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Mussa, Richard

Economics Department, Chancellor College, University of Malawi

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Exit from Catastrophic Health Payments: A Method and an Application to Malawi

Richard Mussa*

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Abstract

This paper proposes three measures of average exit time from catastrophic health payments; the first measure is non-normative in that the weights placed on catastrophic payments incurred by poor and nonpoor households are the same. It ignores the fact that the opportunity cost of health spending is different between poor and nonpoor households. The other two measures allow for distribution sensitivity but differ in their conceptualization of inequality; one is based on socioeconomic inequalities in catastrophic health payments, and the other uses pure inequalities in catastrophic health payments. The proposed measures are then applied to Malawian data from the Third Integrated Household Survey. The empirical results show that when the threshold of pre-payment income is increased from 5% to 15%, the average exit time decreases from 2.1 years to 0.2 years; and as the catastrophic threshold rises from 10% to 40% of ability to pay, the average exit time falls from 3.6 years to 0.1 years. It is found that when socioeconomic inequality is adopted, the changes in the exit times are quite small, however, using pure inequality leads to large reductions in the exit time.

Keywords: Catastrophic payments; average exit time; Malawi

1 Introduction

The reliance on out-of-pocket payments (OOP) is a dominant feature of health care finance in most developing countries; and this means that households especially poor ones, face a difficult intertemporal choice between diverting resources towards medical care now, or foregoing treatment at the expense of depreciating their human capital. OOP payments on health care can be catastrophic if they severely disrupt household living standards. Such catastrophic payments can threaten living standards either in the short term through the sacrifice of current consumption, or in the long term, through depletion of assets, dissavings or accumulation of debts (Xu et al., 2003; Russell, 2004; Wagstaff, 2006; Sparrow et al., 2013).The financial protection of households from catastrophic payments is a widely accepted conception of fairness in health finance (WHO, 2000, 2010).

*Department of Economics, Chancellor College, University of Malawi, Box 280, Zomba, Malawi, rimussa@yahoo.co.uk.

Besides, catastrophic health care payments have motivated calls on governments to move to some kind of pre-payment mechanism such as taxes or universal medical insurance (WHO, 2005).

Similar to the poverty measurement problem (Sen, 1976), the methodology for measuring catastrophic OOP health payments, can be broken down into two stages: (i) the identification of individuals or households incurring catastrophic medical expenditures, and (ii) the aggregation of all the individuals or households into an overall indicator that quantifies the extent of catastrophic health payments. In the identification stage, out-of-pocket medical spending is defined as catastrophic if it exceeds a certain amount in monetary terms (e.g. Waters et al., 2004) or alternatively, health spending is considered catastrophic if it exceeds some fractional threshold of pre-payment income or ability to pay income (e.g. Wagstaff and van Doorslaer, 2003; Van Doorslaer et al., 2007). The aggregation stage, as developed by Wagstaff and van Doorslaer (2003), includes measures of the incidence and intensity of catastrophic health payments, and measures that reflect the fact that catastrophic health payments matter more for the poor.

This paper focuses on the aggregation stage, and develops measures which answer the following question: how long would it take for those individuals or households that incur catastrophic health payments to exit from their catastrophic situation? Specifically, this paper proposes three measures of average exit time from catastrophic health payments; the first measure assumes away the distribution of catastrophic payments, and therefore ignores the fact that the opportunity cost of health spending is different between poor and nonpoor households. The other two measures allow for distribution sensitivity but differ in their conceptualization of inequality; one is based on socioeconomic inequalities in catastrophic health payments, and the other uses pure inequalities in catastrophic health payments.

As has been argued by Morduch (1998), the average exit time is meaningful in the sense that it describes an interesting "if-then" relationship, and it is based on "best case" assumptions. Although, the measures are static in nature, their usefulness lies in the fact that they provide a simple metric by which to assess the potential for policy to reduce catastrophic health payments through the reduction in the health payments budget share. The proposed measures of average exit time are then applied to Malawian data from the Third Integrated Household Survey.

