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# Measuring Financial Protection in Health

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## Abstract

Health systems are not just about improving health: good ones also ensure that people are protected from the financial consequences of receiving medical care. Anecdotal evidence suggests health systems often perform badly in this respect, apparently with devastating consequences for households, especially poor ones and near-poor ones. Two principal methods have been used to measure financial protection in health. Both relate a household's out-of-pocket spending to a threshold defined in terms of living standards in the absence of the spending: the first defines spending as catastrophic

if it exceeds a certain percentage of the living standards measure; the second defines spending as impoverishing if it makes the difference between a household being above and below the poverty line. The paper provides an overview of the methods and issues arising in each case, and presents empirical work in the area of financial protection in health, including the impacts of government policy. The paper also reviews a recent critique of the methods used to measure financial protection.

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# Measuring Financial Protection in Health

by

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## Introduction

Health systems are not just about improving health. Good ones also ensure that people are protected from the financial consequences of illness and death, or at least from the financial consequences associated with the use of medical care. Anecdotal evidence suggests health systems often perform badly in this respect, apparently with devastating consequences for households, especially poor ones and near-poor ones. The World Bank's 50-country participatory poverty study known as *Voices of the Poor*<sup>1</sup> found that poor health and illness are universally dreaded as a source of destitution, partly because of the costs of health care but also the income lost due to illness. *Voices of the Poor* documents the case of a 26 year-old Vietnamese man who, as a result of the large health care costs necessitated by his daughter's severe illness, has moved from being the richest man in his community to being one of the poorest.<sup>2</sup> Also recorded was the case of a 30-year-old Indian mother of four who has been forced to sell the family's home and land, and has to walk 10 kilometers a day transporting wood on her head in order to finance the cost of her diabetic husband's medical care.<sup>2</sup>

How can one measure the success with which a health system protects people against the financial consequences of ill health? What do systems that do well in this regard have in common? And how far do health system reforms improve people's financial protection vis-à-vis health expenses? This paper provides an overview of the methods and issues arising in each case, and presents empirical work in the area of financial protection in health, including the impacts of government policy. The paper also reviews a recent critique of the methods used to measure financial protection.

### **Some preliminaries**

The measures of financial protection developed to date are based on people's out-of-pocket spending on medical care, and relate out-of-pocket payments to a threshold.<sup>3</sup> The idea is that out-of-pocket spending is largely involuntary and does not contribute to household well-being in the way that spending on, say, a new car does, and that a household unfortunate enough to have to spend on medical care is deprived of resources it could have used to purchase other goods and services, including necessities such as food and shelter. One approach is to classify spending as 'catastrophic' if it exceeds a certain fraction of household income. Another is to classify it as 'impoverishing' if it is sufficiently large to make the difference to the household being above the poverty line and below it, i.e. in the absence of the medical outlays the household's resources would have been sufficient to keep its living standards above the poverty line, while with the outlays its living standards are pushed below the poverty line.

Several general issues arise with these approaches. One is that the focus is on the cost of medical care. The income losses associated with illness, injury and death are not captured, even though they may be more important in terms of their impact on household welfare. The justification for this omission is that the measures aim at measuring financial protection vis-à-vis health care expenses, and that protecting households against income losses is not the business of the health financing system but of the social protection system more generally. Second, the assumptions that out-of-pocket spending on health is involuntary and that such spending automatically deprives the household of the resources in question are worth thinking about. They are discussed further below. Third, the focus on what households end up spending is argued by some to miss an

important point, namely that people may be deterred from using health services by the high out-of-pocket cost. A country where people pay little out-of-pocket (and which therefore looks good from a financial protection perspective) may be one where people do not use health services. Some argue that this ought to be captured by a measure of financial protection.

On the face of it, the suggestion that measures of financial protection should capture forgone utilization caused by a high out-of-pocket cost seems reasonable enough. But on reflection it becomes clear the suggestion is confusing policy objectives and policy instruments. Policymakers have multiple variables they wish to influence (*focal variables*), including health outcomes and people's expenditure on health (and by implication the resources people have available for other goods and services). In seeking to influence these variables, policymakers have a number of *instruments* at their disposal, including the share of the cost of health care that people pay out-of-pocket. A change in a given instrument will likely affect several focal variables. So, exempting the poor from user fees at public facilities will likely affect use of services by the poor (non-use and under-utilization by the poor should fall) *and* the amount that the poor end up paying out-of-pocket.

In a health systems assessment, the natural approach is to see how well the system fares in terms of the focal variables, and then to work backwards to see how far the performance can be attributed to the specific set policies that have been adopted. A country might do well on financial protection but poorly on health outcomes and health inequalities; the reason may be that its policies on out-of-pocket payments discourage

most people from using health services but that the health services people do use are high quality and appropriate. Another country might do poorly on financial protection and poorly on health outcomes and inequalities; the reason might be that people use services despite the high cost at the point of use but the care is poor quality or inappropriate to people's needs. This example brings home the important point that performance on financial protection depends not just on policies with respect to health financing narrowly defined but also (among other things) on the way providers are paid and regulated.

### **Catastrophic expenditures: The basics**

A natural starting point—and in many studies the stopping point—is to examine the distribution of ‘catastrophic’ health expenditures, defined as health spending that exceeds some threshold, defined usually in relation to the household’s ‘pre-payment’ income. Figure 1 illustrates. The x-axis plots out-of-pocket spending on medical care ( $M$ ) and the y-axis plots expenditure on other items such as food, housing, transport, etc., labeled non-medical spending ( $NM$ ). The budget line is a 45° line—each dollar spent on medical care means one dollar less to spend on other things. It is this fact that underpins the concern over financial protection, the view being that medical care outlays are different from spending on other goods and services, being involuntary and the response to a unwanted health shock, and having an entirely negative effect on household welfare by depriving a household of resources that could have been spent on goods and services that do contribute to welfare. In Figure 1 the household has an income equal to  $x$  (the intercept on both the x-axis and the y-axis), and spends  $M_0$  on medical care and  $NM_0$  on other items. One approach is to define out-of-pocket medical spending as catastrophic if

