

Non Evidence-Based Policy: How Effective is China's New Cooperative Medical Scheme in Reducing Medical Impoverishment?

by

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Abstract

With the goal of protecting its rural population from impoverishment by medical expenses, China began rolling out the New Cooperative Medical System (NCMS) in 2003 with significant government investment. The prevailing model of NCMS combines medical savings accounts with high-deductible catastrophic hospital insurance (MSA/Catastrophic). To assess the effectiveness of this approach, we--using household survey data linked to claims records of health expenditures--simulated the effect of MSA/Catastrophic in reducing the share of individuals falling below two different poverty lines (headcounts) and the amount by which household resources fall short of the poverty lines (poverty gaps) due to medical expenses. We compared the effects of MSA/Catastrophic to Rural Mutual Healthcare (RMHC), an alternate model which provides first dollar coverage for primary care, hospital services and drugs without any deductible but with lower ceilings, for a similar premium. Under the internationally-accepted poverty line of US\$1.08 per person per day, the MSA/Catastrophic models would reduce the poverty headcount by 3.5-3.9%, the average poverty gap by 11.8-16.4% and the positive poverty gap by 8.3-13.1%. By comparison, RMHC would reduce the poverty headcount by 6.1-6.8%, the average poverty gap by 15-18.5% and the positive poverty gap by 11.1-13.3%. Similar results were found using the Chinese official poverty line of 663 RMB (US\$83). The primary reason for the poorer performance of NCMS is

that its design was not evidence-based. It does not address a major cause of medical impoverishment—expensive outpatient services for chronic conditions. Without first examining the disease profile and health expense pattern, the government’s investment would be only marginally effective in achieving its goal in preventing medical impoverishment. A lesson from our study is that, in settings where resources are limited, it is not necessarily true that insurance coverage focusing on expensive hospital care is the most effective in providing financial risk protection, when chronic diseases impose a growing share of the burden on the population in developing countries

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Introduction

China's reform of rural health care has been breathtaking—since its inception in 2003, 396 million farmers, close to 50% of the Chinese rural population, have already been covered by a new government-run voluntary insurance program, the New Cooperative Medical System (NCMS). By 2008, NCMS is targeted to reach 100% of China's rural population (Central Committee of CPC, 2002). The Chinese government has allocated significant resources to NCMS, targeting the poorer Western and Central regions. One of the primary goals of NCMS is to prevent rural residents from being impoverished by medical expenses. How efficacious is NCMS in achieving this goal? This paper provides an evidence-based answer. We conducted a static simulation exercise to assess the effectiveness of the predominant models of NCMS—combining medical savings account (MSA) with hospital insurance with high deductibles--in reducing medical impoverishment, and compared them to an alternative model—Rural Mutual Health Care (RMHC), which provided first-dollar coverage of both outpatient and inpatient services. Our analysis focuses on the Western and Central regions, where approximately 500 million of China's rural population lives and where household impoverishment by medical spending is most acute.

The next section provides a brief overview of China's rural health care and the latest policy developments. It then describes the designs of the most common model of NCMS in the Western and Central regions and contrasts it to the RMHC. Next we discuss the data and method of analysis, followed by the results and discussion.

China's Rural Health Care and Policy Developments

From the early 1950s to 1980, China had a strategy for rural health care that emphasized prevention and basic health care. Near-universal insurance coverage was provided by the Cooperative Medical System (CMS) in the rural areas. Primarily financed by the welfare fund of the communes (collective farming), the CMS organized health stations, paid village doctors to deliver primary care, and provided drugs. It also partially reimbursed patients for services received at township and county facilities. At its peak in 1978, CMS covered 90 percent of China's rural population. This system made basic health care accessible and affordable and also offered peasants financial protection against large medical expenses.

When China reformed its rural economy in 1979 and introduced the Household Responsibility System, the communes disappeared and without its funding base, CMS collapsed, leaving 90% of all peasants uninsured. Village doctors became private practitioners with little government oversight, earning their income from patients on a fee-for-service basis. Furthermore, like all transitional economies, China experienced a drastic reduction in its revenue during its economic transition, which in turn reduced the government's capacity to fund health care. Government subsidies for public health facilities fell to a mere 10% of the facilities' total revenues by the early 1990s. To keep health care affordable, the government maintained its strict price control by setting prices for basic health care below cost. At the same time, the government wanted facilities to survive financially, so it set prices for new and high-tech diagnostic services above cost

and allowed a 15% profit margin on drugs. These created perverse incentives for providers who had to generate 90% of their budget from revenue-generating activities, turning hospitals, township health centers and village doctors all alike into profit seeking entities. Subsequently, providers over-prescribe drugs and tests and hospitals race to introduce high-tech services and expensive imported drugs that give them higher profit margins (Liu and Mills 1999). For example, 75% of patients suffering from a common cold are prescribed antibiotics, as are 79% of hospital patients – over twice the international average of 30% (Zhou). Health care expenditure soared, growing at 16% per year—7% faster than the growth of GDP, and patients' out of pocket health expenditure grew at an average rate of 15.7% from 1978-2003 (Blumenthal and Hsiao 2005; Smith 2005). Besides, village doctors often use fake or expired drugs which they bought at a lower cost but charged at the official prices in order to increase their profits (Blumenthal and Hsiao 2005).