The remainder of the paper is organized as follows. Section 2 presents measures for capturing exit time from catastrophic health payments. Section 3 provides a description of the Malawian context, and data used in the empirical application. Results of the application are reported in Section 4. Finally, Section 5 offers conclusions.

2 Exit from Catastrophic Health Payments

Let f_i be per capita expenditure on food of household i, c_i be per capita annualized household expenditure, then $y_i = c_i - f_i$ is a household's ability to pay for health. Define the fraction of health spending (h_i) in a household's ability to pay for health as $v_i = \frac{h_i}{y_i} \in (0,1)$. Conventionally, a household's health payments are considered catastrophic if $v_i > z$, where $z \in (0,1)$ is a threshold above which spending on health is considered catastrophic (Wagstaff and van Doorslaer, 2003). One can alternatively define the fraction of health spending in pre-payment income which is per capita annualized household expenditure gross of food expenditure. Following Morduch (1998), I define the exit time from catastrophic health payments for a household as the time it will take the household to reach a catastrophic health payments threshold through a decay/decline in the proportion of health spending. Assuming the share of health payments declines at a constant negative rate of g every year, then the relationship between the threshold z, and the proportion of current health spending can be expressed as

$$z = v_i e^{-t_i g} \tag{1}$$

Taking logarithms, and solving for t_i gives

$$t_i = -\frac{\ln z - \ln v_i}{g} \tag{2}$$

Using $\ln \tilde{z} - \ln \tilde{v}_i$, define a new variable as follows

$$m_i = \begin{cases} |\ln z - \ln v_i| & \text{if } \ln z - \ln v_i \leq 0 \\ 0 & \text{if } \ln z - \ln v_i > 0 \end{cases} \tag{3}$$

Thus , m_i is a catastrophic overshoot. Using this new variable, the exit time from catastrophic health payments for each household can be re-written as

$$t_i = \frac{m_i}{g} \tag{4}$$

Equation (4) says that the exit time for those households that do not suffer from catastrophic health payments is zero. The average exit time from catastrophic health payments can then be found by taking a weighted average of t_i

$$\begin{aligned} T_g &= \frac{1}{g}\left(\frac{\sum_i^N w_i m_i}{\sum_i^N w_i}\right) \\ &= \frac{W}{g} \end{aligned} \tag{5}$$

Where $W = \frac{\sum_i^N w_i m_i}{\sum_i^N w_i}$ is the Watts Index (Watts, 1968), w_i is the survey sampling weight of each household, and $\sum_i^N w_i = N$ is the total number of households in the sample. Equation (5) shows that the average exit time is just equal to the catastrophic payments Watts Index divided by the growth rate of the proportion of health spending.

One might wish to place a normative interpretation on the exit time, such that more weight is given to excess OOPs incurred by poorer households. The average exit time derived above is insensitive to the distribution of catastrophic payments in the sense that all households exceeding the threshold regardless of whether they are poor or rich are treated equally. The opportunity cost of health spending may not be the same between poor and rich households (O'Donnell et al., 2008), and the average exit time needs to reflect this differential opportunity cost. To address this problem, I weight m_i by weights defined by Wagstaff and van Doorslaer (2003). Let r_i denote household i's absolute rank in ascending order of per capita consumption expenditure, a proxy for household income. This is equal to 1 for the poorest household, 2 for the second poorest household, and N for the richest household. The weights are defined as

$$s_i = 2\frac{N + 1 - r_i}{N} \tag{6}$$

Thus, $s_i = 2$ for the poorest household i.e. $r_i = 1$, and $s_i = \frac{2}{N}$ for the richest household i.e. $r_i = N$. Taking a weighted average of the weighted household level exit times $s_i m_i$, gives the distribution-sensitive average exit time from catastrophic health payments as

