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Does health insurance reduce out-of-pocket expenditure? Heterogeneity among China's middle-aged and elderly*

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Abstract

China's recent healthcare reforms aim to provide fair and affordable health services for its huge population. In this paper, we investigate the association between China's health insurance and out-of-pocket (OOP) healthcare expenditure. We further explore the heterogeneity in this association. Using data of 32,387 middle-aged and elderly individuals drawn from the 2011 and 2013 waves of China Health and Retirement Longitudinal Study (CHARLS), we report five findings. First, having health insurance increases the likelihood of utilizing healthcare and reduces inpatient OOP expenditure. Second, healthcare benefits are distributed unevenly: while low- and medium-income individuals are the main beneficiaries with reduced OOP expenditure, those faced with very high medical bills are still at risk, owing to limited and shallow coverage in certain aspects. Third, rural migrants hardly benefit from having health insurance, suggesting that institutional barriers are still in place. Fourth, health insurance does not increase patient visits to primary care facilities; hospitals are still the main provider of healthcare. Nonetheless, there is some evidence that patients shift from higher-tier to lower-tier hospitals. Last, OOP spending on pharmaceuticals is reduced for inpatient care but not for outpatient care, suggesting that people rely on inpatient care to obtain reimbursable drugs, putting further pressure on the already overcrowded hospitals. Our findings suggest that China's health insurance system has been effective in boosting healthcare utilization and lowering OOP hospitalization expenditure, but there still remain challenges due to the less generous rural scheme, shallow outpatient care coverage, lack of insurance portability, and an underdeveloped primary healthcare system.

Key words: China; health insurance; healthcare utilization; out-of-pocket expenditure; migrant

1 Introduction

China's market liberalization since 1978 has brought about remarkable economic growth. Meanwhile, it also dismantled the previous publicly funded healthcare system, leading to a rapid increase in out-of-pocket (OOP) spending, with its share in total health expenditure rising from 20% in 1978 to nearly 60% in 2002 (MOH, 2006). To tackle the poor access to healthcare and medical impoverishment, China has launched a series of healthcare reforms since the late 1990s, and managed to achieve near-universal health insurance coverage by 2011 (Chen, 2009; Cheng, 2012). While this is remarkable progress, it remains unclear as to how effective China's health insurance schemes have been in reducing the financial burden of the world's largest population.

Existing evidence on the link between China's health insurance and OOP expenditure is mixed. In a review of empirical research on China's health system, Wagstaff et al. (2009b) suggest that there is no clear association between insurance and OOP spending under the pre-2003 health system. Using data from two national surveys and one provincial household survey, Wagstaff and Lindelow (2008) find the "curious case" of health insurance increasing the risk of high and catastrophic spending in China. This is likely due to healthcare users switching to more costly and higher-level providers, as well as higher utilization rates among the insured (Jung and Streeter, 2015). Some studies focusing on specific health insurance programs find little or no effect of reducing financial risks (Hou et al., 2014; Lei and Lin, 2009; Li and Zhang, 2013; Meng et al., 2012; Wagstaff et al., 2009a; Yip and Hsiao, 2009),

while others arrive at the opposite conclusion (Jung and Streeter, 2015; Meng et al., 2004), due to differences in data sources and methodologies used.

While much work has gone into the overall effect of health insurance on healthcare utilization and OOP financial burden, there is not much evidence on the distributional effects. In their evaluation of China's new rural health insurance scheme, Wagstaff et al. (2009a) find heterogeneity across income groups, with the poor more likely to use lower-level than higher-level facilities, and thus less upward pressure on their OOP spending. A few studies using small-scale data find that health insurance improves equity in healthcare access and eases the OOP financial burden. For instance, Liu et al. (2002) find a bigger increase in outpatient care utilization among lower socioeconomic groups, while Liu and Zhao (2006) find disadvantaged groups favored in the redistribution of OOP expenditure.

Few studies have examined how health insurance affects rural migrants, a subpopulation faced with lower immunization rates, higher infectious disease rates, more occupational health problems, higher maternal mortality rates, and higher healthcare cost (Barber and Yao, 2010; Herd et al., 2010; Hesketh et al., 2008; Hu et al., 2008; Zhang et al., 2010). Due to the *hukou* system, China's household registration system which ties certain local social welfare benefits to the place of *hukou* registration (usually the place of birth), migrants often do not have access to subsidized local healthcare at the place where they work and live. Qin et al. (2014), using data from a household survey covering nine cities in 2007 and 2010, find China's health insurance schemes are ineffective in alleviating the financial burden of healthcare or promoting the use of formal medical facilities among migrant workers. Using

data from a telephone survey, Zhao et al. (2014b) find no association between health insurance and gross or OOP medical cost.

The main objective of this paper is to investigate the association between China's health insurance schemes and individual OOP expenditure as well as healthcare utilization, and further explore the heterogeneity in this association. We make a number of contributions to the literature. First, we examine in detail whether and how insurance is associated with healthcare utilization and OOP spending in different ways across socioeconomic groups, and how individuals incurring different levels of health expenditure are affected differently. Second, we specifically consider rural migrants, and investigate whether migrants and local residents derive different benefits from health insurance. Third, we examine whether health insurance has led patients to seek basic care from primary care facilities. Fourth, we also investigate the relationship between health insurance and pharmaceutical and non-pharmaceutical spending. Lastly, we apply these analyses to a recent dataset of the China Health and Retirement Longitudinal Study (CHARLS) for 2011 and 2013; CHARLS is a biennial survey of a nationally representative sample of the middle-aged and elderly in China. This new dataset enables us to examine the most recent progress in China's health insurance schemes and their impact at a national level.

2 China's Health Insurance Schemes

2.1 Institutional Background

China's current health insurance system consists of three main schemes, the Urban Employee Basic Medical Insurance (UEBMI), the New Cooperative Medical Scheme (NCMS), and the Urban Resident Basic Medical Insurance (URBMI), each intended for a certain population group. A brief description of these three schemes is provided in Online Appendix Table A1. See Meng et al. (2015) and Yip et al. (2012) for more details.

UEBMI, established in 1998, provides health insurance to formal-sector urban employees and retirees. It is managed by cities/municipalities and financed by premium contributions from employers' payroll tax (6% of employees' wages) and employees' wages (2% wages). Retirees' premiums are fully borne by employers. Outpatient and inpatient healthcare expenditures are managed in two separate accounts. 4.2% of the contribution goes to a medical savings account (MSA), which is used to cover outpatient services until it is exhausted, after which the enrollees will have to pay from their pocket; the rest of the funds (3.8% wages) go to a social risk pool (SRP), to cover inpatient services.

NCMS is a voluntary scheme, first rolled out in 2003 in a few provinces, and quickly expanded to the whole country. Enrollment is at the household level to alleviate adverse selection into the scheme. The scheme is operated at the county level, and subsidized by the central and county governments. This replaces an old cooperative scheme that operated at the village or township level, providing a larger risk pool and economies of scale in organization and

management (Wagstaff and Yu, 2007). The premium and subsidy were set at very low levels (at 10 RMB or 2 USD individual contribution and 20 RMB or 3 USD subsidy) at the start of the scheme, but both gradually increased over time. By 2010, the average total premium had risen to 160 RMB (25 USD). The NCMS prioritizes inpatient services, with outpatient expenses covered only in some counties.

URBMI is intended to cover unemployed urban residents (including students and children), the self-employed, and employees in informal sectors, who are not eligible under UEBMI or NCMS. Launched in 2008, it is also a subsidized program, partly funded by local and central governments, and partly funded by individual contribution. Like NCMS, the URBMI also focuses on inpatient services, with outpatient coverage available only in some counties.