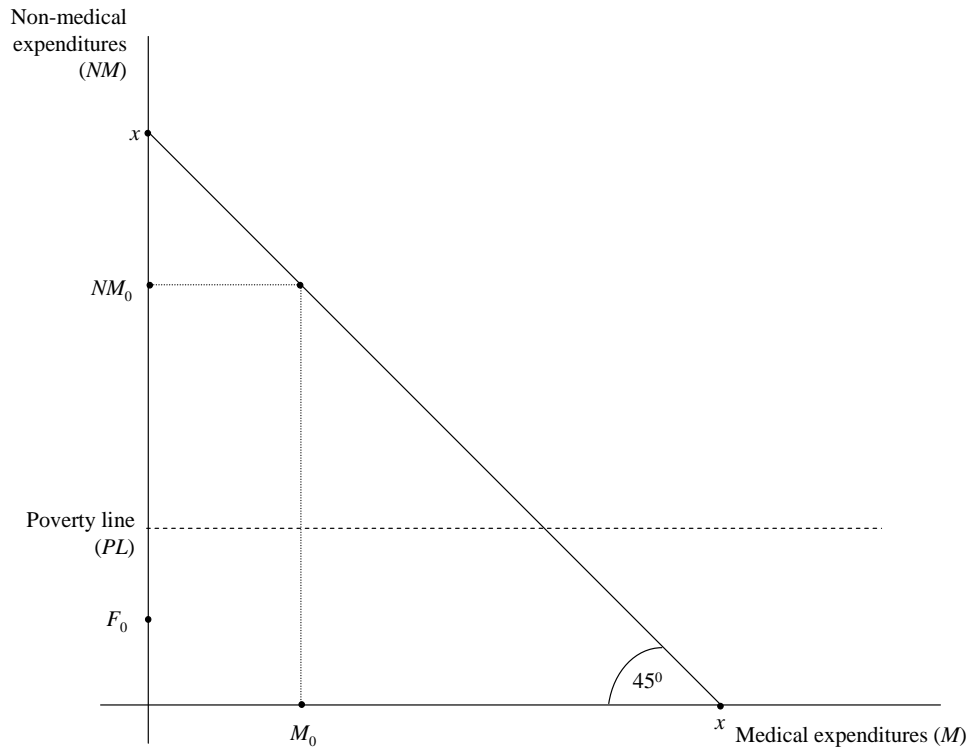
it exceeds a certain amount in monetary terms.<sup>4</sup> An alternative approach<sup>3</sup> is to say spending is catastrophic if it exceeds some specified fraction of pre-payment income,  $x$ , defined as the sum of observed medical outlays  $M_0$  and observed non-medical spending  $NM_0$ . Alternatively the threshold could be defined in terms of pre-payment income less a deduction for food and perhaps other necessities too.<sup>3,5</sup> The idea is that by subtracting a deduction for basic necessities one gets a better idea of the individual's ability to pay. One could deduct an individual's (or household's) actual food expenditure, labeled  $F_0$  in Figure 1. Or one could deduct an amount that represents society's view about the minimum acceptable level of expenditure on food (and perhaps other necessities) as reflected in a poverty line, labeled  $PL$  in Figure 1. This latter approach is problematic when a household's pre-payment income falls short of the poverty line: in this case, the household's estimated 'ability to pay' is negative and it falls below the catastrophe threshold automatically whatever its medical care outlays.<sup>3\*</sup>

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\* Xu et al.<sup>5</sup> use this approach. Their poverty line is just for food expenditures, which is subtracted apparently from non-medical consumption ( $NM_0$ ) rather than pre-payment income ( $x$ ). Ability to pay is defined as  $NM_0 - PL$  except for households for whom this is negative. In such cases, ability to pay is defined as  $NM_0$  less *actual* food expenditure. This leads to the rather unsatisfactory outcome that a household just below their poverty line could be judged to have the same ability to pay as one just above it.



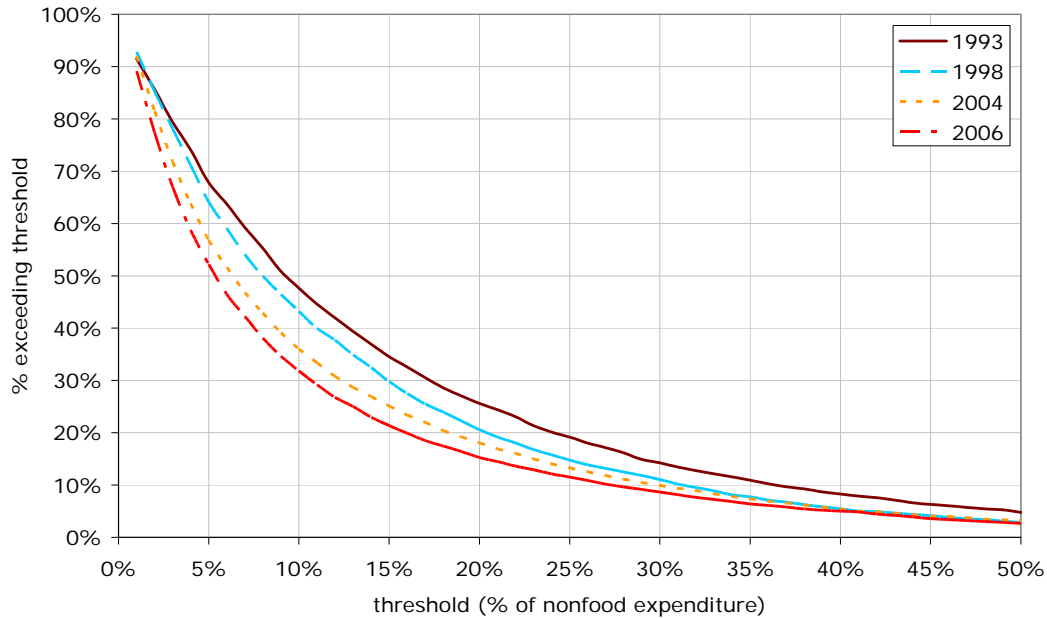
Figure 1: Defining catastrophic health spending



Source: Author.

The precise fraction of pre-payment income (with or without some deduction for basic necessities) is, of course, arbitrary, and it makes sense to examine the sensitivity of one's results to the threshold chosen. Figure 2 plots catastrophic spending curves for a variety of years for Vietnam. These curves plot on the y-axis the fraction of households experiencing catastrophic out-of-pocket spending for a given threshold on the x-axis. In this particular instance, the choice of threshold is irrelevant, and the conclusion is that the incidence of catastrophic spending has fallen continuously over the period whatever threshold is chosen.