In under two decades, China had transformed its rural health care system from one that provided prevention and affordable basic health care to all to one in which people cannot afford basic health care and many families are driven into poverty due to large medical expenses (Hsiao 1984; Hesketh 1997a; Hesketh 1997b; Lindelow 2005; Watts 2006; Watts 2007). The 2003 National Health Survey (Center for Health Statistics and Information 2004) found that 46% of the rural Chinese who were ill did not seek health care and among them, 40% cited cost as the main reason. Another 22% of those who were advised by physicians to be hospitalized refused to do so because they could not afford it. Of those who did become hospitalized, about 35% discharged themselves

against their doctor's advice because of cost. Studies have found that medical expenditures accounted for 30-40% of poverty (Center for Health Statistics and Information 2004; Watts 2006).

The public has expressed its discontent with unaffordable access and medical impoverishment (*kan bing nan, kan bing gui*) through thousands of organized protests throughout the country that have attracted frequent media attention (Geng, 2006; Watts, 2007). The current Chinese leaders, who give high priority to social development and building an equitable society, have finally responded to this dissatisfaction and initiated the NCMS program (Anonymous, 2003). Indeed in October 2006, the Chinese government announced that its new guiding principle will be *people-centered*: it will strive to build a harmonious society through balancing economic and social developments (Zhu 2006). Under this principle, health has been identified as a top social priority. President Hu promised a "bigger government role in public health, with a goal for everyone to enjoy basic health care service to continuously improve their health and well being" (Feng 2006). These concerns, together with growing tax revenue generated by a thriving economy, have led to the introduction of several major reform initiatives, including the NCMS, which is intended to serve as the new foundation for China's rural health care.

The primary goals of the NCMS are to prevent farmers from being impoverished by medical expenses and to reduce inequalities in care between China's rich and poor communities. Conspicuously absent from the stated goals are improvement of health and

reduction of the considerable waste in health care delivery as discussed in the previous section. The Chinese government has allocated significant new resources to the NCMS, targeted towards the poor Western and Central regions. For the program's initial waves, the government subsidized each farmer in these provinces 20 RMB (1 RMB = US\$ 0.125) annually, shared equally between the central and local governments, if the farmer pays an annual premium of 10 RMB to enroll in the NCMS (Central Committee of CPC, 2002; Watts, 2006).

The NCMS incorporates two important policy features: voluntary enrollment and coverage of catastrophic illnesses (Central Committee of CPC, 2002). The voluntary feature was adopted to overcome public resistance to pay any money into a government-run insurance program because people do not trust local governments that have imposed many taxes and fees on them and often the funds collected were misused or lost to corruption. The emphasis on covering catastrophic illnesses came from the desire to prevent the Chinese from being impoverished by major illnesses. Apart from these, the design of the program is left to the local governments. Consequently, a variety of models emerged, many of which were not designed based on evidence.

Benefit Designs of NCMS and a Social Experiment—Rural Mutual Health Care

In low-income countries where resources are limited, a key challenge in benefit design of health insurance is whether to allocate the limited resources for first-dollar coverage or for providing insurance against expensive hospital services with high deductibles. For the

objective of protecting households from medical impoverishment, the conventional wisdom has been to target resources for providing insurance against “catastrophic” inpatient expenses, under the rationale that most households generally are able to afford expenses of minor illness (Gertler & Gruber, 2002; Gertler & Solon, 1999; Morduch, 2003). However, there is increasing empirical evidence that non-hospital expenditures contributed to a significant share of medical impoverishment. For example, using data from Vietnam, Wagstaff and van Doorslaer (2003) showed that household spending on ambulatory services and drugs, rather than hospitalization, was the primary contributor to medical impoverishment. Other studies from Mexico and Uganda also confirmed the role of spending on ambulatory services in driving households into poverty (Knaul, Arreola-Ornelas, Mendez & Miranda, 2005; Xu, Evans, Kadama, Nabyonga, Ogwal, & Nabukhonzo et al., 2006). Yet, most insurance schemes in developing countries still focus solely on covering hospital expenses as the means of providing financial risk protection (Devadasan, Criel, van Damme, Ranson & Van der Stuyft, 2007; Ranson, 2002; van Damme, van Leemput, Por, Harderman, & Meessen, 2004).

With a total contribution of 30 RMB, what services should NCMS cover if reducing medical impoverishment is the policy objective? This is a challenge given that health expenditure per person in the Western and Central regions of China averages about 150-180 RMB. We here describe the most commonly-found model of NCMS in the Western and Central region of China and an alternative model which the authors designed and experimented.