No comprehensive or universal medical coverage scheme targets migrants specifically at the national level. As the three main insurance schemes are managed by local governments, they are regionally segregated and often tied with the local *hukou*, and hence migrants are generally not eligible, except that URBMI is offered to migrants in some cities (Yip et al., 2012). As the majority of migrants move from rural to urban areas, with *hukou* registered at their home county, many migrants are eligible for enrollment in NCMS at their home county but not at their place of residence. Binding health insurance to the local *hukou* restricts the reimbursement for health services at non-local facilities and makes it difficult to obtain. This regional segregation of the health insurance system poses a significant institutional barrier to migrants receiving healthcare services at their place of residence rather than

at their hometown.

2.2 Hypothesis Development

From the description above, China's health insurance schemes are mainly intended to provide financial protection for inpatient OOP spending, while outpatient services have only limited coverage or are not covered at all.

All three insurance schemes feature a reimbursement cap, which is roughly six times the average local individual income. The reimbursement rates range from 44% to 68%, considering the deductibles, copayments, and ceilings. Given the shallow depth of coverage and low reimbursement rates, health insurances seem to offer better protection for individuals with relatively lower, than for those with higher, healthcare expenditure. From a demand perspective, low- and medium-income individuals, who are more likely to incur lower healthcare expenditures (for instance, by purchasing generic drugs rather than patented ones), may benefit from health insurance through lower OOP spending. Considering the potential heterogeneity across the income distribution, we develop the following hypothesis:

Hypothesis 1 *Health insurance is associated with lower OOP spending (in both inpatient and outpatient services), with differential effects across income groups.*

The three insurance schemes are managed by the city/municipality or county government, mainly to serve their local residents. Migrants are generally not categorized as "local residents" even though they live and work in the same municipality or county. Since eligibility for a local health insurance

account is often tied with a local *hukou*, many migrants can enroll in a health insurance scheme only at their place of birth, and not at their place of work or residence. This poor portability and transferability of health insurance across regions leads us to formulate our second hypothesis:

Hypothesis 2 *Compared to local residents, migrants benefit less from health insurance.*

China has a weak primary care system, with its healthcare dominated by hospitals. Recent reforms have increased government funding for building community health centers (CHCs) in cities and township hospitals and village clinics (VCs) in rural areas (Bhattacharyya et al., 2011; Yip et al., 2012), but there is still a lack of well-trained personnel on the supply side as well as public trust on the demand side of the primary care system (Liu et al., 2011; Mossialos et al., 2016; Wang et al., 2011). The weak primary care system leads to heavy reliance on hospitals for both inpatient and outpatient services. One common feature of the three health insurance schemes is the variance in reimbursement rates by healthcare facility, with more generous reimbursement for visits to lower-level facilities (Wang et al., 2012). This provides an incentive for people to visit primary care facilities, but it remains a question whether this would incentivize people to switch from hospitals to CHCs or VCs for basic care. To answer this question, we present our next hypothesis:

Hypothesis 3 *Relative to the uninsured, insured patients are more likely to use primary care institutions.*

Pharmaceutical spending is a major component of healthcare expenditure in China, more so for outpatient expenditure in recent years. Outpatients

and inpatients generally have different reimbursement eligibility and rates for pharmaceutical spending, with inpatient reimbursement being more generous (Hu and Mossialos, 2016; Mossialos et al., 2016). Drugs dispensed in outpatient services are often subject to low reimbursement ceiling or not eligible for reimbursement at all. In addition to the above hypotheses on total OOP spending, we examine how pharmaceutical and non-pharmaceutical components of OOP spending are associated with health insurance by testing the following hypothesis:

Hypothesis 4 *Health insurance is associated with lower OOP pharmaceutical spending.*

3 Data

We draw our data from the 2011 and 2013 waves of the CHARLS, a survey of a representaive sample of individuals aged 45 or above in China. Ethical approval is not applicable in our study as we use anonymized secondary data. The CHARLS national survey, first conducted in 2011, covered 28 provinces, 150 counties/districts, and 450 villages/urban communities across the country. A total of 17,708 individuals from around 10,000 households were interviewed on a range of social, economic, and health circumstances. A detailed description of this cohort can be found in Zhao et al. (2014a). A follow-up wave was conducted in 2013 to track the changes in the same respondents' circumstances during the preceding two-year period, while incorporating a small share of new respondents, totaling 18,244. Around 81% of the original 2011 sample participated in the follow-up survey in 2013, and

those who dropped out were replaced with new respondents.

A major element of the survey is devoted to recording healthcare utilization and health insurance status. The data provide information on the type(s) of the respondents' health insurance and whether the health insurance account is managed locally. The data on healthcare utilization contain detailed records on the last outpatient visit during the previous month and last inpatient visit during the previous year. The survey also contains rich information on demographic and socioeconomic status. Given its richness in health-related information and the representativeness of its sample, CHARLS is an ideal dataset to study how health insurance affects healthcare utilization and OOP expenditure among the middle-aged and elderly in China, both on a national scale and across different socioeconomic subgroups.

Although the data have a panel structure, only limited variation is found in the status of health insurance across the two waves. Therefore, we pool the two waves for our analysis. The pooled data contain 35,952 observations. Our selected sample includes 32,387 individuals, making up 90.1% of the full sample, after dropping those with lower age (2.0% are under age 45), non-responses to healthcare related questions (5.5%), and covariates (1.9%), and trimming off the top and bottom outliers (0.6% of the full sample, that have OOP expenditures on/below the 1st percentile or on/above the 99th percentile of the *positive* OOP expenditure distribution for outpatient *or* inpatient care).

Our main outcomes are on outpatient and inpatient utilization and OOP expenditures. Overall, the utilization rate of outpatient services during the previous month is 18%, whereas the inpatient service utilization rate is about

10% during the previous year. The survey records detailed healthcare spending for the last outpatient and inpatient visit, where the response rates exceed 95%. Detailed definitions for all variables are provided in Online Appendix Table A2.

In our selected sample, 5.3% of individuals are not covered under any health insurance. The descriptive summary by insurance status is available in Online Appendix Table A3. We divide the health insurance schemes into four groups: UEBMI, URBMI, NCMS, and multiple/other insurances. NCMS has the largest coverage by population (72% of the sample are insured under this scheme), followed by UEBMI (11%) and URBMI (4%). Multiple/other insurances cover the rest (7%). A small proportion (6%) of the insured hold their insurance account outside the county/city where they live. A simple comparison shows the insured more likely to use both outpatient and inpatient services, and that they incur less OOP expenses for inpatient services. We plot the distribution of outpatient and inpatient OOP spending in Online Appendix Figure A1, conditional on utilization. From the figure, OOP payments seem to be log-Gamma distributed with a left tail.

In terms of socioeconomic background and health status, the insured are more likely to be male, rural, married and living with spouse, older, better educated, working, less likely to be in good health or disabled, and more likely to drink regularly and have chronic diseases. Their consumption does not differ, although the insured are less likely to report consumption.

4 Econometric Methods

4.1 Two-Part Model

We are interested in how health insurance is associated with OOP expenditure. Health insurance may affect OOP expenditure through two channels. First, health insurance may affect the probability of using healthcare services. Second, conditional on the utilization of healthcare, the insured may opt for a different level of care, thus incurring higher or lower OOP spending. We employ a two-part model (TPM) to address this. The first part is a logit model with the binary outpatient or inpatient utilization variable as the outcome, while the second part is a generalized linear model (GLM) with gamma error distribution and a log link function. We control for the provincial fixed effects to account for the variation across provinces in terms of economic development, public health infrastructure, and health resources. In addition, we cluster the standard errors at the county level to allow for any arbitrary correlation of unobservable factors within the administrative boundary of the local healthcare authority.