$$\begin{aligned} T_g^C &= \frac{1}{g}\left(\frac{\sum_i^N w_i s_i m_i}{\sum_i^N w_i}\right) \\ &= \frac{1}{g}\left[\frac{2}{\sum_i^N w_i}\sum_{i=1}^N \left(1 + \frac{1}{N} - R_i\right) w_i m_i\right] \\ &= \left[2\frac{W}{g} - \frac{1}{g}\left(\frac{2}{\sum_i^N w_i}\sum_{i=1}^N R_i w_i m_i\right)\right] \quad \text{if } N \text{ is large} \end{aligned} \tag{7}$$

where $R_i = \frac{r_i}{N} \in [0, 1]$ is the household's relative fractional rank. The second term in equation (7) can further be simplified by using the formula for a concentration index C by Kakwani et. al. (1997) expressed as

$$C = \frac{2}{NW}\sum_{i=1}^N R_i w_i m_i - 1 \tag{8}$$

To get

$$W(1 + C) = \frac{2}{N}\sum_{i=1}^N R_i w_i m_i \tag{9}$$

Substituting equation (9) into equation (7) gives a distribution-sensitive average exit time from catastrophic health payments in terms of the concentration index

$$T_g^C = T_g(1 - C))$$

If the poor and the rich are equally likely to exceed the catastrophic payments threshold, then $C = 0$, and $T_g^C = T_g$. If poor households tend to exceed the catastrophic payments threshold, C will be negative, and $T_g^C > T_g$. This means that T_g will understate the average exit time. If better-off households tend to exceed the threshold, C will be positive, and $T_g^C < T_g$. This suggests that T_g will overstate the average exit time.

The above distribution-sensitive average exit time shows income-related inequalities in catastrophic health payments. The average exit can also be expressed in terms of pure or total inequalities in health payments as measured by a Gini coefficient G of the variable $s_i' m_i$. The average exit time in terms of the Gini coefficient can be defined analogously to the exit time in terms of the concentration index as

$$T_g^G = T_g(1 - G)) \tag{10}$$

where all other variables are as defined before but a new weight s_i' and not s_i is used instead. For s_i', households are ranked in ascending order of m_i, and not in terms of per capita consumption expenditure. If all households are equally likely to overshoot the catastrophic threshold i.e. $G = 0$, then the distribution-neutral average exit time T_g is equal to the distribution-sensitive average exit time, T_g^G. If few households are more likely to suffer from catastrophic health payments, then G will be close to one, and $T_g^G < T_g$. This implies that T_g will overestimate the average exit time.

The above measures suggest that the distribution-sensitive average exit time from catastrophic health spending can nest either the concentration index or the Gini coefficient. Morduch (1998) shows that the distribution-sensitive average exit time from poverty nests the Theil-L index of inequality. In terms of the relationship between the exit time and the rate of decay, two things are noteworthy. First, the rates of decay, g which would achieve a given average exit time from catastrophic health spending are given as: $g = \frac{W}{T_g}$, $g = \frac{W(1-C)}{T_g^C}$, $g = \frac{W(1-G)}{T_g^G}$ for the distribution neutral, income-related inequality, and pure inequality adjusted average exit time respectively. This means that if the targeted average exit time was one year for instance, then the required growth rates would be: $g = W$, $g = W\,(1 - C)$, and $g = W\,(1 - G)$ respectively.

Second, incremental changes in the average exit time following changes in g are expressed as: $\frac{\partial T_g}{\partial g} = -\frac{W}{g^2} < 0$, $\frac{\partial T_g^C}{\partial g} = -\frac{W(1-C)}{g^2} < 0$, $\frac{\partial T_g^G}{\partial g} = -\frac{W(1-G)}{g^2} < 0$. This implies that when the rate of decay increases (in absolute value), the average exit time decreases. The rate of decay is policy amenable; for instance rolling out universal health insurance, subsidized or free health care would ensure that the share of OOP on health care in the budget declines i.e. rate of decay increases, and this would in turn lead to a decrease in the exit time from catastrophic health payments.