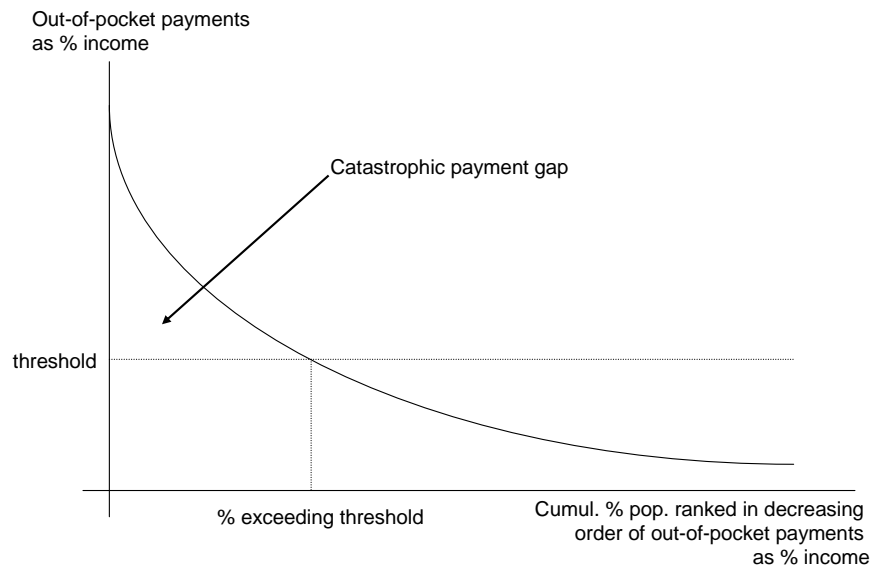
Figure 2: Catastrophic spending curves, Vietnam various years



Source: Author.

One might also want to move beyond counting the number of households who overshoot the threshold to capturing the amount by which they overshoot it, just as in the poverty literature one looks not just at the number of people in poverty but at the poverty gap—the depth below which people fall below the poverty line. The *catastrophic payment gap* is simply the aggregate or average amount by which out-of-pocket spending exceeds the threshold.<sup>3</sup> Figure 3 plots out-of-pocket payments as a share of income on the y-axis against the cumulative share of the population on the x-axis, ranked in decreasing order of out-of-pocket payments as a share of income. By reading off the curve at the threshold one gets the catastrophic payment headcount—the fraction whose payments exceed the threshold. The (aggregate) catastrophic payment gap is the area above the threshold line below the curve—it shows the overall amount by which payments exceed the threshold in the sample.

Figure 3: Catastrophic spending gap



Source: Wagstaff and van Doorslaer<sup>3</sup>.

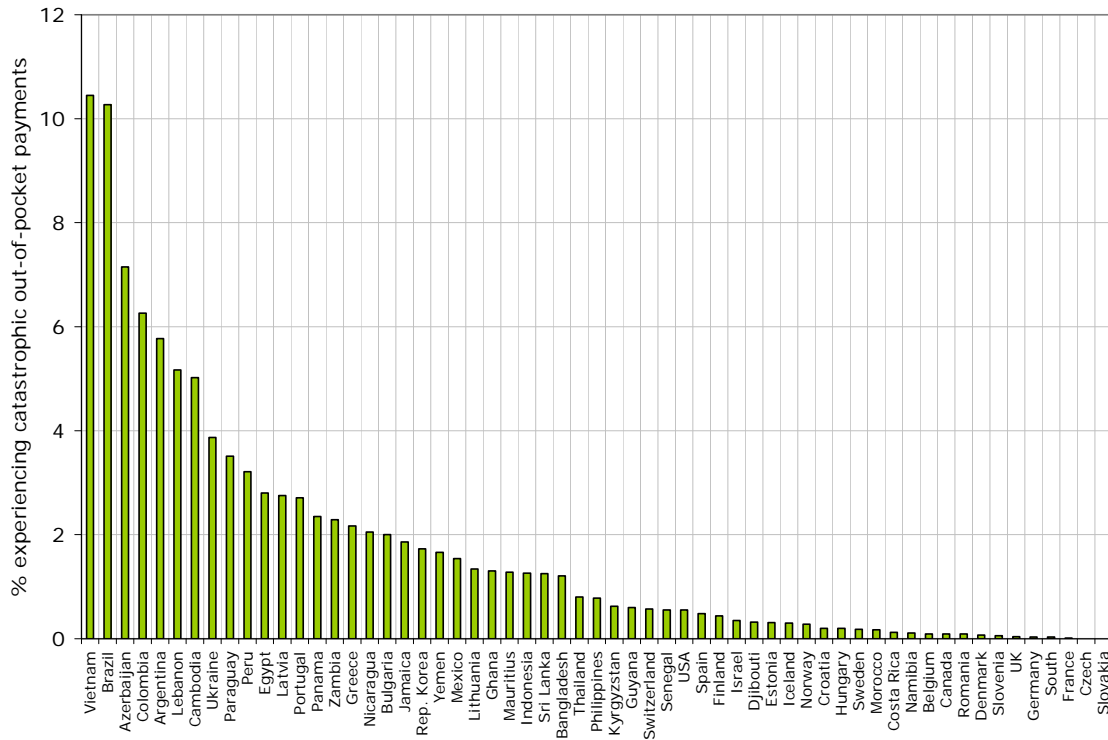
A final modification is to make some allowance for whether it is well-off households who exceed the threshold or worse-off ones. It seems likely that policymakers would be more concerned if it is the latter rather than the former. One could tabulate the incidence of catastrophic payments and the catastrophic payment gap by pre-payment income quintile, or one could compute a concentration index for each.<sup>3</sup> The concentration index for the catastrophic health expenditure ‘headcount’, for example, would be negative if catastrophic expenditures were, on average, more common among the worse off. Of course, it could be that that the fraction of the population experiencing catastrophic spending has increased over time, but has become less concentrated among the poor. A natural summary measure that takes both into account is the catastrophic payment headcount multiplied by the complement of the concentration index.<sup>3</sup> This is equivalent to constructing a rank-weighted average of the catastrophic payment indicator

(1 if the threshold has been exceeded, zero otherwise), where the weight is decreasing in the person's rank in the income distribution. If  $N$  is the sample size, the weight is 2 for the poorest person, and declines by  $2/N$  for each one-person step up through the income distribution, reaching  $2/N$  for the richest person.