Participation in health insurance could be endogenous, in that individuals and households self-select into insurance. However, this is unlikely a major concern in our setting. Enrollment in UEBMI is mandatory for formal-sector employees. Although both URBMI and NCMS are voluntary schemes, they are designed to alleviate the selection issue by taking enrollment at the household level. While our results cannot be interpreted as causal effects, in our setting, the majority are covered by health insurance, making it more interesting to uncover the heterogeneity in the association between health insur-

ance and healthcare outcomes across different socioeconomic subgroups. We apply the TPM to various subsamples by consumption and resident status to find out how the potential benefits from health insurance might differ across these subgroups.

4.2 Quantile Regression

Besides examining how health insurance affects the average OOP spending, we are also interested in how it affects different parts of the distribution of OOP spending. The association between health insurance and OOP spending may be quite different for the light users faced with low healthcare costs and the heavy users faced with high costs. Quantile regression can provide this capability. We run a series of quantile regressions at the 0.1–0.9 quantiles of OOP spending to provide a fuller picture of how health insurance is correlated with OOP spending.

5 Results and Discussion

5.1 Overall Effect

First, we examine the overall effect of health insurance coverage on healthcare utilization and OOP expenditures. These results are reported in Table 1. Throughout the analysis, we consider the effect of health insurance on outpatient and inpatient healthcare OOP expenditures separately for two reasons. First, health insurance can have different effects on these two OOP components; second, the data do not provide an overall measure of all healthcare

expenditures, but instead give the OOP payment of the last outpatient and inpatient visit.

In Panel A, the main variable of interest is having health insurance or not. Column (1) shows that having health insurance significantly increases the probability of using outpatient care by 3.8 percentage points from a baseline of 14.5%. Meanwhile, column (2) shows that overall health insurance does not significantly change the OOP expenditure per visit for outpatient care.

As for inpatient care, the estimates present a different pattern. While column (3) shows that health insurance increases the probability of using inpatient healthcare, column (4) demonstrates that the inpatient OOP expenditure per visit is significantly reduced by 27%.

Panel B provides more detailed results by breaking down the insurance variable into four categories: UEBMI, URBMI, NCMS, and multiple/other insurances. The results suggest that while the different health insurance schemes may affect healthcare outcomes in the same direction, the significance and magnitude could be different. For utilization, all insurance schemes except URBMI lead to significantly higher utilization rates; but for OOP expenditure, different schemes lead to varying outcomes: only URBMI increases outpatient OOP expenditure, while all schemes except NCMS decrease inpatient OOP expenditure.

These differential effects on inpatient and outpatient OOP spending are consistent with the design of the insurance schemes. All the three insurance schemes prioritize the coverage for inpatient services, while the reimbursement for outpatient services is either capped at a low amount or not available at all. In addition, the results also highlight the different depths of coverage

across the schemes, with urban schemes apparently offering better financial protection for inpatient OOP expenditure than the rural NCMS.

Overall, our results show that China's health insurances have been at least partly effective in boosting healthcare utilization and offering financial protection against OOP spending for inpatient services. Our results are consistent with earlier findings that health insurances increase access to healthcare. Our finding on OOP spending is somewhat different from the evidence of earlier studies (for instance, Wagstaff and Lindelow, 2008; Yip and Hsiao, 2009), but is more in line with more recent studies (for instance, Jung and Streeter, 2015). Besides the differences in data and methodologies used, the time scopes of the studies could also be a reason for these different findings. More recent data seem to support the view that China has been progressing toward a better healthcare system, particularly since its recent reforms in 2009.

5.2 Heterogeneity

In addition to the overall effect, we are further interested in how OOP spending and health insurance are associated in different ways for different subgroups. Figure 1 plots the proportion of OOP payment in the per capita household consumption by insurance status for the last outpatient and inpatient visits across quintiles of per capita household consumption. We find the gap between the insured and uninsured much larger at the lower parts of the consumption distribution. This graphical evidence suggests that health insurance offers financial protection mainly for low- and medium-income in-

dividuals.

In Table 2, we test this implication by running a subgroup analysis across the consumption distribution. We split the sample into three subgroups by terciles of per capita household consumption, and run separate regressions on these subgroups. The results show that low and medium subgroups drive the overall results. For low- and medium-consumption individuals, health insurance is significantly associated with higher outpatient and inpatient utilization, and higher outpatient and lower inpatient OOP spending. For those with high consumption, none of the associations are statistically significant. The breakdown results by insurance scheme are available in Online Appendix Table A4.

The above analysis focuses on how health insurance affects OOP expenditure at the mean, although there may be differential effects across the OOP spending distribution. This is directly related to the depth of insurance coverage, because a shallow coverage might buffer against lower health expenditure, but might not protect the enrollees from catastrophic expenditure. In addition, one potential problem with the above subsample analysis is that the sample sizes are becoming smaller, which could lead to lower statistical power. To address these issues, we turn to quantile regressions to explore the heterogeneity in the association between OOP spending and health insurance. We run a series of quantile regressions of OOP spending on health insurance, each time focusing on one quantile, thus avoiding the problem of stretching the data thinner as in the subgroup analysis approach.

The quantile regression results are presented in Table 3. For outpatient services, health insurance reduces OOP spending at the 0.2 quantile, but does

not significantly change the OOP spending for the rest of the distribution, except for the 0.9 quantile, where insurance actually increases OOP spending. A breakdown by insurance scheme reveals that NCMS (0.1 to 0.3 quantiles) and multiple/other insurances (0.2 quantile) are effective in buffering against small expenditures. However, all the schemes fail to ease the financial burden of large outpatient OOP expenditures (0.4–0.9 quantiles), if they do not increase it.

For inpatient care, health insurance reduces OOP spending at the lower and medium quantiles (0.1 to 0.7). A comparison of the schemes suggests that all schemes except NCMS reduce inpatient OOP spending across the whole distribution. NCMS reduces inpatient spending up to the 0.7 quantile, but fails to offer financial protection for very large inpatient OOP expenditure at the 0.8 and 0.9 quantiles.

Our exploration of heterogeneity in the association between health insurance and OOP spending shows that people with low and medium standards of living benefit from lower inpatient OOP spending. From a policy perspective, this is encouraging, by pointing to reducing the inequity in healthcare. However, the quantile regression results also highlight that health insurance still does not offer adequate financial protection for some individuals faced with the largest healthcare expenditure owing to two factors: first, outpatient coverage is still limited; second, the largest scheme, NCMS, does not offer enough protection from large hospitalization expenditure. These results suggest that the shallow depth of coverage is one gap that needs to be filled in China's current health insurance schemes.

5.3 Migrants

We next consider the potential heterogeneous effects by resident status. We split the sample into urban residents, rural migrants, and rural residents, and re-estimate the same TPM on these three subsamples. The descriptive statistics are available in Online Appendix Table A5. Rural migrants are better educated and more affluent than rural residents, but they fall far behind urban residents. Although they may work and live in urban areas, most of them (80%) are on NCMS. They are much more likely (18%) to have their health insurance account set up outside the city/county compared to urban (6%) and rural (5%) residents. They are also more likely (12%) to have no insurance at all compared to urban (8%) and rural (4%) residents.