NCMS Models in the Western and Central Regions

With the goal of reducing medical impoverishment, the majority of NCMS also focuses on insuring expensive hospital services. A survey of 354 counties in China found that most NCMS models covered only inpatient services, some covered inpatient plus several selected outpatient services for major acute illnesses, and a small proportion covered both inpatient and outpatient services (Mao, 2005). All of them had high coinsurance rates and reimbursement caps, and many also required a deductible.

In the Western and Central regions, the most commonly found model combines a medical savings account and high-deductible catastrophic insurance (MSA/Catastrophic) for inpatient services (Mao, 2005). Of the 10 RMB premium, 8 RMB is put into an MSA to pay for outpatient visits and can be shared among household members. The government's 20 RMB subsidies plus the remaining 2 RMB premium are pooled to cover inpatient hospital expenses above a certain deductible. In some cases, the deductible applies to annual accumulated hospital expenses. In other cases, the deductible is applied to each individual admission. The amount of the deductible varies from place to place, with the majority of them at least above 400 RMB. Besides the deductible, patients still have to pay 40-60% of covered inpatient expenses. The benefit package also caps the benefit payment at 10,000-20,000 RMB (Center for Health Management and Policy, 2006; Wang, 2006).

A Social Experiment—Rural Mutual Health Care

In late 2002, when the government announced its intention to establish NCMS for rural China, our project developed a community-based prepayment scheme, RMHC, and experimented it in three towns in two Western/Central provinces—a total population of 60,000. These towns are fairly representative of the socioeconomic conditions in China's low-income regions. In 2003, the average annual income and out-of-pocket health expenditure per person at our experimental sites was 1,400-1,800 RMB and 120-160 RMB, respectively. In other words, people on average spend 8-10% of their annual income on health care.

In tune with the guiding principle of NCMS, enrollment in RMHC is voluntary. To replicate the government's subsidies, our project subsidized an average of 20 RMB for each farmer who enrolled; but unlike the prevailing NCMS model of MSA/Catastrophic insurance, the RMHC was designed based on the community's epidemiological profile and farmers' preferences regarding benefit packages. Like everywhere in the world, the distribution of health expenditure in rural China is skewed, with a large proportion of the population incurring no or moderate health expenditure and a few individuals incurring very high expenditure each year (Table 1). Consequently, people prefer benefit packages that cover primary and outpatient care, as confirmed by our interview and focus group discussions with farmers in the study sites. In addition, coverage of primary care and outpatient service provide incentives for the patients to use basic, rather than more expensive hospital services. Thus, the benefit packages of RMHC covered primary care,

hospital services, and drugs without any deductible. We developed two benefit packages for RMHC. On average, an enrollee pays a premium of 12 RMB.

--Table 1 around here--

Table 2 summarizes and compares the benefit packages of several variants of the MSA/Catastrophic and the RMHC models that we analyze in the paper.

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Analysis and Data

In this section, we describe the method and data for assessing the relative impact of the various MSA/Catastrophic and RMHC benefit packages, as laid out in Table 2, on reducing medical impoverishment.

Poverty Impact Analysis

The method we adopted is a static simulation model, adapted from methods commonly used in the international literature for analyzing the impact of medical payment on impoverishment (Chen & Ravallion, 2004; Ravallion, Datt & van de Walle, 1991; van Doorslaer, O'Donnell, Rannan-Eliya, Somanathan, Adhikari & Garg et al., 2006). Figure 1 provides a diagrammatic illustration. We graphed the income levels on the y-axis against the cumulative percentage of individuals ranked by income on the x-axis. (Wagstaff & van Doorslaer, 2003). The line labeled *pre-payment* shows the cumulative distribution of income before medical payment for a population, and “a” indicates the proportion of the population falling below the poverty line. The *post-payment* line shows the cumulative distribution of income *after* deducting out-of-pocket health expenditure,

before any reimbursement by an insurance scheme. The difference between “a” and “c” thus measures the additional share of population driven into poverty by medical expenditure. The *post-reimbursement* line shows the distribution of income after reimbursement by insurance. The difference between “b” and “c” thus measures the impact of the insurance scheme on reducing medical impoverishment.

Figure 1 around here

We calculated three measures of poverty impact: a) the proportion of population below the poverty line--the headcount; b) the average amount by which resources fall short of the poverty line as a percentage of that line --the poverty gap, where the shortfall is counted as zero for those who were above the poverty line; and c) the positive poverty gap. The poverty gap and the positive poverty gaps are measured similarly, except that the former applies to the whole population while the latter applies only to those who are below the poverty line. That is, the *average poverty gap (PG)* is defined as:

$$PG = \frac{\sum_{i=1}^N [(L - I_i) / L]}{N}$$

L: poverty line
I: prepayment/postpayment/postreimbursement income
N: Total sample size

and the *positive poverty gap (PPG)* as:

$$PPG = \frac{\sum_{i=1}^N [(L - I_i) / L]}{n}$$

n: number of people in poverty (headcount)

The headcount thus measures the breadth of poverty impact, while the positive poverty gaps measure the depth and the positive gap captures both.

We then applied the benefit packages as summarized in Table 2 to calculate the effects of MSA/Catastrophic and RMHC on these three measures.