### **Catastrophic expenditures: Empirical studies**

Xu et al.<sup>5</sup> report the incidence of catastrophic health spending (using a 40% threshold) in 59 countries and find large differences; their results are shown in Figure 4. Xu et al.<sup>6</sup> have recently produced estimates for 89 countries covering 89% of the world's population, again using the 40% threshold. Their estimates range from 0% in the Czech Republic, Slovakia and the United Kingdom to more than 10% in Brazil and Vietnam. Several OECD countries—Portugal, Spain, Switzerland and the United States—all record rates in excess of 0.5%.

Figure 4: The incidence of catastrophic out-of-pocket payments in 59 countries



Source: Xu et al.<sup>5</sup>

Van Doorslaer et al.<sup>7</sup> look at catastrophic spending in 10 Asian territories. They find relatively low rates in Malaysia, Sri Lanka and Thailand, and relatively high rates in China, Vietnam and Bangladesh. This study also looks at the distribution by pre-payment income of those experiencing catastrophic payments. For the most part, they find that catastrophic spending is concentrated among the better off, though this depends to some degree on the threshold chosen. Taiwan (China) is the exception: catastrophic spending is concentrated among the poor whatever the threshold. A different picture emerges in the study by Waters et al.<sup>4</sup> of the United States: they find a higher incidence of catastrophic spending among poor families, as well as those with multiple chronic conditions.

A number of studies explore how policies and institutions impact on the incidence of catastrophic health spending. Xu et al.<sup>5,6</sup> find that rates of catastrophic spending are higher in poorer countries and in countries with limited prepayment systems. In their most recent study<sup>6</sup>, they find that (controlling for whether prepayment as a share of health spending exceeds 50%) whether a country operates a tax-financed financing system or a social health insurance system makes no difference to the incidence of catastrophic spending. Looking at their cross-country differences, Van Doorslaer et al.<sup>7</sup> speculate that the low incidence of catastrophic spending in Sri Lanka, Malaysia and Thailand reflects the low reliance on out-of-pocket spending in financing health care and the limited use of user fees in the public sector. By contrast, the high rate of incidence in Korea is argued to reflect the high co-payments in that country's social insurance system and the partial coverage of inpatient care.

Several country-level studies conclude that insurance reduces the risk of catastrophic health spending. Gakidou et al.<sup>8</sup> and Knaul et al.<sup>9</sup> find that the introduction of the *Popular Health Insurance* scheme in Mexico from 2001 onwards led to a reduction in the incidence of catastrophic health expenditures. Limwattananon et al.<sup>10</sup> find that rates of catastrophic spending in Thailand were lower after the universal health care scheme was introduced in 2001. Habicht et al.<sup>11</sup> find that the risk of catastrophic spending in Estonia has increased during the late 1990s and early 2000s, and attribute this in part to rising co-payments (and hence a decrease in the depth of coverage) linked to a decline (in real terms) in government health spending, and in part to a graying of the population and the elderly having shallower coverage, especially for medicines.

Other studies point to the limitations of insurance to reduce and eliminate catastrophic spending. Wagstaff and Pradhan<sup>12</sup> find that the introduction of a social health insurance scheme in Vietnam in 1993 reduced the incidence of catastrophic expenses, while Wagstaff<sup>13</sup> finds that the subsequent extension of the scheme to the poor (financed through general revenues) also did so; however, the percentage reductions were estimated to be small, and high rates of catastrophic spending are observed even among those with insurance. One factor explaining these results is that insurance appears to have increased the utilization of services in Vietnam. Xu et al.<sup>14</sup> find that rates of catastrophic out-of-pocket spending among the population as a whole fell in Uganda after the removal of user fees in 2001; however, the rate among the poor *increased*. They speculate that this was due to the frequent unavailability of drugs at government facilities after the removal of user fees which forced patients to buy drugs from private pharmacies, and that informal payments to health workers increased to offset lost revenues from fees. Devadasan et al.<sup>15</sup> look at the effects of two community health insurance schemes in India on the risk of catastrophic out-of-pocket payments, and conclude that the schemes reduced the risk but only by half. They attribute the limited impact to benefit packages having low maximum limits, the exclusion of some conditions from the package, and the use of the private sector for some inpatient admissions.

Ekman<sup>16</sup> finds that insurance *increases* the risk of catastrophic spending in Zambia. He suggests that the amount of care per illness episode may have increased, and that quality assurance and the oversight of service providers is important in determining how far insurance reduces the risk of catastrophic spending. Three recent studies from China reinforce these points. Wagstaff and Lindelow<sup>17</sup> find that China's urban insurance

scheme *increases* the risk of catastrophic out-of-pocket spending, and attribute the results in part to weak regulation of providers coupled with a fee-for-service payments system and a fee schedule that allows providers to make profits on drugs and high-tech care results in insured patients receiving more complex care and from higher-level (and hence more costly) providers. Wagstaff et al.<sup>18</sup> find that China's new rural insurance scheme does not appear to have reduced the incidence of catastrophic health spending; they attribute this to the exclusions, high deductibles, low reimbursement ceilings, and similar supply responses to those seen in the urban setting. By contrast, Wagstaff and Yu<sup>19</sup> find that supply-side interventions in rural China (including the introduction of treatment protocols and essential drug lists) *did* reduce the incidence of catastrophic health spending.

### **Impoverishing expenditures: The basics**

A difficulty with the “catastrophic” payment approach is that it is blind as to how far ‘catastrophic’ payments actually cause hardship. One household might have spent more than 25% of its pre-payment income on health and yet be nowhere near crossing the poverty line as a result of the expenditure. Another might have spent just 1% of its pre-payment income and yet have crossed the poverty line. An alternative perspective to catastrophic health expenditures is that of impoverishment, the core idea being that no one ought to be pushed into poverty—or further into poverty—because of health care expenses.