From Table 4, the benefits that these three groups derive from health insurance are vastly different. Urban residents (columns 1–4) enjoy the most benefits from higher probability of using healthcare and lower inpatient OOP spending, although a small group of urban residents under URBMI might incur higher outpatient OOP spending. Rural residents (columns 9–12), who are mostly on NCMS, mainly benefit from higher utilization rates for both outpatient and inpatient services, but their OOP expenditures are not lowered.

Migrants (columns 5–8) hardly benefit from health insurance even if they have one. The only positive effect is that they are more likely to use outpatient services if they have a local insurance account (this is mainly driven by multiple/other insurances), but those whose accounts are set up elsewhere have no such benefits. NCMS, the most likely option for migrants, has no

effect on their healthcare utilization or OOP expenditure.

A plausible explanation for these distinctions between migrants and non-migrants is the institutional barriers in the current health insurance system. The public funding for insurance schemes is managed by local municipality/county governments to serve local residents; migrants often do not have access to local social welfare, while they receive little or no reimbursement for outside municipality/county healthcare services due to poor regional portability and transferability of the current health insurance system.

While China has made significant progress toward achieving near-universal coverage, our results suggest that migrants have been left out, both in terms of access to care and financial protection. On this front, the priority should be to make health insurance more portable and transferable across geographic regions, so that this particularly vulnerable socio-economic group can acquire the benefits enjoyed by local residents.

5.4 Primary Care

The next question we explore is whether health insurance can incentivize people to visit primary care facilities. This is a particularly important issue in China, which relies heavily on hospitals to provide even the most basic care (Liu et al., 2011; Wang et al., 2011).

Table 5 reports the average marginal probabilities of visiting different types of healthcare providers, namely, CHCs/VCs, township hospitals, or county/city hospitals from a multinomial logit estimation. For outpatient care, the probability of insured patients visiting CHCs/VCs has not increased

at all. UEBMI patients are in fact more likely to visit county/city hospitals for outpatient care. For inpatient care, the probability of UEBMI and NCMS patients visiting CHCs is higher, but CHCs make up only 3% of all inpatient visits, and they are not designed for hospitalization, so although the coefficient is statistically significant, it is not economically significant. Rural areas show a shift from higher-tier county/city hospitals to lower-tier township hospitals; but in urban areas, UEBMI enrollees are more likely to switch from lower-tier to higher-tier hospitals. Overall, the evidence suggests that the incentive offered by health insurance schemes for patients to seek care from a primary care facility is limited.

5.5 Pharmaceutical Spending

Pharmaceutical spending represents a significant share of OOP expenditure. Indeed, the descriptive statistics show that the share of pharmaceutical expenditure is more than two-thirds of the outpatient and roughly half of the inpatient OOP expenditure. Hence, shedding more light on the pharmaceutical expenditure/insurance nexus is important, particularly from a policy point of view.

We divide OOP expenditures into pharmaceutical and non-pharmaceutical spending, to investigate which component drives the effects of health insurance reducing OOP expenditure. From Table 6, health insurance has not been effective in reducing either pharmaceutical or non-pharmaceutical OOP spending for outpatient care. In fact, insurance leads to higher non-pharmaceutical OOP spending except for UEBMI enrollees. For inpatient

care, all schemes reduce OOP pharmaceutical spending, but only urban schemes reduce OOP non-pharmaceutical spending, again highlighting the shallower NCMS coverage.

These results suggest that health insurance coverage should be extended for outpatient services, especially for drugs. Under the current schemes, patients have to rely on inpatient services to obtain reimbursable drugs, putting further pressure on the already overcrowded hospitals. Given the increasing pharmaceutical spending on outpatient care (Mossialos et al., 2016), it seems more important now than ever before to expand the coverage for outpatient care.

5.6 Limitations

It is important to note that our study has its limitations. First, the data used are self-reported survey data, which could suffer from measurement error. Second, our results cannot be interpreted as causal, although self-selection is unlikely to be a major concern in our setting. Third, we do not investigate how the association between health insurance and OOP spending changes over time, as we only have two waves of data that are not sufficiently far apart in time. However, more waves of CHARLS data will become available for future research to track the changes over time.

6 Conclusion

In conclusion, our analysis using recent CHARLS data shows that China's health insurance schemes have been partly effective. For the middle-aged

and elderly, insurance is generally associated with a considerable reduction in OOP expenditure for inpatient services, but with no reduction for outpatient OOP spending. In some cases, outpatient OOP spending even increases. Next, we also find the benefits distributed unevenly. Across the consumption distribution, individuals with low and medium standards of living are the main beneficiaries. Furthermore, those with very high medical bills are still at risk because of the limited coverage for outpatient services and shallower coverage of NCMS for inpatient care. Third, a comparison of the migrants and non-migrants shows that migrants hardly benefit from health insurance. They still face strong institutional barriers to the social welfare benefits enjoyed by local residents. Fourth, health insurance has not been effective in encouraging people to seek care from primary healthcare facilities; hospitals are still the main healthcare provider in the delivery of healthcare, although NCMS does shift some inpatient visits from higher-tier to lower-tier hospitals. Finally, OOP spending on pharmaceuticals is reduced for inpatient care but not for outpatient care, suggesting that people have to rely on inpatient care to obtain reimbursable drugs, putting further pressure on overcrowded hospitals.

Our analysis presents evidence that China's health insurance system has been effective in boosting healthcare utilization and alleviating the financial burden of individuals facing hospitalization, especially those with low and medium income. However, our findings also shed light on several areas where challenges remain, owing to the less generous rural NCMS scheme, shallow outpatient care coverage, lack of portability of insurance benefits for migrants, and an underdeveloped primary healthcare system.

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Table 1: The overall effect of health insurance on healthcare utilization and out-of-pocket expenditures: two-part model results

	Last outpatient visit		Last inpatient visit	
	(1) Util.	(2) OOP	(3) Util.	(4) OOP
	Logit	GLM	Logit	GLM
Panel A				
Insurance	0.038***	0.140	0.036*	−0.266**
	(0.013)	(0.209)	(0.020)	(0.119)
Panel B				
UEBMI	0.069***	0.133	0.051**	−0.386***
	(0.022)	(0.231)	(0.021)	(0.140)
URBMI	0.021	0.451**	0.021	−0.378**
	(0.022)	(0.220)	(0.025)	(0.161)
NCMS	0.032*	0.115	0.033*	−0.181
	(0.017)	(0.204)	(0.019)	(0.113)
Multiple/Other	0.045***	0.086	0.037*	−0.379***
insurances	(0.014)	(0.282)	(0.021)	(0.144)
N	32,387	5,889	32,387	3,119

Notes Average marginal effects (probabilities) are reported for logit models, whereas coefficients are reported for GLM models. Clustered standard errors at the county level are in parentheses. Sampling weights are applied in all models to obtain the estimates. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