We used two poverty lines for our analyses. First, we used the poverty line of US\$1.08 per person per day in 1993 dollars developed by the World Bank and commonly used in international studies of poverty. This poverty line was estimated without any specific allowance for health care needs and refers to extreme poverty. It translates to 1046 RMB in 2006, after adjusting for purchasing-power differences between the US and China and price inflation from 1993 to 2006 (van Doorslaer & O'Donnell et al., 2006). Second, we used the Chinese government's official poverty line, currently defined as an annual income of 663 RMB per person. This line has not been adequately adjusted for cost of living since its promulgation more than a decade ago. The general findings from our simulation exercise are unaffected by the line used.

Data

The data for our analysis combine claims data and a representative household survey collected from one of our social experiment sites in 2006. The RMHC scheme maintained a complete record of all health expenditures incurred by all the enrolled households because RMHC reimbursed the first dollar of health expenses. The household survey collected comprehensive information on the sampled household's socioeconomic

conditions, household consumption expenditure and characteristics of the household's members, including demographic and health conditions. Of the total sample of 5380 enrolled households, about 1051 (around 3663 household members) were linked to household income (measured by household consumption expenditure) collected from the household survey. We verified that the health expenditure distribution of this linked sample is similar to those not linked; thus our results are representative of the total sample of 5380 households. The unit of analysis is individual. To account for intra-household sharing of resources, income and health spending are assumed to be shared equally across all members of a household. That is, the post-payment and post-reimbursement income are calculated by first aggregating health care payments and health care payments net of reimbursement incurred by each member to the household level, and then dividing by the size of household, adjusting for equivalence of adults and children. For the MSA/Catastrophic simulation, we account for household members sharing the 8 RMB in each member's MSA.

Results

Table 3 shows the effects of medical spending on impoverishment. Under the poverty line of US\$1.08 per person per day, 7.31% of individuals were impoverished due to medical expenses, increasing the poverty rate from 29.61% to 36.92%. Medical expenses increase the average poverty gap from 6.61% to 14.06% and the positive poverty gap from 22.3% to 38.09%. In other words, among those who are below the poverty line, their incomes are 22% below the poverty line before payment for medical expenses. After payment, their incomes are 38% below the poverty line. Under the poverty line of 663

RMB, 6.25% of the study sample was impoverished due to medical expenses, increasing the poverty rate from 5.08% to 11.32%. The average poverty gap increased from 0.89% to 8.49% while the positive poverty gap grew from 17.53% to 74.96%. Figure 2 is a graphical illustration of the medical impoverishment effect in our sample. Individuals are ranked by their annual income and plotted based on the cumulative distribution, overlaid with their medical expenses indicated by the vertical line drops. As shown, some people fell below the poverty line after paying for medical expenses while others fell further below the poverty line.

--Table 3 around here--

--Figure 2 around here--

The main findings of the simulation are presented in Table 4. Under the US\$1.08 poverty line, the MSA/Catastrophic models would reduce the poverty headcount by 3.5-3.9%, the average poverty gap by 11.8-16.4% and the positive poverty gap by 8.3-13.1%. By comparison, RMHC would reduce the poverty headcount by 6.1-6.8%, the average poverty gap by 15-18.5% and the positive poverty gap by 11.1-13.3%. Overall, the MSA/Catastrophic plan (3), in which the deductible is applied to each hospital admission performs worst. The RMHC models perform best in terms of headcounts and average poverty gap, and comparably to MSA/Catastrophic 1 and 2 in terms of positive poverty gap. These results show that even though they have similar premiums, the RMHC is more effective than the MSA/Catastrophic model at reducing medical impoverishment, particularly when measured by headcount. Under the poverty line of 663 RMB, again, the RMHC models perform measurably better than the MSA/Catastrophic models, in terms

of headcounts, but their impact on reducing the poverty gaps are less than MSA/Catastrophic 1 and 2. In the next section, we examined the causes for these findings.

--Table 4 around here--

Why would the MSA/Catastrophic model be less effective at preventing medical impoverishment when it specifically focuses on insuring against expensive hospitalization? The answer lies in the epidemiological profile, and thus health expenditure patterns of the population. In our sample, only 4.13% of the impoverished individuals under the US\$1.08 poverty line, and 8.78% of those under the 663 RMB poverty line incurred inpatient expenses. Then what accounts for the large impoverishing outpatient expenditures? Our data show that 40% of the households in the study sample have members with chronic conditions, such as hypertension, arthritis, diabetes, and asthma. They make frequent visits and incur high medication costs, but do not qualify for reimbursement under the MSA/Catastrophic model, except for the 8 RMB in the MSA.

Table 5 shows the different impacts of medical expenditure on people with and without chronic disease. At the US\$1.08 poverty line, medical expenditure increased poverty headcount by 40.7% (or 9.07 percentage points) for chronic disease patients, compared to 22.86% (7.03 percentage points) for patients without chronic conditions. However, those with chronic disease experience smaller poverty gaps than those without chronic conditions, because those without chronic ailments are largely driven into poverty due to hospital expenses. Similar results are found for analyses using the 663 RMB poverty line. The greater impact of non-chronic patients on the poverty gaps here are expected because of the lower absolute poverty line.