3 Empirical Application to Malawi

3.1 Context

The health finance system in Malawi comprises the government, foreign donors, private individuals and players through direct OOP payments, and medical insurance. Donor funding dominates total health expenditure in Malawi. For example, over the period, 2005-2009, donor contributions accounted for an average of 60% of total health expenditure. Donor contributions rose from 46% to 66% of total health expenditure between 2002/03 and 2008/09, while the share public sector domestic financing decreased from 35% to 18%. Household health expenditure shares in total health expenditures, marginally declined from 12.2% in 2002/03 to about 11% in 2008/09 (World Bank, 2013).

Malawi has no social medical insurance, and private medical insurance, plays a marginal role as a source of health care finance; for instance, private health insurance managed an average of 3% of total health spending between 2007 and 2009 (GOM, 2012). The limited availability of private health insurance is unlikely to change in a significant way. Malawi has a small formal sector from which health insurance premiums could be collected with relative ease. Besides, the informal sector is characterised by low wages and salaries. The presence of a predominantly free public health care system distorts the incentive for households to insure against unexpected illness and the consequent medical costs (GOM, 2012).

The heavy reliance on donor funding to finance health expenditure is unsustainable and leaves Malawi in a vulnerable position to external shocks such as aid suspension, and financial crises in donor economies. For instance, the execution of donor pledges was affected by the global financial crisis which started in 2008 such that in 2011/12 only 25% of pledges were released (World Bank, 2013). This risk is further compounded by the fact that pre-payment mechanisms such as taxes or universal medical insurance have limited scope for growth in Malawi. All this then points to a strong possibility that going forward, Malawi's health care financing system will shift towards full cost recovery or cost sharing arrangements. This in turn suggests that in order to mitigate against the financing risks, and although the share of OOP health care spending is relatively, it is likely to increase rather than decrease in the future.

3.2 Data description and thresholds

The data used in the paper come from the Third Integrated Household Survey (IHS3) conducted by Malawi's National Statistical Office (NSO). The survey is statistically designed to be representative at both national, district, urban and rural levels. It was conducted from March 2010 to March 2011. The survey collected information from a sample of 12271 households. The information collected includes socioeconomic and demographic characteristics of households and individual household members. It also collected data on OOP health care payments to cover: medicines (including non-prescription medicines), tests, consultation, cost of travel to a medical facility, in-patient fees, preventative health care, pre-natal visits, check-ups, out-patient costs, and hospitalization costs including the cost of stay at a traditional healer's or faith healer's dwelling. I consider the household as the unit of analysis.

Since the data were collected from different locations and times of the year, the consumption and health care payments are converted into real values by using a temporal and spatial deflator. I use two measures to capture the share of OOP heath care payments; one is the share of OOP in household pre-payment income as proxied by per capita annualized household consumption, gross of OOP health payments, and the other is the share of health spending in a household's nondiscretionary expenditure or capacity to pay (Xu et al., 2003; Wagstaff and van Doorslaer, 2003), which is defined as per capita total household expenditure net of per capita expenditure on food. I use different thresholds to identify catastrophic health payments; heath care payments are considered catastrophic if the shares exceed these thresholds.

As argued by O'Donnell et al.(2008), researchers should not impose their own judgment but rather should present results for a range of values of the threshold, and let the reader choose where to give more weight. The exact threshold that one ends up using is arbitrary, but it depends on whether the denominator is total expenditure or nondiscretionary expenditure. The paper adopts a number of thresholds as follows: 5%, 10%, and 15% for OOP as share of total household expenditure, and 10%, 20%, 30%, and 40% for OOP as share of capacity to pay. It should be pointed out that the existing literature, commonly uses 10% as a threshold when total expenditure is used as the denominator (e.g. Pradhan and Prescott 2002; Ranson 2002; Wagstaff and van Doorslaer 2003), and 40% when nondiscretionary expenditure is used as the denominator (e.g. Xu et al., 2003).

4 Results

4.1 OOP shares and catastrophic payments

Before looking at average exit time results, I first discuss the pattern and prevalence of catastrophic OOP health care payments. Table 1 reports results for OOP payments as a percentage of total household expenditure, and total non-food expenditure. As would be expected, the results indicate that the mean of the share of ability to pay is larger than that for the share of pre-payment income. A similar pattern is observed for the median.