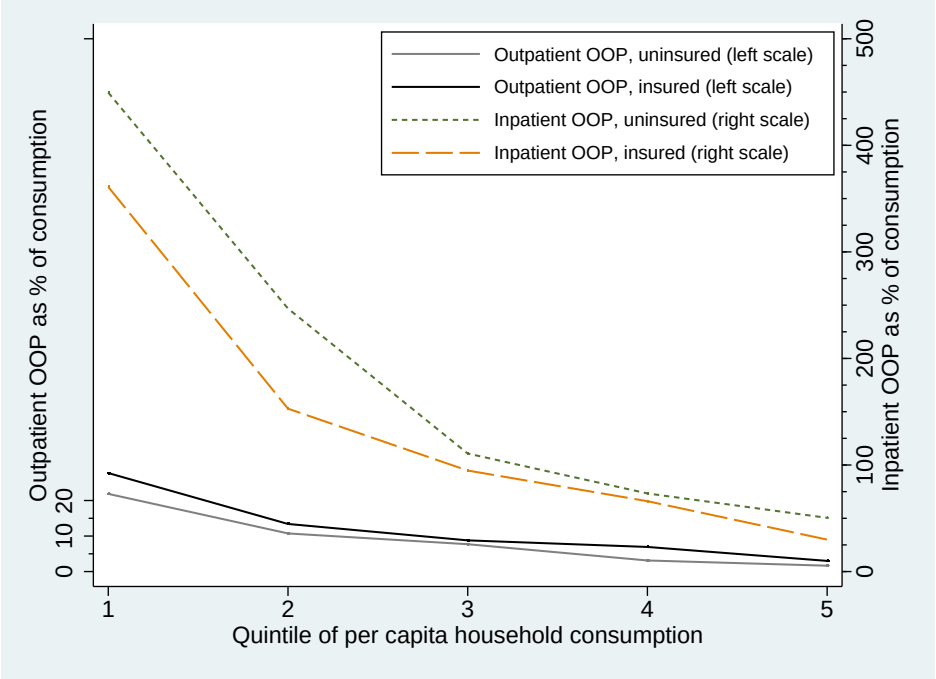

Figure 1: Share of outpatient and inpatient OOP spending out of per capita household consumption across the consumption distribution

Table 2: Heterogeneous effects of health insurance across terciles of per capita household consumption

	Terciles of consumption		
	Low	Medium	High
Panel A: Outpatient utilization, logit			
Insurance	0.010	0.073***	0.010
	(0.018)	(0.022)	(0.032)
N	10,353	10,334	10,337
Panel B: Outpatient OOP spending, GLM			
Insurance	0.461***	0.115	−0.385
	(0.171)	(0.192)	(0.468)
N	1,816	1,920	1,962
Panel C: Inpatient utilization, logit			
Insurance	0.031*	0.026	0.039
	(0.017)	(0.018)	(0.041)
N	10,323	10,315	10,337
Panel D: Inpatient OOP spending, GLM			
Insurance	−0.511**	−0.342*	−0.195
	(0.201)	(0.196)	(0.209)
N	877	1,005	1,091

Notes
Sampling weights are applied in all models to obtain the estimates. Average marginal effects (probabilities) are reported for logit models, whereas coefficients are reported for GLM models. Clustered standard errors at the county level are in parentheses. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

Table 3: Quantile effects of health insurance on OOP expenditures

	Quantile								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Panel A: Outpatient OOP expenditure, $N = 5,889$									
Insurance	−0.254	−0.286**	−0.132	0.012	−0.054	−0.074	−0.043	0.201	0.453***
	(0.142)	(0.106)	(0.083)	(0.101)	(0.186)	(0.119)	(0.103)	(0.108)	(0.136)
Panel B: Outpatient OOP expenditure, $N = 5,889$									
UEBMI	0.047	−0.273	−0.076	0.039	−0.022	−0.020	0.188	0.310	0.692***
	(0.156)	(0.164)	(0.177)	(0.170)	(0.208)	(0.173)	(0.175)	(0.161)	(0.209)
URBMI	−0.095	−0.243	0.096	0.245	0.228	0.156	0.278	0.442**	0.780**
	(0.179)	(0.201)	(0.204)	(0.193)	(0.201)	(0.177)	(0.177)	(0.163)	(0.270)
NCMS	−0.300*	−0.271**	−0.186*	−0.041	−0.048	−0.147	−0.069	0.102	0.364*
	(0.136)	(0.099)	(0.080)	(0.103)	(0.158)	(0.126)	(0.100)	(0.099)	(0.152)
Multiple/Other	−0.235	−0.311*	−0.107	−0.036	−0.047	−0.118	−0.049	0.262	0.703**
insurances	(0.185)	(0.155)	(0.155)	(0.160)	(0.195)	(0.172)	(0.163)	(0.203)	(0.238)
Panel C: Inpatient OOP expenditure, $N = 3,119$									
Insurance	−0.786*	−0.758***	−0.713***	−0.522***	−0.514**	−0.432**	−0.363*	−0.279	−0.433
	(0.311)	(0.162)	(0.115)	(0.153)	(0.158)	(0.164)	(0.184)	(0.212)	(0.266)
Panel D: Inpatient OOP expenditure, $N = 3,119$									
UEBMI	−0.711*	−0.720***	−0.770***	−0.608***	−0.647***	−0.644***	−0.752***	−0.716***	−0.782***
	(0.388)	(0.197)	(0.147)	(0.187)	(0.185)	(0.180)	(0.182)	(0.197)	(0.233)
URBMI	−0.820**	−0.776***	−0.688***	−0.535***	−0.604***	−0.521**	−0.516**	−0.423*	−0.630***
	(0.398)	(0.246)	(0.160)	(0.196)	(0.200)	(0.222)	(0.220)	(0.222)	(0.241)
NCMS	−0.812**	−0.753***	−0.686***	−0.501***	−0.484***	−0.369**	−0.286*	−0.261	−0.218
	(0.356)	(0.159)	(0.125)	(0.172)	(0.167)	(0.156)	(0.169)	(0.168)	(0.200)
Multiple/Other	−0.800**	−0.792***	−0.776***	−0.593***	−0.614***	−0.584***	−0.585***	−0.464**	−0.554**
insurances	(0.396)	(0.230)	(0.155)	(0.197)	(0.179)	(0.174)	(0.188)	(0.193)	(0.215)

Notes Clustered standard errors at the county level are in parentheses. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

Table 4: Health insurance and healthcare by resident status

	Urban residents				Rural migrants				Rural residents			
	Last outpatient visit		Last inpatient visit		Last outpatient visit		Last inpatient visit		Last outpatient visit		Last inpatient visit	
	(1) Util.	(2) OOP	(3) Util.	(4) OOP	(5) Util.	(6) OOP	(7) Util.	(8) OOP	(9) Util.	(10) OOP	(11) Util.	(12) OOP
	Logit	GLM	Logit	GLM	Logit	GLM	Logit	GLM	Logit	GLM	Logit	GLM
Panel A: Overall												
Insurance	0.039*	0.445	0.060***	−0.664***	0.004	−1.114	−0.009	0.118	0.049***	0.142	0.048***	−0.095
	(0.021)	(0.315)	(0.023)	(0.232)	(0.031)	(1.250)	(0.031)	(0.273)	(0.017)	(0.175)	(0.014)	(0.136)
Panel B: By insurance account location												
Local insurance	0.030	0.437	0.060***	−0.726***	0.049**	−1.091	−0.008	0.057	0.050***	0.161	0.049***	−0.096
	(0.019)	(0.312)	(0.023)	(0.230)	(0.024)	(1.189)	(0.034)	(0.287)	(0.018)	(0.170)	(0.014)	(0.136)
Elsewhere insurance	0.105**	0.529	0.059**	−0.006	−0.064	−1.199	−0.011	0.215	0.032	−0.213	0.043**	−0.053
	(0.042)	(0.450)	(0.029)	(0.263)	(0.049)	(1.460)	(0.031)	(0.312)	(0.021)	(0.205)	(0.017)	(0.175)
Panel C: By insurance scheme												
UEBMI	0.057*	0.410	0.075***	−0.689***	0.047	−1.050	0.016	−0.445	0.049	0.298	0.038*	−0.665***
	(0.030)	(0.323)	(0.023)	(0.241)	(0.071)	(1.381)	(0.051)	(0.833)	(0.043)	(0.402)	(0.022)	(0.243)
URBMI	0.016	0.578*	0.038	−0.688***	−0.114*	−0.489	0.047	−0.528	0.057	0.354	0.065***	0.116
	(0.021)	(0.305)	(0.025)	(0.230)	(0.062)	(1.158)	(0.044)	(0.629)	(0.037)	(0.412)	(0.024)	(0.284)
NCMS	0.042	0.352	0.050*	−0.613**	−0.007	−1.018	−0.009	0.081	0.049***	0.133	0.048***	−0.089
	(0.026)	(0.334)	(0.028)	(0.260)	(0.038)	(1.034)	(0.030)	(0.269)	(0.017)	(0.175)	(0.014)	(0.135)
Multiple/Other insurances	0.024	0.425	0.058***	−0.600**	0.153***	−1.522	−0.024	0.413	0.047**	0.254	0.052***	−0.405**
	(0.019)	(0.328)	(0.022)	(0.260)	(0.048)	(1.325)	(0.074)	(0.343)	(0.021)	(0.252)	(0.017)	(0.194)
N	7,104	1,114	7,107	808	2,026	378	1,902	168	23,251	4,397	23,238	2,143