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Table 6 further shows the differential impacts of MSA/Catastrophic and RMHC models on preventing medical impoverishment by patients with and without chronic conditions. At the poverty line of \$US1.08, both the RMHC and MSA/Catastrophic schemes benefit patients with chronic conditions more than they do those without such conditions; however, the impact of RMHC is larger. RMHC reduces the headcount for those with and without chronic conditions by 9% and 5.7-6.5%, respectively, while the MSA/Catastrophic plans reduces the headcount by 5.8% and about 3.5%, respectively. With regard to poverty gaps, the RMHC schemes benefit patients with chronic conditions significantly more than they do for those without these conditions. In contrast, the impacts of all three MSA/Catastrophic plans are similar for patients with, and without chronic conditions. The results when using the 663RMB poverty line are very similar and are not shown here.

Discussion

Our results show that, despite the noble goal of protecting its rural population from medical impoverishment, the new resources China has devoted to the NCMS are not being used effectively. With almost the same premium as the MSA/Catastrophic, the RMHC model, which covers primary care and inpatient services without a deductible (but with higher coinsurance rates and lower maximum caps), is more effective at reducing medical impoverishment. The fundamental problem of the NCMS is that its design is not

evidence-based. Without first examining the epidemiological profile or distribution of health expenses of the population, the policymakers did not recognize that in fact expenses incurred for treating chronic illnesses—not only hospitalizations—are a major factor in medical impoverishment. Consequently, the benefits that could be produced from the government subsidies and the farmers' contributions are not fully realized. This erroneous policy is likely to affect the poor communities more where the prevalence rate of chronic conditions is particularly high as the young and healthy migrate to the cities to work, leaving the elderly and the infirm behind.

In 2006, the government subsidies to the NCMS program were increased to 40 RMB in the Western and Central provinces, without first objectively evaluating the first waves' experience. Thus, many Western and Central provinces continue to adopt the MSA/Catastrophic model. To achieve the goal of preventing medical impoverishment, the NCMS benefit package should be substantially redesigned. Lowering the deductible alone probably would not suffice. The MSA should be abolished, and the money currently put in the MSA pooled into a single risk pool fund. The MSA of 8 RMB has very limited effect in reducing medical impoverishment because a single visit to the village health posts or township health centers usually costs 16-18 RMB or 26-30 RMB, respectively.

In addition, as the burden of chronic disease is expected to be much heavier in the foreseeable future (Wang 2005), the government should pay serious attention to its role in causing poverty. Our analysis suggests individuals with chronic diseases are more

susceptible to medical impoverishment but also benefit more from a basic health care plan like RMHC than from the prevalent catastrophic insurance since they usually have, instead of single large inpatient expense, multiple relatively smaller payments that would be ineligible for catastrophic reimbursement. However, simply lowering the deductible to cover these smaller expenses would perhaps create more inefficiency by attracting people to use expensive hospital services.

This paper focuses on the differences in benefit designs of RMHC and MSA/Catastrophic models, but the RMHC also aims to address a fundamental cause of medical impoverishment—rapid health expenditure growth caused by waste and inefficiencies. By pooling the risk of all outpatient and inpatient services, the RMHC fund office serves as a prudent purchaser of health care for the insured and uses its financial power to reform the health care delivery system, including changing the payment method for village doctors from fee-for-service to salary plus performance-based bonus, and introducing bulk purchasing for drugs. Secondary data from our experiments show that these measures have improved the efficiency of primary care by at least 30%. These gains allow RMHC to pay higher benefits to the insured. Moreover, these measures improved the quality of health care by eliminating counterfeit drugs dispensed by village doctors and town health centers, reducing inappropriate use of antibiotics and IV injections for flu, and increasing access to primary care (Yip, Wang & Hsiao, 2007). In contrast, the MSA/Catastrophic model, a pure insurance model, does not reform health care delivery or reduce waste and inefficiency.

There are several limitations to our static simulation model. First, it does not take into account the behavioral responses of patients and providers under the benefit-package designs. For example, under MSA/Catastrophic, patients are likely to demand more inpatient services which may further increase the number of impoverished households. Similarly, under the RMHC, patients would demand more primary health care and a few people may demand more inpatient services, which could, again, increase health expenditures and medical impoverishment. Thus, the static simulation exercise may overestimate the poverty-reduction impact of both models. On the other hand, the simulation model does not take into account the efficiency gains of the RMHC model and the associated lower health expenditures, thus, underestimating the poverty-reduction effect. Finally, since our data are based on a population that voluntarily elected to enroll in RMHC, their health expenditure distribution may be higher than the general population. However, this limitation is somewhat mitigated by the fact that over 85% of households enrolled in RMHC in our experiments. Nonetheless, our finding demonstrates the importance of evidence-based policy formulation. It also has significant implications for China in terms of re-thinking its NCMS program, which could affect 900 million farmers.