An obvious way to proceed is to classify a household as impoverished by out-of-pocket payments on medical care if its pre-payment income ( $x$  in Figure 1) lies above the



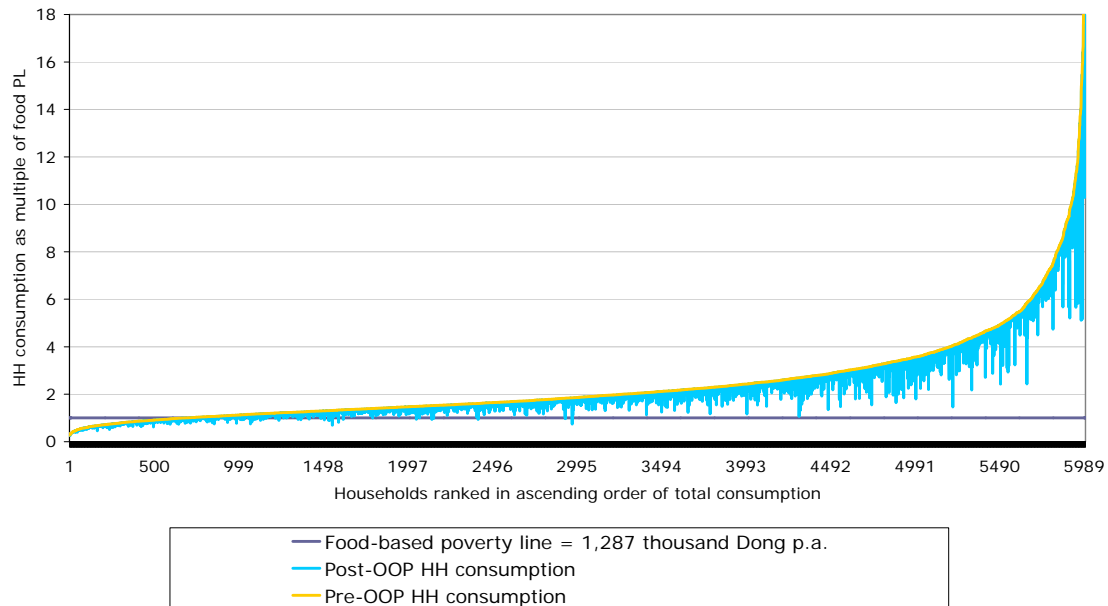
poverty line ( $PL$ ) and its non-medical spending ( $NM_0$ ) lies below the poverty line.<sup>3</sup> One could get a sense of how far out-of-pocket payments cause impoverishment by comparing the pre-payment poverty headcount (the fraction of households for whom  $x > PL$ ) with the post-payment poverty headcount (the fraction of households for whom  $NM_0 < PL$ ) to get the fraction of the population crossing the poverty line as a result of health expenditures. This approach does not capture *how far* people are pushed below the poverty line as the result of health spending, and does not capture the possibility that health spending may push households who are already poor in terms of their pre-payment discretionary income even poorer. To get at this, one can compare the pre-payment poverty gap (the aggregate shortfall from the poverty line using pre-payment income  $x$  as the living standards measure) with the post-payment poverty gap (the aggregate shortfall from the poverty line using non-medical spending  $NM_0$  as the living standards measure).

### **Impoverishing expenditures: Empirical studies**

Wagstaff and van Doorslaer<sup>3</sup> look at health care payments and poverty in Vietnam in 1993 and 1998. Figure 5 shows their pre-payment income Pen parade for Vietnam in 1998. Also shown in this ‘paintdrip’ chart are the out-of-pocket payments of the households in the chart, along with a food-based poverty line. The difference between the pre-payment and post-payment poverty headcount is around 3.5 percentage points, while the difference between the pre-payment and post-payment (normalized) poverty gaps is around one percentage point. In 1993, the difference between the pre-payment and post-payment poverty headcounts was 4.4 percentage points, so that the fall in the headcount

is larger for post-payment income than for pre-payment income. This reflects the fall in the share of income absorbed by health spending over this period in Vietnam.<sup>20</sup>

Figure 5: Out-of-pocket payments and poverty, Vietnam 1998



Source: Wagstaff and van Doorslaer<sup>3</sup>.

Results for rural China over the same period show a reduction in the difference between pre-payment and post-payment headcounts.<sup>21</sup> However, Gustafsson and Li<sup>22</sup> find the opposite result in their analysis of changes between 1988 and 1995: the poverty headcount fell by 2.2 percentage points at the dollar-a-day poverty line if health expenditures are not deducted from disposable income and by only 0.7 percentage points if they are. This reflects the fact that the share of income spent on health care increased in rural China during the period 1988-95.

A couple of studies have looked at trends before and after the introduction of a reform. Limwattananon et al.<sup>10</sup> find that rates of impoverishment in Thailand were lower

after the universal health care scheme was introduced in 2001, but not zero. They attribute the failure of the scheme to eliminate impoverishment from out-of-pocket expenses to people bypassing their designated provider and hence making themselves unnecessarily liable for out-of-pocket payments and non-coverage of certain interventions including renal dialysis and chemotherapy. Knaul et al.<sup>9</sup> report that the difference between the pre-payment and post-payment poverty gap narrowed following the introduction of the *Popular Health Insurance* scheme in Mexico.

Van Doorslaer et al.<sup>23</sup> use data from 11 Asian countries to compare pre-payment and post-payment poverty headcounts and poverty gaps using the World Bank's dollar-a-day poverty line (as well as its \$2-a-day poverty line). They find that the dollar-a-day poverty headcount is, on average, almost three percentage points higher after deducting out-of-pocket spending from household consumption. In Bangladesh and India, the difference is almost four percentage points. In Malaysia and Sri Lanka, by contrast, the difference is just 0.1 and 0.3 percentage points respectively.

### **Is health spending involuntary?**

Both the catastrophe and impoverishment approaches outlined above make two key assumptions. The first is that health care payments ought to be thought of as involuntary and non-discretionary—the result of a “shock”, unforeseen and unwanted, rarely the result of a deliberate choice by the individual concerned. Health care payments, in this view, stand apart from other items of household consumption that contribute to household welfare or utility.

This view could be—and sometimes is—challenged. In some cases there may well be some discretion (at least at the margin) over health expenditures. However, in most cases, it seems more reasonable to treat health spending as non-discretionary and to view it as not contributing to household welfare. This would point to *not* including it with other items of household spending in consumption aggregates in studies of household living standards. This is the conclusion that Deaton and Zaidi<sup>24</sup> reach based in part on the low income-elasticities of health spending they find in six out of the seven developing countries they study. Burtless and Siegel<sup>25</sup> also argue for this approach in their discussion of proposals to take explicit account of health care spending in computing US poverty rates.