The distributions of the shares of OOP are positively skewed with the mean about ten times the median. The asymmetry in the distribution of the shares is further confirmed by the Gini coefficients which are about 0.8; suggesting that few households register high OOP shares.

The coefficient of variations for the OOP shares are greater than two, and this implies that OOP payments are highly unpredictable. The concentration index of the OOP share of pre-payment income is positive, while it is negative for the OOP share of ability to pay. The differences in the direction of the relationship between the two OOP shares and household economic status conform to what is expected in a low-income country like Malawi (van Doorslaer et al., 2007). This is because in ability to pay, food which is a necessity, is removed from the denominator, and this in turn means that the OOP share of non-food expenditure decreases as the level of non-food expenditure increases.

Table 2 shows the catastrophic payment headcount, which measures the incidence (in percentage) of catastrophic payments, and the mean positive overshoot (MPO), which captures the intensity or gap of the occurrence of households incurring catastrophic payments (see Wagstaff and Van Doorslaer (2003) for more details). The results also include the mean overshoot- which is the incidence times the intensity- and two additional measures that reflect not only the incidence and intensity but also the distribution of catastrophic payments. As expected, for both OOP shares, the incidence and intensity of catastrophic payments declines as the threshold rises. When the threshold is increased from 5% to 15% of total expenditure, the incidence of catastrophic payments declines from about 6.9% to 1.1%.

Further to this, the MPO for OOP payments in excess of 5% of the household budget is 5.7%, and it is 9.5% for those that spend more than 15% of total expenditure on health care. This means that households that spend more than 5% of total expenditure on health care, on average spend 10.7% (5% + 5.7%), and those that spend in excess of 15% of the household budget on health care, on average spend 34.5% (25% +9.5%). As expected, for a given threshold, the incidence and intensity of catastrophic payments are higher when the share of ability to pay is used; and the headcounts range from about 11.3% to about 1%, and the MPOs range from 11.2% to 12.9%. This for instance, means that amongst households spending more than 40% of ability to pay on OOP payments, the average OOP share exceeds this threshold by 11.8 percentage points, which in turn gives a 51.8% OOP budget share.

For both OOP shares, there is a direct proportionality between the concentration index of catastrophic payment indicators and thresholds; and this suggests that health care payments are a luxury good. A similar pattern is displayed between the concentration index of payment overshoots and thresholds. Consequently, the rank-weighted headcount and intensity measures which reflect distribution sensitivity in OOP are progressively lower as one increases the thresholds. This implies that catastrophic OOPs are incurred relatively more by nonpoor households, and that the inequality unadjusted measures of catastrophic payments overstate the incidence and intensity of catastrophic payments. The preceding discussion has shown that the prevalence of catastrophic health payments is relatively high considering that Malawi operates a largely free public health system. The existence of catastrophic health care payments can have adverse consequences on the affected households such as the reduction in current consumption and/or the accumulation of debt or the depletion of savings and assets with long-term consequences for household welfare (van Doorslaer et al., 2007).

4.2 Exit from catastrophic payments

I now turn to the illustration of the average exit time from catastrophic payments developed in this paper. The average exit time is illustrated below for a hypothetical constant and uniform decay rate of -2%. Table 3 displays results of the three measures of average exit time for different thresholds of the OOP shares of pre-payment income, and of ability to pay. For both shares, the results indicate that the average exit time declines as the threshold rises. This is in conformity with the incidence and intensity results discussed before, and it is expected because a higher threshold denotes a more stringent classification of OOP payments as catastrophic.

The average exit times for the OOP share of ability to pay are higher than those for pre-payment income. When the threshold of pre-payment income is increased from 5% to 15%, the average exit time decreases from 2.1 years to 0.2 years. As the catastrophic threshold rises from 10% to 40% of ability to pay, the average exit time falls from 3.6 years to 0.1 years. For the same threshold, 10% in this case, the average exit of the OOP share of ability to pay is longer than that for pre-payment income. This pattern is consistent with what was seen earlier for the incidence and intensity measures. Overall, the exit times are clearly short, this is however to be expected considering that the prevalence and intensity of catastrophic payments in Malawi is very low.