One major lesson from our study is that, in settings where resources are limited, it is not necessarily true that insurance coverage focusing on expensive hospital care is the most effective in providing financial risk protection. As chronic diseases impose a growing share of the burden on the population in developing countries (Beaglehole & Yach, 2003; Murray & Lopez, 1997; Yach, Hawkes, Gould & Hofman, 2004), they will increasingly

be an important determinant of catastrophic expenditures (Su, Kouyaté & Flessa, 2006; Water, Anderson & Mays, 2004). It is important for countries to pay close attention to the benefit design of any insurance if resources are to be used effectively to prevent medical impoverishment.

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Figure 1: Illustration of poverty-reducing effect of insurance

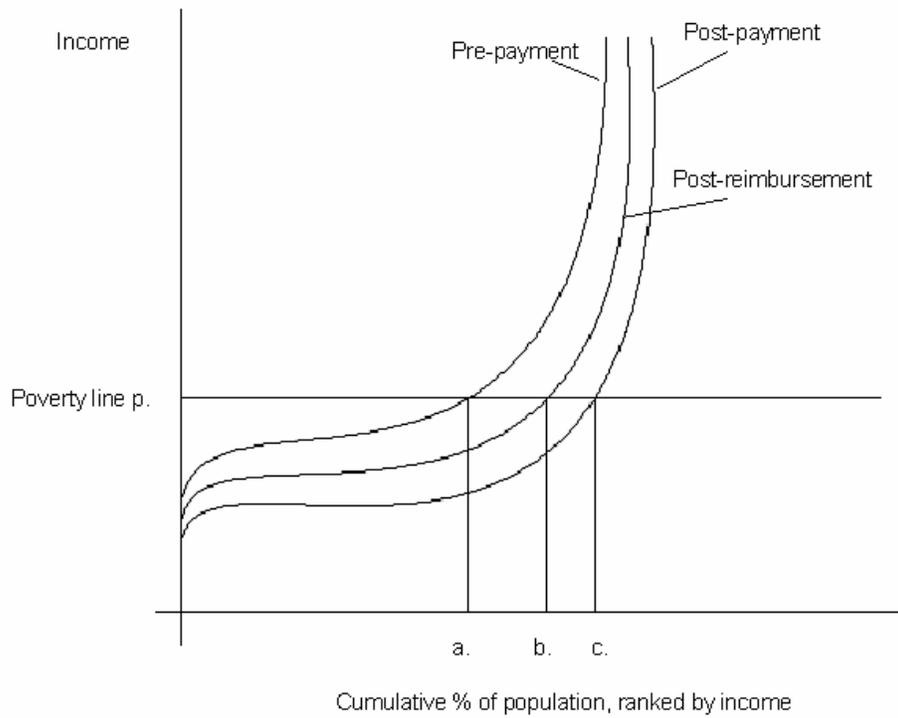
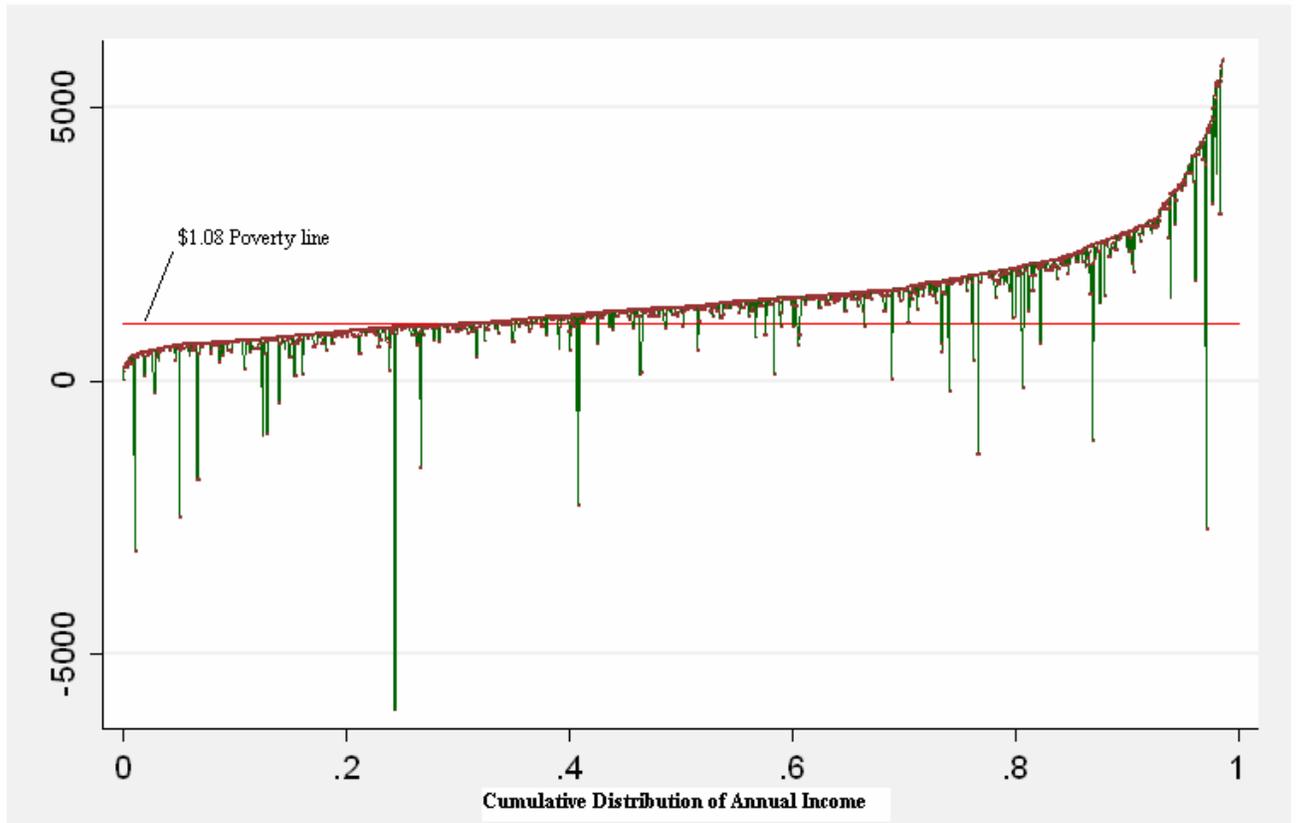