While treating health expenditures as involuntary seems reasonable, the implied practice of not including out-of-pocket spending in consumption aggregates when measuring poverty is often not followed. The World Bank's official dollar-a-day poverty figures, for example, are actually based on measures of household consumption that include out-of-pocket spending on medical care. This makes for lower poverty rates than would be the case if out-of-pocket spending on medical care were treated as involuntary and excluded from the consumption aggregate.<sup>23</sup>

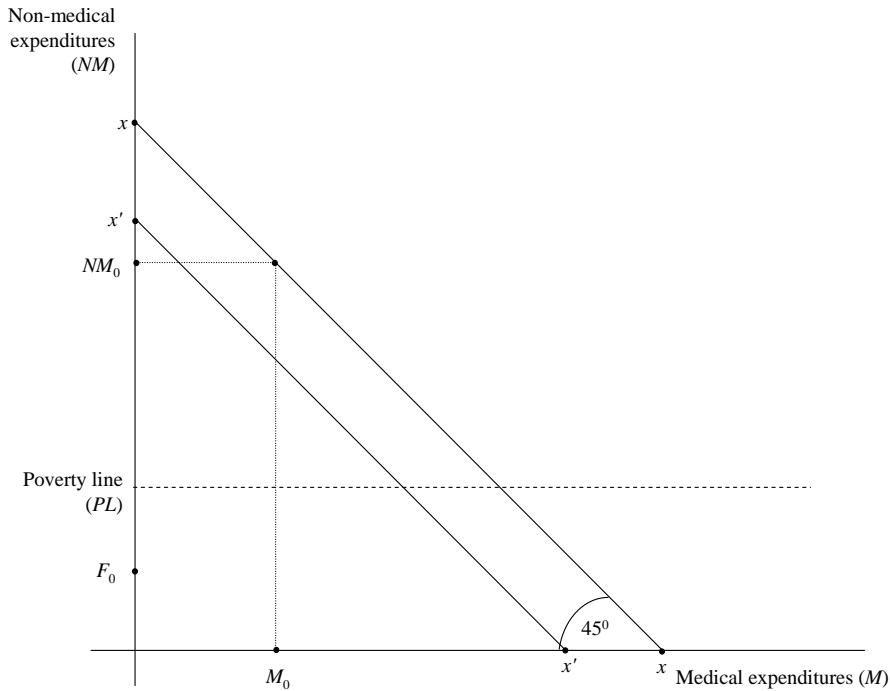
### **Asset sales, dissaving and borrowing**

The second assumption underpinning the approaches above is that the household's non-medical expenditure in the period under consideration would have increased by an amount equal to its out-of-pocket expenditures on medical care had it not been forced to incur the out-of-pocket spending. The assumption, in other words, is that

the household was forced to finance the health spending entirely out of its current non-medical consumption.

The assumption breaks down if the household is able to finance some or all of the expenditure by running down its stock of financial and physical assets, or by borrowing. In both cases, current income (gross of proceeds of asset disposals and loans taken out) is higher when medical costs are incurred than when they are not. Figure 6 illustrates. The household is observed spending  $M_0$  on medical care and  $NM_0$  on other things. Had the household member needing medical care not fallen ill, the household's income would have been  $x'$  not  $x$ . The difference between the two reflects the proceeds of asset sales or funds received through a gift or loan. The drop in non-medical consumption caused by the use of medical care (ultimately the quantity of interest) is equal to the difference between  $x'$  and  $NM_0$ . This is less than out-of-pocket spending  $M_0$  in cases as that illustrated in Figure 6 when people are able to borrow or sell assets to reduce the impact of health spending on non-medical consumption. Indeed, it may well be that the household is completely able to smooth its non-medical consumption in the face of health shocks that necessitate health expenditure. In this case,  $x'$  and  $NM_0$  coincide Figure 6, and the medical expenses cause no reduction in non-medical consumption. The case illustrated is where the household is only partially to smooth non-medical consumption in the face of health shocks, and non-medical consumption is cut back in the period when the health shock occurs, but the reduction is less than the amount of the medical expenditure. Only in the extreme case where the household is unable to use savings or borrow is the reduction in non-medical consumption equal to the amount of health expenditures—the case illustrated in Figure 1.

Figure 6: The case where health spending is not financed out of current income

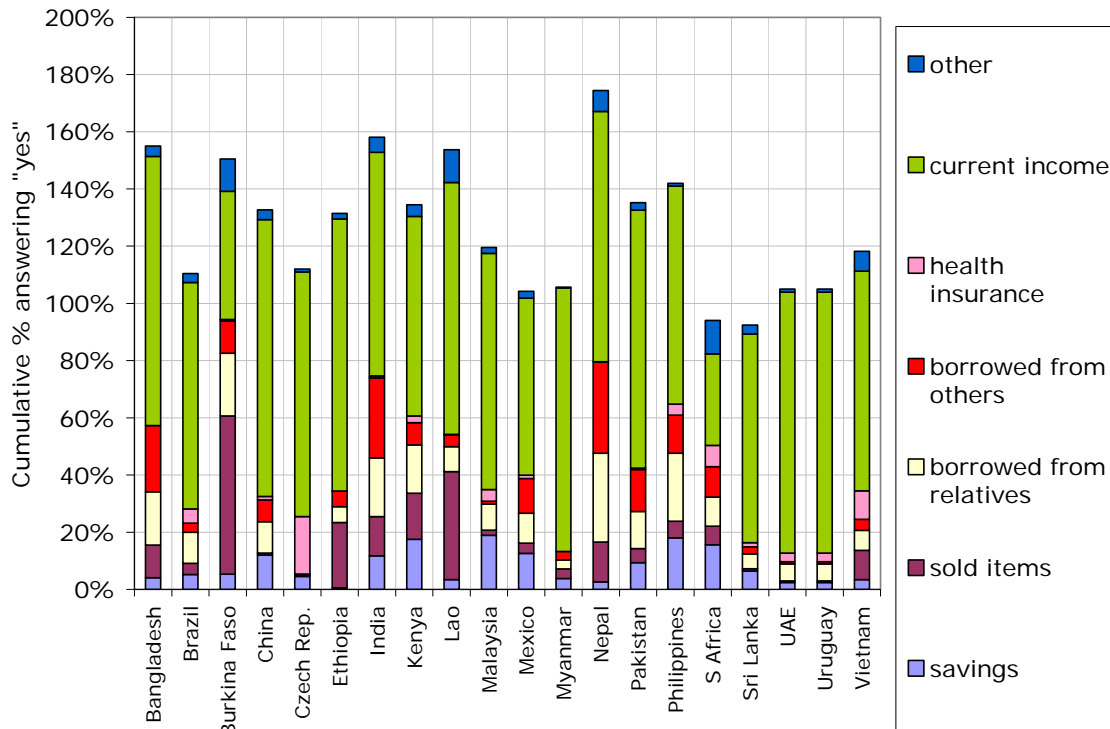


Source: Author.