The concentration indices of the overshoot, m are all positive; implying that nonpoor households are more likely to overshoot the catastrophic health payments thresholds than poor households. Consequently, attaching a normative interpretation to the exit times leads to even shorter exit times for both OOP shares and all thresholds. It is also worth noting that the concentration indices are not quantitatively substantial. This means that the extent to which the overshoots are prevalent among the nonpoor is not pronounced. A result of this is that the declines in the average exit times are marginal. For instance, after adjusting for socioeconomic inequalities in catastrophic payments, the average exit time marginally declines from 2.13 years to 2.08 years for those that exceed the 5% threshold of pre-payment income, and it minimally drops from 3.56 years to 3.54 years for those with OOP shares of ability to pay in excess of 10%. Interestingly, the null hypothesis that the concentration indices are equal to zero is rejected (results not reported in the table); suggesting that the concentration indices are statistically significant but economically insignificant.

I now turn to pure inequalities of the overshoots as measured by the Gini coefficient. The results indicate that for the two OOP shares and all thresholds, the coefficients are almost equal to one; specifically the coefficients range from 0.929 to 0.994. This means that only few households face catastrophic health care payments. When the average exit time is adjusted for this high pure inequality in the distribution of catastrophic payments, it substantially drops. For instance, households that exceed the 10% threshold of pre-payment income, their average exit time decreases from 0.573 years to 0.007 years. The equivalent change for ability to pay is that it falls from 3.556 years to 0.254 years. Thus, adjusting the average exit time for inequality crucially depends on what concept of inequality is used. When socioeconomic inequality is adopted, the changes in the exit times are quite small, however, using pure inequality leads to large reductions in the exit times.

The above results are based on the arbitrary growth rate of -2%; Figure 1 shows distribution-neutral average exit times for different thresholds and growth rates. The growth rates range from -9% to -1%. The figure shows a clear ranking in the average exit times by threshold; for any given growth rate, curves for lower thresholds are everywhere above those for higher thresholds. This means that the lower the threshold, the longer it takes to exit from catastrophic health payments. As would be expected, decreases (in absolute value) in the growth rate are associated with increases in the average exit time. Regardless of the growth rate used, and when the same threshold of 10% is adopted, the exit times are longer for the OOP share of ability to pay than the OOP share of pre-payment income. A similar picture is observed for the distribution-sensitive average exit times (figure not reported).

What growth rate is needed in order to exit in one year? The measures developed in this paper can also be used to provide answers to this question. Results in Table 4 show the relationship between exiting from catastrophic health payments in one year, and the growth rate necessary to achieve that. For both OOP shares, there is a negative relationship (in absolute value) between growth rates required to exit in one year, and thresholds. For example, as the threshold for the OOP of pre-payment income rises from 5% to 15%, the growth rate decreases from 4.25% to 0.469%. Two things are noteworthy: (i) the growth rates are lower (in absolute value) when distribution sensitivity is imposed, and (ii) they are higher (in absolute value) for the OOP share of ability to pay. This means that for households to exit from catastrophic payments in a year, the required growth rate would be smaller if one takes into account the distribution of catastrophic payments; and the required growth rate would be higher if one considers catastrophic OOP health payments in terms of households' total expenditure net of discretionary expenses.

5 Concluding Comments

The paper has proposed three measures of average exit time from catastrophic health payments; the first measure is distribution-insensitive in that it does not account for the fact that the opportunity cost of health spending is different between poor and nonpoor households. The other two measures reflect distribution sensitivity; a key difference is that one is based on socioeconomic inequalities in catastrophic health payments, and the other uses pure inequalities in catastrophic health payments. The proposed measures have been illustrated by using Malawian data from the Third Integrated Household Survey.