Notes Average marginal effects (probabilities) are reported for logit models, whereas coefficients are reported for GLM models. Clustered standard errors at the county level are in parentheses. Sampling weights are applied in all models to obtain the estimates. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

Table 5: Average marginal probabilities of visiting different types of healthcare providers: Multinomial logit model results

	Last outpatient visit			Last inpatient visit		
	(1) CHC VC	(2) Township hospital	(3) County/City hospital	(4) CHC	(5) Township hospital	(6) County/City hospital
Panel A						
Insurance	−0.005	0.022	−0.017	0.055*	0.158**	−0.213***
	(0.048)	(0.026)	(0.043)	(0.030)	(0.067)	(0.072)
Panel B						
UEBMI	−0.010	−0.098**	0.108**	0.057*	−0.235**	0.178*
	(0.056)	(0.042)	(0.049)	(0.033)	(0.095)	(0.091)
URBMI	0.018	−0.087*	0.069	0.049	−0.104	0.056
	(0.060)	(0.045)	(0.053)	(0.034)	(0.091)	(0.098)
NCMS	0.016	0.043	−0.060	0.059**	0.202***	−0.261***
	(0.054)	(0.028)	(0.049)	(0.030)	(0.060)	(0.065)
Multiple/Other	−0.028	−0.020	0.048	0.047	0.082	−0.129
insurances	(0.051)	(0.039)	(0.039)	(0.034)	(0.073)	(0.081)
N	5,889	5,889	5,889	3,119	3,119	3,119
% outcome = 1	44.63	16.48	38.89	2.95	17.95	79.11

Notes Clustered standard errors at the county level are in parentheses. Sampling weights are applied in all models to obtain the estimates. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

Table 6: Health insurance and OOP pharmaceutical and non-pharmaceutical spending

	Last outpatient visit			Last inpatient visit		
	(1) Total OOP spending	(2) OOP pharma. spending	(3) OOP non-pharma. spending	(4) Total OOP spending	(5) OOP pharma. spending	(6) OOP non-pharma. spending
	GLM	GLM	GLM	GLM	GLM	GLM
Panel A						
Insurance	0.140	−0.212	0.637**	−0.266**	−0.648***	−0.290
	(0.209)	(0.343)	(0.294)	(0.119)	(0.244)	(0.263)
Panel B						
UEBMI	0.133	−0.171	0.396	−0.386***	−0.730**	−0.638**
	(0.231)	(0.401)	(0.304)	(0.140)	(0.305)	(0.272)
URBMI	0.451**	0.100	0.992***	−0.378**	−0.542*	−0.662*
	(0.220)	(0.352)	(0.321)	(0.161)	(0.289)	(0.352)
NCMS	0.115	−0.227	0.633*	−0.181	−0.646***	0.042
	(0.204)	(0.328)	(0.327)	(0.113)	(0.246)	(0.276)
Multiple/Other insurances	0.086	−0.377	0.628**	−0.379***	−0.642**	−0.255
	(0.282)	(0.420)	(0.287)	(0.144)	(0.275)	(0.331)
N	5,889	5,115	5,115	3,119	1,678	1,678

Notes Clustered standard errors at the county level are in parentheses. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. The sample sizes in columns (2), (3), (5), and (6) are smaller due to missing values. Valid zero spending is recoded to 1 RMB. All covariates in the Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

A Online Appendix

Table A1: Summary of China's health insurance schemes as of 2010

	UEBMI	URBMI	NCMS
Year launched	1998	2008	2003
Target population	Formal sector urban employees	Urban residents without formal employment and some migrants	Rural residents and some migrants
% Enrolment	92%	93%	97%
Risk pool unit	City	County	County
Central gov. subsidy	None	120 RMB (19 USD) per person	120 RMB (19 USD)
Minimum local gov. subsidy	6% payroll tax levied on employers	60 RMB (9 USD)	60 RMB (9 USD)
Individual contribution	2% wages	20–250 RMB (3–38 USD)	20–50 RMB (3–8 USD)
Total premium per person	1,560 RMB (240 USD)	140 RMB (22 USD)	160 RMB (25 USD)
Inpatient reimburse rate[1]	68%	48%	44%
Outpatient coverage	Yes, via personal MSA	In some counties	In some counties
Total reimbursement ceiling	Six-times average wage of employees in the city	Six-times disposable income of local residents	Six-times income of local farmers

[1] % total inpatient expenditure reimbursed by insurance taking into account deductible, copayment, and ceiling.
Source: Yip et al. (2012); Meng et al. (2015).

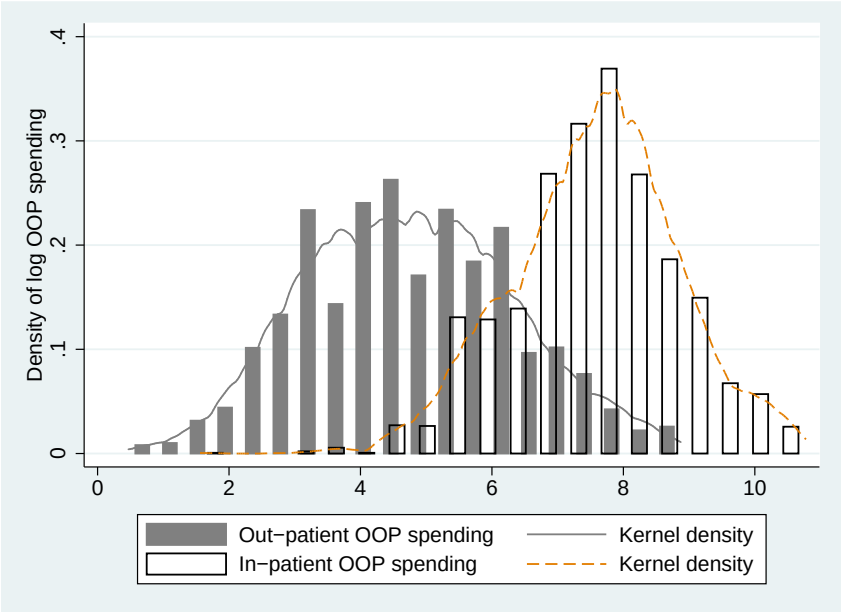

Figure A1: The distributions of log OOP spending for the last outpatient and inpatient visit

Notes: Kernel density is estimated using an Epanechnikov kernel-weight function with the optimal bandwidth that minimizes the mean integrated squared error.