Empirical evidence suggests that people are indeed able to prevent drops in non-medical consumption by selling assets or borrowing. The *World Health Survey* (WHR) asks people how they financed their health expenditures. Respondents were able to choose any or all of the following sources: “savings”; “selling items”; “borrowing from relatives”; “borrowing from others”; “health insurance”; “current income”; and “other”. Figure 7 shows the cumulative percentages for a selection of countries. If people used all seven sources, the y-axis would be 700%. In a country with a pre-payment scheme financed out of general revenues and where nobody pays anything out-of-pocket, it seems likely that people would answer No to all seven questions, since people may well not see the pre-payment scheme as insurance. This explains why S Africa and Sri Lanka average less than 100%. The clear message from Figure 7 and from other surveys is that people do indeed borrow, sell assets and dissave to protect their living standards in the face of

health shocks that necessitate out-of-pocket spending on medical care. The mix of strategies varies from country to country. Countries where asset disposals feature prominently are likely to be those where households find it difficult to get credit.

Figure 7: How households finance their health spending, selected countries



Source: World Health Surveys: <http://www.who.int/healthinfo/survey/whsresults/en/index.html> .

Irrespective of whether it is asset sales, dissaving or loans that are being used to protect living standards in the face of health shocks, it is important to allow for such strategies when estimating the degree of financial protection people enjoy vis-à-vis health expenditures. Failure to do so will result in an overestimate of the extent to which health expenditures are catastrophic and impoverishing, and an underestimate of the degree to which—through one method or another—people enjoy financial protection vis-à-vis health expenditures. As far as catastrophic spending is concerned, the numerator

(originally  $M_0$ ) ought to be replaced by the drop in non-medical consumption caused by the medical expenditure, i.e.  $x' - NM_0$  in Figure 6, while the denominator (originally  $x$ ) ought to be replaced by the amount of non-medical consumption that would have been enjoyed in the absence of the health shock, i.e.  $x'$  in Figure 6. In the case of impoverishment, the pre-payment headcount ought to be assessed on the basis of  $x'$  rather than  $x$ , while the post-payment poverty headcount is still to be computed using observed non-medical consumption,  $NM_0$ . Factoring in dissaving, asset sales and borrowing also casts further doubt on the practice of including out-of-pocket payments in the consumption aggregate when measuring poverty.<sup>23</sup> A household may have been pushed above the poverty line in terms of its combined non-medical and medical expenditure by its medical outlays financed largely by dissaving and borrowing. A health financing reform that cuts out-of-pocket payments and reduces the need for households to dissave and borrow would end up increasing measured poverty!

Modifying estimates of catastrophe and impoverishment to take into account dissaving, asset sales and borrowing requires that one have an estimate of the counterfactual income  $x'$ —the household's income in the absence of the health expenditures. Most household surveys do not even ask how households financed their health expenditures (the *WHR* is one of the few that does), let alone how much was raised by selling assets or borrowing. Such questions are sometimes asked in specialized vulnerability surveys, but rarely in health surveys. The 1995 *Indian National Sample Survey* is an exception. In their analysis of the data, Flores et al.<sup>26</sup> find that heavy use of coping strategies, including drawing down of savings, asset sales, borrowing, and transfers. They find such strategies finance three-quarters of the cost of inpatient care in



rural areas and two-thirds of the cost in urban areas. They also find that hospital costs are fully financed from these sources by 52% of rural households and 44% of urban ones. Not taking into account the use of coping strategies to protect current income suggests that 2.2% of rural Indian households incur catastrophic payments for inpatient care using a 5% threshold. Making the adjustments outlined above reduces the estimate to just 0.2%. The magnitudes are similar for urban households. Flores et al.<sup>26</sup> find similarly dramatic differences for impoverishment. In rural areas, the poverty headcount corresponding to  $NM_0$  in Figure 6 (actual non-medical consumption) is 39.45%, while the headcount corresponding to  $x$  (the naïve estimate of what non-medical consumption would have been in the absence of medical outlays) is 8.94%. The naïve approach would lead one to conclude that out-of-pocket payments have raised poverty dramatically. However, the headcount corresponding to  $x'$  (what non-medical consumption would have been in the absence of medical outlays, factoring in people's coping strategies) is just 39.39%, barely different from the actual poverty rate.

These results point to households being fairly able to smooth their non-medical consumption in the face of large outlays on medical care. On the face of it, they seem at odds with the econometric literature that looks at the effects of health shocks on household non-medical consumption. That literature typically finds that households are *not* able to smooth consumption in the face of health shocks, at least large ones.<sup>27,28</sup> However, outlays on medical care are just one channel through which health shocks have an effect on non-medical consumption. Losses in earned income (possibly offset at least in part by increases in unearned income) are the other and possibly more important channel, and evidence suggests that households are unable to smooth consumption in the

face of income shocks.<sup>29</sup> The two literatures are therefore not, in fact, at odds with one another.

### **Asset sales, dissaving and borrowing: Intertemporal considerations**

What the argument of the previous section misses, as Flores et al.<sup>26</sup> acknowledge, is that households still have to incur costs in financing their out-of-pocket payments. When they borrow, they have to repay in subsequent periods, possibly at very high interest rates, and when they sell their assets or dissave, in subsequent periods they forgo returns on the assets and savings.\* These costs ought not to be disregarded when measuring catastrophic and impoverishing payments.

Consider the example of the Indian high-spending household on p.xxx of Flores et al.<sup>26</sup> The household's per capita consumption is Rs. 6866 and its inpatient out-of-pocket payments are Rs. 2760. To finance these payments, the household borrows Rs 1020, draws Rs 823 from savings, gets Rs. 298 from asset sales, finds Rs. 439 from other sources, and pays Rs. 180 out of current income. Flores et al. focus on the Rs. 180 financed out of current income and ignore the other expenses. They compute the coping-adjusted expense ratio as 180 (the amount financed out of current income) divided by 4286 (the consumption of 6866 less the out-of-pocket payments financed through coping strategies 2580), which is just 4%, one tenth of the conventional ratio of out-of-pocket spending divided by consumption ( $2760/6866=40\%$ ). Even for the current period, 4% is likely to underestimate the hardship caused by medical care costs: forgone returns start

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\* It may also be the case that if they had been covered by insurance against the out-of-pocket payments and therefore faced less uncertainty over future expenditures, they would have held their wealth in a less liquid form and enjoyed a higher return in periods prior to the health shock.

accruing as soon as the assets are disposed of and the savings are cashed in; and loan repayments are likely to start well within 12 months of the expenses being incurred. In any case, one would not want simply to ignore costs incurred beyond the current period.