The empirical illustration has shown that the when threshold of pre-payment income is increased from 5% to 15%, the average exit time decreases from 2.1 years to 0.2 years; and as the catastrophic threshold rises from 10% to 40% of ability to pay, the average exit time falls from 3.6 years to 0.1 years. Using the same threshold, 10% in this case, the average exit of the OOP share of ability to pay is longer than that for pre-payment income. It has been shown that adjusting the average exit time for inequality crucially depends on what concept of inequality is used. When socioeconomic inequality is adopted, the changes in the exit times are quite small, however, using pure inequality leads to large reductions in the exit time.

The proposed measures have useful policy relevance in that public policy can be used to influence the growth rate/decay of the share of OOP health care payments. Efforts to introduce pre-payment mechanisms such as private or public insurance would lead to declines in OOP shares which in turn means that the prevalence, and hence, the exit times from catastrophic health payments would be reduced. The measures can therefore be used to perform scenarios analysis on different exit times and the growth rates required to attain them.

Two caveats are worth noting regarding the measures developed in this paper. First, the average exit time is based on best case assumptions, such as that there is a uniform and constant decay rate in OOP shares, which may not hold in reality. Second, the measures are no different from conventional measures of the incidence and intensity of catastrophic health spending in terms of how catastrophic payments are defined and identified. The conventional measures have been criticised for their failure to capture the following: cost barriers to access; differences in health care utilization by ability to pay; protection inadequacies for poor individuals; measures of illness vulnerability; degrees of financial protection and coverage; informal treatment payments; debt or credit financing of health care expenditures; reduced consumption of other household necessities; and the indirect costs of illness and strategies of coping with direct and indirect costs of illness (see Ruger (2012) for more details). The inability of the proposed measures to account for these problems means that the average exit times may actually be underestimated.

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Table 1. OOP payments for health care as a percentage of household consumption

Statistic	Share of pre-payment income	Share of ability to pay
Mean	1.35	3.69
Median	0.13	0.34
Coefficient of variation	2.50	2.10
Concentration index	0.01	-0.01
Gini coefficient	0.79	0.77
Observations	12271	12271

Note: sample weights are applied in the computation of all statistics to give population estimates

Table 2. Headcount and gap of catastrophic OOP health care payments

Threshold level	5%	10%	15%	20%	30%	40%
(a) Share of pre-payment income						
Headcount measures						
Headcount	6.89%	2.48%	1.08%			
Concentration index	-0.01	0.02	0.08			
Rank weighted headcount	6.96%	2.43%	1.00%			
Gap measures						
Mean overshoot	0.40%	0.18%	0.10%			
Concentration index	0.04	0.06	0.09			
Rank weighted overshoot	0.38%	0.17%	0.09%			
Mean positive overshoot	5.74%	7.43%	9.50%			
(b) Share of ability to pay						
Headcount measures						
Headcount		11.33%		4.27%	2.01%	0.95%
Concentration index		-0.03		0.01	0.05	0.05
Rank weighted headcount		11.62%		4.24%	1.90%	0.90%
Gap measures						
Mean overshoot		1.26%		0.55%	0.25%	0.11%
Concentration index		0.01		0.04	0.07	0.06
Rank weighted overshoot		1.25%		0.53%	0.24%	0.11%
Mean positive overshoot		11.17%		12.87%	12.67%	11.80%
Observations	12271	12271	12271	12271	12271	12271

Note: sample weights are applied in the computation of all statistics to give population estimates