Table A2: Definition of variables

Variable	Definition
Health insurance	
Insurance	= 1 if policy holder or primary beneficiary of any of the types of listed health insurance, = 0 if no insurance
No insurance	= 1 if *not* policy holder or primary beneficiary of any of the types of listed health insurance, = 0 if any insurance
UEBMI	= 1 if only insurance is UEBMI, = 0 otherwise
URBMI	= 1 if only insurance is URBMI, = 0 otherwise
NCMS	= 1 if only insurance is NCMS, = 0 otherwise
Multiple/Other insurances	= 1 if policy holder or primary beneficiary of more than one type of listed health insurance, or policy holder or primary beneficiary of any insurance other than UEBMI, URBMI, and NCMS (including Urban and Rural Resident Medical Insurance, Government Medical Insurance, medical aid, private medical insurance purchased by the respondent's union, private medical insurance purchased by the respondent, Urban Non-Employed Person's Health Insurance, and other medical insurance), = 0 otherwise
Local insurance	= 1 if health insurance account/policy was set up within this county/city, = 0 otherwise
Elsewhere insurance	= 1 if health insurance account/policy was set up outside this county/city, = 0 otherwise
Last outpatient visit in the last month	
Utilization	= 1 if having visited a public hospital, private hospital, public health center, clinic, or health worker's or doctor's practice, or been visited by a health worker or doctor for outpatient care in the last month, = 0 if not

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Variable	Definition
OOP expenditure	The OOP amount paid for this visit, after reimbursement from insurance
Share of OOP in consumption	OOP expenditure divided by per capita household consumption
OOP pharmaceutical spending	The OOP amount paid for medications from this visit (including prescriptions received). Zero amount recoded to 1 RMB.
OOP non-pharmaceutical spending	OOP expenditure minus OOP pharmaceutical spending. Zero amount recoded to 1 RMB.
Share of pharmaceutical spending	OOP pharmaceutical spending divided by OOP expenditure
Community health center/village clinic	= 1 if the last health facility visited for outpatient care is a community healthcare center, a Healthcare post, or a village/private clinic, = 0 otherwise
Township hospital	= 1 if the last health facility visited for outpatient care is a township hospital, = 0 otherwise
County/City hospital	= 1 if the last health facility visited for outpatient care is a general hospital, a specialized hospital, or a Chinese medicine hospital, = 0 otherwise
Last inpatient visit in the last month	
Utilization	= 1 if having received inpatient care in the past year, = 0 if not
OOP expenditure	The OOP amount paid (or will be paid) for this visit
Share of OOP in consumption	OOP expenditure divided by per capita household consumption
OOP pharmaceutical spending	The OOP amount paid for medications from this visit

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Variable	Definition
OOP non-pharmaceutical spending	OOP expenditure minus OOP pharmaceutical spending
Share of pharmaceutical spending	OOP pharmaceutical spending divided by OOP expenditure
Community health center	= 1 if the last health facility visited for inpatient care is a community healthcare center, or a Healthcare post, = 0 otherwise
Township hospital	= 1 if the last health facility visited for inpatient care is a township hospital, = 0 otherwise
County/City hospital	= 1 if the last health facility visited for inpatient care is a general hospital, a specialized hospital, or a Chinese medicine hospital, = 0 otherwise
Covariates	
Female	=1 if female, = 0 if male
Rural resident	=1 if living in a rural village, = 0 otherwise
Migrant	=1 if living in a urban community and have a rural *hukou*, = 0 otherwise
Urban resident	=1 if living in a urban community and have a urban *hukou*
Living with spouse	= 1 if married and living with spouse, = 0 otherwise
Not living with spouse	= 1 if married but not living with spouse temporarily, = 0 otherwise
Not married	= 1 if separated, divorced, widowed, or never married, = 0 otherwise
Age 45∼55	= 1 if age$\geq$ 45 and age$<$ 55, = 0 otherwise
Age 55∼65	= 1 if age$\geq$ 55 and age$<$ 65, = 0 otherwise
Age $\geq$65	= 1 if age$\geq$ 65, = 0 otherwise

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Variable	Definition
Education below primary	= 1 if no formal education, or did not finish primary school, = 0 otherwise
Education primary	= 1 if home school or highest education level is primary school, = 0 otherwise
Education middle school	= 1 if highest education level is middle school, = 0 otherwise
Education high school+	= 1 if highest education level is or above high school, = 0 otherwise
Working	= 1 if have engaged in agricultural work (including farming, forestry, fishing, and husbandry for own family or others) for more than 10 days in the past year, or have worked for at least one hour last week, or currently on leave from work but expect to return to job within 6 months, = 0 otherwise
Good health	= 1 if self-rated health is excellent, very good, or good
Fair health	= 1 if self-rated health is fair, = 0 otherwise
Bad health	= 1 if self-rated health is poor or very poor, = 0 otherwise
Current smoker	= 1 if current smoker, = 0 otherwise
Former smoker	= 1 if not currently smoking but used to smoke, = 0 otherwise
Never smoked	= 1 if never smoked, = 0 otherwise
Drinking	= 1 if drink alcoholic beverages more than once a month, = 0 otherwise
Disabled	= 1 if have any of the listed disabilities (physical disabilities, brain damage/mental retardation, vision loss, hearing loss, speech impediment), = 0 if none
Chronic disease	= 1 if diagnosed with any of the 14 listed chronic diseases, = 0 otherwise

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Variable	Definition
Chronic disease missing	= 1 if missing response for diagnoses, = 0 otherwise
Log per capita consumption	Logarithm of annualized household consumption (excluding medical expenditure) divided by number of household members. Annualized household consumption is calculated as the sum of the following: spending on food (including home-grown food), eating out, alcohol and tobacco in the last week, multiplied by 52; spending on 7 listed items (communication, water and electricity, fuels, maids/housekeepers/servants, household items and personal toiletries, and entertainment) in the last month, multiplied by 12; and spending on 13 other listed items (clothing and bedding, travelling expenses, heating, furniture and durable goods, education and training, fitness, beauty, transportation and telecommunication, taxes and government fees, automobiles, electronics, property management, and donations) in the last year. This variable is recoded to 0 for those without valid reporting of consumption data, while a binary variable "consumption missing" (see below) is also included in the estimation.
Consumption missing	=1 if no valid data on consumption, = 0 otherwise.
Year 2011	= 1 if wave of data is 2011, = 0 otherwise
Year 2013	= 1 if wave of data is 2013, = 0 otherwise

Notes: All monetary measures are deflated to 2011 RMB.