Figure 2. Cumulative Distribution of Income and the Effect of Medical Spending



Note: for the purpose of this figure, observations with extreme values (above 6000 RMB and below -6000 RMB) are excluded.

Table 1. The Distribution of Health Expenditures

Expenditure (in RMB)	Percentage of individuals (%)	Percentage of households (%)
0	31.53	15.41
0-50	28.75	9.51
50-100	14.09	9.61
100-150	8.27	7.99
150-200	4.34	6.18
200-250	2.92	5.99
250-300	2.18	5.33
300-350	1.61	4.57
350-400	1.20	4.85
400-500	1.12	5.33
500-600	0.90	4.09
600-800	0.87	5.04
800-1000	0.19	3.90
1000-2000	0.79	5.99
2000-3000	0.46	2.47
3000-4000	0.27	1.52
4000-5000	0.16	0.48
5000-6000	0.03	0.29
6000-7000	0.08	0.48
7000-8000	0.14	0.29
8000-9000	0.03	0.19
9000-10000	0.03	0.19
10000-20000	0.00	0.19
>20000	0.03	0.10

Source: author's tabulation based on data from the RMHC site (described in the data section).

Table 2: Comparison of Different Insurance Benefit Packages

		MSA/Catastrophic 1	MSA/Catastrophic 2	MSA/Catastrophic 3	RMHC 1	RMHC 2
Outpatient	Individual Savings Account (MSA)	Deposit 8 RMB each year. Can be withdrawn to pay for outpatient services and shared among household members.	Same as MSA/Catastrophic 1	Same as MSA/Catastrophic 1	None	None
	Reimbursement rate for:					
	<ul style="list-style-type: none"> • Village health posts • Township health centers • Clinics at county and above 	N/A*	N/A	N/A	45%	50% (capped at 400 RMB)
		N/A	N/A	N/A	40%	45% (capped at 400 RMB)
		N/A	N/A	N/A	40%	35% (capped at 400 RMB)
Inpatient	Deductible	800 RMB	400 RMB	Township: 150 RMB County: 350 RMB Above county: 750 RMB	None	None
	Reimbursement rate for:					
	<ul style="list-style-type: none"> • Township health centers • County hospitals and above 	50% (capped at 20,000 RMB)	50% (capped at 20,000 RMB)	40% at township and county level, 30% at level above county (annual ceiling at 8000 RMB)	40% (capped at 400 RMB)	45% (capped at 500 RMB)
		50% (capped at 20,000 RMB)	50% (capped at 20,000 RMB)		40% (capped at 8,000 RMB)	35% (capped at 2100 RMB)

*N/A: Not applicable

Table 3. Effects of Medical Payment on Impoverishment

	Poverty line of \$1.08 per day				Poverty line of 663 RMB per day			
	Pre-payment	Post-payment	Percentage point change	Percentage change	Pre-payment	Post-payment	Percentage point change	Percentage change
Headcount	29.61%	36.92%	7.31%	24.70%	5.08%	11.32%	6.25%	123.08%
Poverty gap	6.61%	14.06%	7.45%	112.67%	0.89%	8.49%	7.60%	853.94%
Positive poverty gap	22.33%	38.09%	15.75%	70.54%	17.53%	74.96%	57.43%	327.63%

Note: Bold numbers denote results that are significantly different from zero at the 5% significance level