Table 3. Average exit time from catastrophic OOP health payments

Threshold	5%	10%	15%	20%	30%	40%
(a) Share of pre-payment income						
Watts index	4.250	1.147	0.469			
Growth rate	-2.000	-2.000	-2.000			
Average exit time	2.125	0.573	0.234			
Concentration index of *m*	0.023	0.059	0.097			
Rank-weighted average exit time	2.075	0.540	0.212			
Gini coefficient of *m*	0.957	0.987	0.994			
Rank-weighted average exit time	0.091	0.007	0.001			
(b) Share of ability to pay						
Watts index		7.112		1.874	0.647	0.230
Growth rate		-2.000		-2.000	-2.000	-2.000
Average exit time		3.556		0.937	0.324	0.115
Concentration index of *m*		0.003		0.036	0.068	0.066
Rank-weighted average exit time		3.544		0.903	0.302	0.107
Gini coefficient of *m*		0.929		0.973	0.987	0.994
Rank-weighted average exit time		0.254		0.025	0.004	0.001
Observations	12271	12271	12271	12271	12271	12271

Figure 1. Average exit times for different thresholds and growth rates

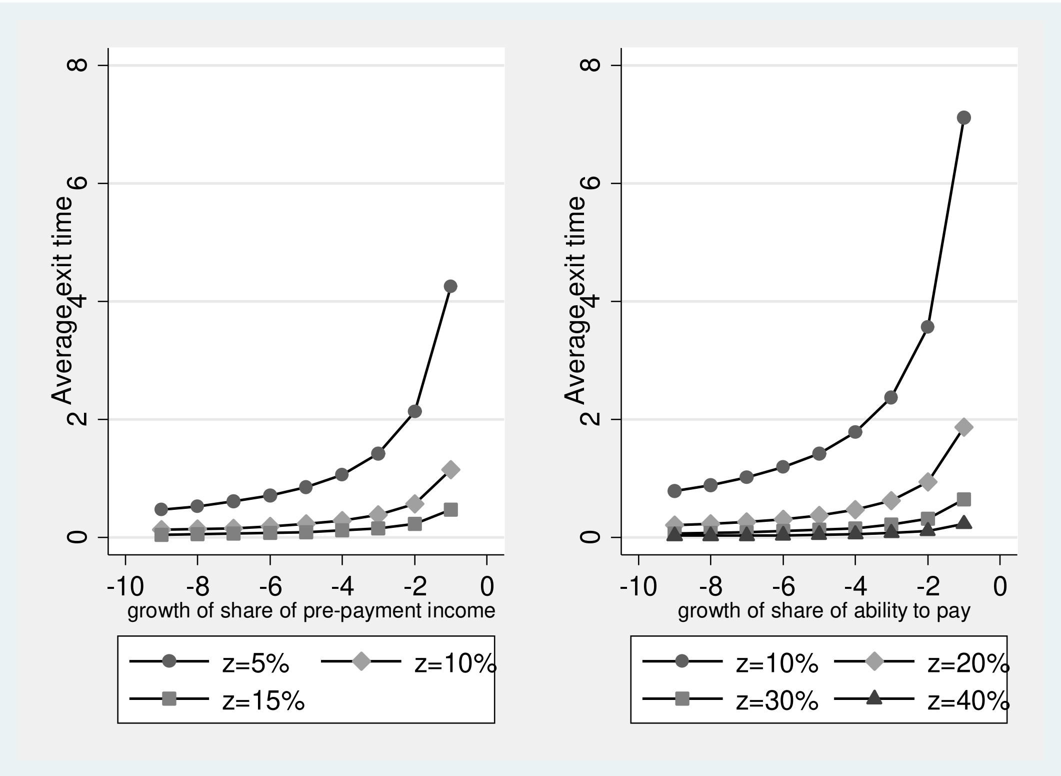

Table 4. Exiting in one year, and corresponding growth rate

Threshold	5%	10%	15%	20%	30%	40%
(a) Share of pre-payment income						
Growth rate	-4.250	-1.147	-0.469			
Growth rate (income-related inequality)	-4.151	-1.079	-0.423			
Growth rate (pure inequality)	-0.183	-0.015	-0.003			
(b) Share of ability to pay						
Growth rate		-7.112		-1.874	-0.647	-0.230
Growth rate (income-related inequality)		-7.089		-1.807	-0.603	-0.215
Growth rate (pure inequality)		-0.508		-0.051	-0.008	-0.001
Observations	12271	12271	12271	12271	12271	12271