What might the time path of expenses look like for this Indian household? Banerjee and Duflo<sup>30</sup> report monthly interest rates among India's poor of 3-4%. If the loan of Rs. 1020 were paid back over 3 years, and the monthly interest rate were 3.5%, the household's annual repayments would be Rs 607. Suppose that in the absence of medical care expenses that forced the household to sell assets and draw down its savings, the household would have kept its savings and assets for 3 years, and that each would have earned a rate of return of 10% p.a. Then, on average, the Rs 823 of savings and the Rs. 298 of assets would have produced annual returns of Rs. 95 and Rs. 34 respectively. Adding up interest paid on the loan and forgone returns on assets and savings gives a total cost of Rs. 736 per annum for each of the three years following the inpatient expenditure. This can be compared with the household's per capita consumption in the absence of the interest payments and forgone returns: Rs. 4842 (=6866-2760+736). The ratio of 736 to 4842 is 15%, considerably less than the 40% from the naïve calculation but a good deal higher than the 4% from the calculation above and at least according to some thresholds might be considered 'catastrophic'. Obviously these calculations hinge on assumptions about the duration of the loan, the interest rate, the number of years the assets and savings would have been held in the absence of the shock, and the rate of return the household would have earned on them.

This takes us some way toward a truer picture. But we are still missing something. We are overlooking the fact that households are likely to incur at least some medical outlays every year—possibly even quite high ones several years in a row. So, while it is true that a health shock in year  $t$  may not cause a major drop in consumption in year  $t$  (if any) because the household borrows to finance the cost of medical care, it is also possible that the household may already be paying off a loan that it was forced to take out in year  $t-2$  when it suffered another health shock. This is more likely the more highly correlated health expenditures are at the household level over time. The rank correlation for health expenditures over the five years between the two waves of the Vietnam 1993-98 Living Standards Measurement Study panel is 0.36, lower than the rank correlation for non-medical consumption (0.66), but still quite high. Over the two years between the two waves of the China panel used by Wagstaff et al.<sup>18</sup> the rank correlation for medical outlays at the household level is 0.31, compared to 0.66 for household income. With correlations of this size, episodes of coping with expenses incurred following health shocks will likely overlap. In the example above of the Indian household, this would mean that one might need to add to the estimated interest payments and forgone returns on assets and savings incurred in respect of the medical bill of Rs. 2760 further interest payments and forgone returns incurred in respect of earlier health expenses. Thus Flores et al.'s 15% figure is likely to be an underestimate of the hardship caused by medical bills, possibly a considerable underestimate.

## Conclusions

A good deal of progress has been made on designing measures of financial protection in health and in implementing them. Perhaps inevitably, however, the work is incomplete. On the measurement front, the main challenge at present seems to be how to take into account how people finance their medical outlays and when they incur the costs. The recent literature is right to reiterate that households may not—contrary to what is assumed by the naïve approach used to date—experience much of a drop in living standards in the period when the outlays are made. But households do nonetheless have to make sacrifices at some stage. By borrowing, they are able to defer the sacrifice and spread it over multiple periods, though the high interest rates they are likely to pay will add to the bill. Furthermore, we need to be alive to the fact that households are unlikely to incur out-of-pocket payments on a one-off basis, but rather are likely to incur at least some expenses every year. A household may borrow to finance a medical care bill precisely because it has not yet paid back a loan taken out to finance a bill paid in a previous year. The challenge is to move from the snapshot approach where it is assumed that outlays entail consumption sacrifices in the period when the outlay is incurred to an intertemporal approach where one estimates the (possibly quite different) time paths of outlays and forgone consumption.

In the meantime, the naïve approach should not be discarded. True, it has the defect of assuming that consumption drops *pari passu* with medical outlays, and is therefore likely to be an upper bound on the true estimate of hardship caused by out-of-pocket spending. But it has the merit of capturing the amount of money that households have—one way or another—to find, and relating it to their standard of living.

Furthermore, it can be implemented with a standard household expenditure or multipurpose survey. By contrast, the alternative approach focuses (purportedly) on costs incurred in the current period, ignoring costs incurred in other periods. Because of this, and because it overlooks the fact that some costs (e.g. forgone returns on assets and loan repayments) are likely to be incurred in part in the period when the medical bills are incurred, it is likely to provide a lower bound, possibly a highly conservative one.

Subject to the caveats associated with the naïve methods of measuring financial protection, some general points emerge from the empirical literature. Financial protection in health appears to vary across countries. In part this reflects the role of per capita income: on average, higher rates of catastrophic payments are found in poorer countries, so that the world's poor who can least afford large out-of-pocket payments for health care at greatest risk. However, differences exist across countries within income groups. These differences appear to reflect in part income inequality, but also the extent to which health care payments are pre-paid through some form of insurance.

The role of insurance or pre-payment comes through in country studies: expansion of coverage tends to reduce the incidence of catastrophic spending and impoverishment, while a reduction in the depth of coverage has tended to be associated with higher rates. Caveats emerge, however. Studies point to a variety of factors that together influence the size of the effect of insurance on financial protection: insurance tends to increase the *quantity* of care received, putting upward pressure on out-of-pocket payments; some benefit packages are not especially generous, with high deductibles, high co-insurance rates, low reimbursement ceilings and multiple exclusions; providers may

not be properly compensated by third-party payers and may look to informal payments to make up for lost income and be unable to procure drugs on the terms offered by the third-party payer; and so on. Recent research suggests, in fact, that in China it is supply-side interventions (treatment protocols, drug lists, etc.) that have had more success in improving financial protection than expansion of insurance coverage. This reinforces a point made earlier in the paper, namely that policymakers have a variety of instruments available to them to increase financial protection in health; insurance coverage, while an important one, is not the only one, and may not be the most effective everywhere.

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