Table 4. Effects of MSA/Catastrophic and RMHC on Medical Impoverishment

Poverty line \$1.08 per day												
	Post-payment head count	Change in headcount due to insurance scheme			Post-payment poverty gap rate	Change in poverty gap rate due to insurance scheme			Post-payment positive poverty gap rate	Change in positive poverty gap rate due to insurance scheme		
		Percentage point change	Percentage change			Percentage point change	Percentage change			Percentage point change	Percentage change	
Without insurance	36.92%	-	-		14.06%	-	-		38.09%	-	-	
RMHC 1	34.68%	-2.24%	-6.06%	*	11.46%	-2.60%	-18.50%	*	33.04%	-5.05%	-13.25%	*
RMHC 2	34.40%	-2.52%	-6.83%	* †	11.64%	-2.42%	-17.19%	* †	33.85%	-4.24%	-11.13%	* †
Catastrophic 1	35.64%	-1.28%	-3.46%	* †	11.95%	-2.11%	-15.03%	* †	33.52%	-4.56%	-11.98%	* †
Catastrophic 2	35.50%	-1.42%	-3.85%	* †	11.75%	-2.31%	-16.40%	*	33.11%	-4.97%	-13.06%	*
Catastrophic 3	35.50%	-1.42%	-3.85%	* †	12.40%	-1.66%	-11.79%	* †	34.94%	-3.15%	-8.26%	* †
Poverty line 663 RMB per day												
Without insurance	11.32%	-	-		8.49%	-	-		74.96%	-	-	
RMHC 1	9.27%	-2.06%	-18.18%	*	5.80%	-2.69%	-31.73%	*	62.55%	-12.41%	-16.56%	*
RMHC 2	9.41%	-1.92%	-16.93%	* †	6.16%	-2.33%	-27.44%	* †	65.47%	-9.48%	-12.65%	* †
Catastrophic 1	10.26%	-1.06%	-9.40%	* †	5.79%	-2.70%	-31.82%	*	56.41%	-18.55%	-24.74%	*
Catastrophic 2	10.08%	-1.24%	-10.97%	* †	5.62%	-2.87%	-33.80%	*	55.74%	-19.22%	-25.64%	*
Catastrophic 3	10.47%	-0.85%	-7.52%	* †	6.51%	-1.97%	-23.25%	* †	62.21%	-12.75%	-17.01%	* †

* significantly different from without insurance

† significantly different from RMHC 1

Table 5. Medical Impoverishment by Chronic Disease Status

	Poverty line of 663 RMB per day				Poverty line of \$1.08 per day			
	Pre-payment	Post-payment	Percentage point change	Percentage change	Pre-payment	Post-payment	Percentage point change	Percentage change
<i>No Chronic Disease</i>								
Headcount	5.35%	11.68%	6.33%	118.46%	30.77%	37.80%	7.03%	22.86%
Poverty gap	0.83%	9.01%	8.18%	985.91%	6.87%	14.66%	7.79%	113.34%
Positive poverty gap	15.52%	77.15%	61.63%	397.08%	22.34%	38.79%	16.45%	73.64%
<i>With Chronic Disease</i>								
Headcount	3.37%	9.07%	5.70%	169.23%	22.28%	31.35%	9.07%	40.70%
Poverty gap	1.27%	5.18%	3.92%	309.34%	4.96%	10.26%	5.30%	106.80%
Positive poverty gap	37.61%	57.18%	19.57%	52.04%	22.26%	32.72%	10.46%	46.98%

Note: Bold numbers denote results that are significantly different from zero at the 5% significance level

Table 6. Effects of MSA/Catastrophic and RMHC on Medical Impoverishment by Chronic Disease Status

		Post-medical payment poverty rate	Effect of RMHC1 in Reducing Impoverishment		Effect of RMHC2 in Reducing Impoverishment		Effect of MSA/Cat1 in Reducing Impoverishment		Effect of MSA/Cat2 in Reducing Impoverishment		Effect of MSA/Cat3 in Reducing Impoverishment	
			Percentage point change	Percentage Change	Percentage point change	Percentage Change	Percentage point change	Percentage Change	Percentage point change	Percentage Change	Percentage point change	Percentage Change
Poverty line of US\$1.08												
<i>Headcount</i>	No chronic d/z	37.803%	-2.139%	-5.658%	-2.468%	-6.529%	-1.193%	-3.156%	-1.357%	-3.591%	-1.357%	-3.591%
	With chronic d/z	31.347%	-2.850%	-9.091%	-2.850%	-9.091%	-1.813%	-5.785%	-1.813%	-5.785%	-1.813%	-5.785%
<i>Poverty Gap</i>	No chronic d/z	14.665%	-2.611%	-17.803%	-2.403%	-16.387%	-2.189%	-14.925%	-2.378%	-16.219%	-1.679%	-11.450%
	With chronic d/z	10.256%	-2.546%	-24.819%	-2.509%	-24.466%	-1.639%	-15.979%	-1.850%	-18.033%	-1.523%	-14.846%
<i>Positive Poverty Gap</i>	No chronic d/z	38.792%	-4.994%	-12.873%	-4.091%	-10.547%	-4.714%	-12.153%	-5.081%	-13.098%	-3.162%	-8.151%
	With chronic d/z	32.719%	-5.661%	-17.301%	-5.534%	-16.913%	-3.540%	-10.820%	-4.253%	-13.000%	-3.147%	-9.617%