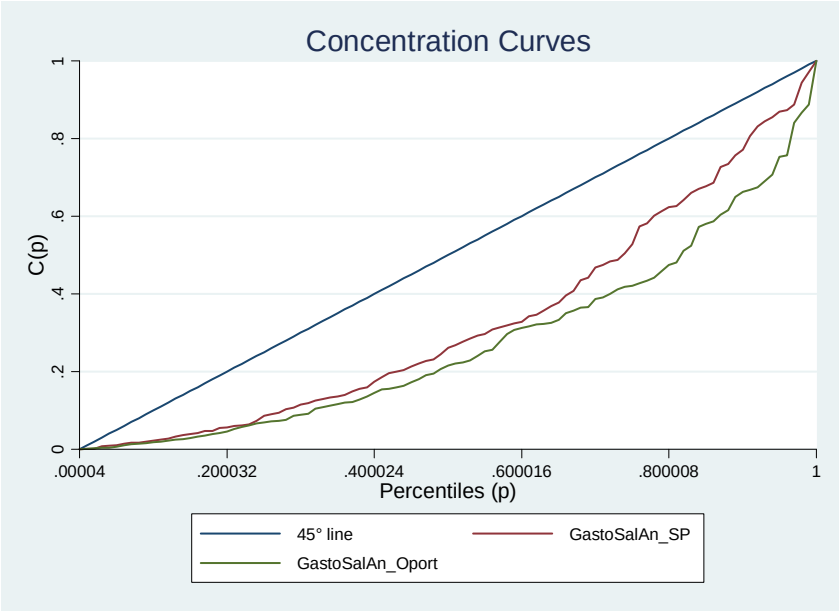

Figure 2 shows a comparison of cummulative oop health payments of Seguro Popular beneficiaries to those of Seguro Popular and Oportunidades beneficiaries. There are many intersections between the curves and the test is no conclusive. This is consistent with the results found earlier in Table 2 and 3, where there was not a real distinction in terms of oop health payments between these two subpopulations.

Figure2. Concentration curves for Seguro Popular's beneficiaries and Seguro Popular and Oportunidades Beneficiaries