Table A3: Summary statistics

	Insured (94.7%)	Uninsured (5.3%)	Difference	Total
	mean (s.d.)	mean (s.d.)	mean (s.e.)	mean (s.d.)
Insurance				
UEBMI	0.11 (0.32)			0.11 (0.31)
URBMI	0.05 (0.21)			0.04 (0.21)
NCMS	0.77 (0.42)			0.72 (0.45)
Multiple/Other insurances	0.07 (0.26)			0.07 (0.25)
Local insurance	0.94 (0.24)			0.89 (0.32)
Elsewhere insurance	0.06 (0.24)			0.06 (0.24)
Last outpatient visit in the last month				
Utilization	0.18 (0.39)	0.13 (0.34)	0.05*** (0.01)	0.18 (0.39)
OOP expenditure ($N = 5,889$)	390 (816)	323 (615)	67 (55)	388 (810)
OOP pharmaceutical spending ($N = 5,115$)	183 (398)	156 (392)	27 (29)	182 (398)
OOP non-pharmaceutical spending ($N = 5,115$)	174 (570)	170 (461)	4 (41)	174 (566)
Share of pharma. spending in OOP expenditure ($N = 5,115$)	0.68 (0.39)	0.69 (0.40)	0.00 (0.03)	0.68 (0.39)
Community health center/ village clinic ($N = 5,889$)	0.46 (0.50)	0.53 (0.50)	−0.07** (0.03)	0.46 (0.50)
Township hospital ($N = 5,889$)	0.19 (0.39)	0.15 (0.36)	0.03 (0.03)	0.19 (0.39)

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	Insured (94.7%)	Uninsured (5.3%)	Difference	Total
	mean (s.d.)	mean (s.d.)	mean (s.e.)	mean (s.d.)
County/City hospital ($N = 5,889$)	0.35 (0.48)	0.32 (0.47)	0.03 (0.03)	0.35 (0.48)
Last inpatient visit in the last 12 months				
Utilization	0.10 (0.30)	0.05 (0.22)	0.05*** (0.01)	0.10 (0.30)
OOP expenditure ($N = 3,119$)	4,082 (6,237)	5,593 (7,057)	−1,511** (692)	4,123 (6,264)
OOP pharmaceutical spending ($N = 1,678$)	1,621 (3,395)	2,241 (2,980)	−620 (464)	1,641 (3,383)
OOP non-pharmaceutical spending ($N = 1,678$)	2,361 (4,827)	3492.81 (6,860)	−1,132* (673)	2,398 (4908)
Share of pharma. spending in OOP expenditure ($N = 1,678$)	0.48 (0.38)	0.47 (0.39)	0.00 (0.05)	0.48 (0.38)
Community health center ($N = 3,119$)	0.03 (0.18)	0.01 (0.11)	0.02 (0.02)	0.03 (0.18)
Township hospital ($N = 3,119$)	0.21 (0.41)	0.08 (0.28)	0.13*** (0.04)	0.21 (0.41)
County/City hospital ($N = 3,119$)	0.75 (0.43)	0.90 (0.30)	−0.15*** (0.05)	0.76 (0.43)
Covariates				
Female	0.51 (0.50)	0.54 (0.50)	−0.03*** (0.01)	0.51 (0.50)
Rural resident	0.73 (0.45)	0.55 (0.50)	0.18*** (0.01)	0.72 (0.45)
Rural migrant	0.06 (0.23)	0.14 (0.34)	−0.08*** (0.01)	0.06 (0.24)
Urban resident	0.21 (0.41)	0.32 (0.47)	−0.10*** (0.01)	0.22 (0.41)

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	Insured (94.7%)	Uninsured (5.3%)	Difference	Total
	mean (s.d.)	mean (s.d.)	mean (s.e.)	mean (s.d.)
Living with spouse	0.82 (0.39)	0.71 (0.46)	0.11*** (0.01)	0.81 (0.39)
Not living with spouse	0.06 (0.24)	0.07 (0.26)	−0.01** (0.01)	0.06 (0.24)
Not married	0.12 (0.33)	0.22 (0.41)	−0.10*** (0.01)	0.13 (0.33)
Age 45∼55	0.34 (0.47)	0.36 (0.48)	−0.02** (0.01)	0.34 (0.47)
Age 55∼65	0.38 (0.48)	0.34 (0.47)	0.03*** (0.01)	0.37 (0.48)
Age $\geq$ 65	0.29 (0.45)	0.30 (0.46)	−0.01 (0.01)	0.29 (0.45)
Education below primary	0.44 (0.50)	0.51 (0.50)	−0.07*** (0.01)	0.45 (0.50)
Education primary	0.22 (0.41)	0.20 (0.40)	0.02* (0.01)	0.22 (0.41)
Education middle school	0.21 (0.41)	0.19 (0.39)	0.03** (0.01)	0.21 (0.41)
Education high school+	0.13 (0.33)	0.10 (0.30)	0.02*** (0.01)	0.13 (0.33)
Working	0.68 (0.47)	0.60 (0.49)	0.08*** (0.01)	0.68 (0.47)
Good health	0.24 (0.43)	0.27 (0.44)	−0.03*** (0.01)	0.24 (0.43)
Fair health	0.48 (0.50)	0.44 (0.50)	0.04*** (0.01)	0.48 (0.50)
Poor health	0.28 (0.45)	0.29 (0.45)	−0.01 (0.01)	0.28 (0.45)
Never smoker	0.58	0.59	−0.01	0.58

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	Insured (94.7%)	Uninsured (5.3%)	Difference	Total
	mean (s.d.)	mean (s.d.)	mean (s.e.)	mean (s.d.)
	(0.49)	(0.49)	(0.01)	(0.49)
Current smoker	0.30	0.29	0.01	0.30
	(0.46)	(0.45)	(0.01)	(0.46)
Former smoker	0.12	0.12	0.01	0.12
	(0.33)	(0.32)	(0.01)	(0.33)
Drinking	0.26	0.23	0.04***	0.26
	(0.44)	(0.42)	(0.01)	(0.44)
Disabled	0.15	0.18	−0.03***	0.15
	(0.36)	(0.39)	(0.01)	(0.36)
Chronic disease	0.69	0.62	0.08***	0.69
	(0.46)	(0.49)	(0.01)	(0.46)
Chronic disease missing	0.02	0.02	0.00	0.02
	(0.13)	(0.14)	(0.00)	(0.13)
Per capita consumption (N = 31,205 excluding missing)	6,094 (8,457)	5,779 (9,098)	315 (218)	6,078 (8,491)
Consumption missing	0.04	0.07	−0.03***	0.04
	(0.20)	(0.26)	(0.00)	(0.20)
Year 2011	0.49	0.63	−0.14***	0.50
	(0.50)	(0.48)	(0.01)	(0.50)
Year 2013	0.51	0.37	0.14***	0.50
	(0.50)	(0.48)	(0.01)	(0.50)
N	30,661	1,726	32,387	32,387

Source: CHARLS 2011 and 2013.
Notes: All monetary measures are deflated to 2011 RMB. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

Table A4: Heterogeneous effects of various health insurance schemes across terciles of per capita household consumption

	Terciles of consumption		
	Low	Medium	High
Panel A: Outpatient utilization, logit			
UEBMI	−0.068*	0.051	0.063***
	(0.039)	(0.033)	(0.021)
URBMI	−0.040	0.078**	−0.004
	(0.031)	(0.033)	(0.039)
NCMS	0.021	0.078***	−0.014
	(0.019)	(0.021)	(0.045)
Multiple/Other insurances	−0.017	0.054*	0.045**
	(0.026)	(0.032)	(0.021)
N	10,353	10,334	10,337
Panel B: Outpatient OOP spending, GLM			
UEBMI	0.914***	0.306	−0.530
	(0.318)	(0.235)	(0.500)
URBMI	0.508	0.461*	−0.196
	(0.363)	(0.279)	(0.464)
NCMS	0.432**	−0.027	−0.309
	(0.174)	(0.209)	(0.435)
Multiple/Other insurances	0.574**	0.362	−0.639
	(0.289)	(0.265)	(0.545)
N	1,816	1,920	1,962
Panel C: Inpatient utilization, logit			
UEBMI	0.030	0.035	0.055
	(0.025)	(0.023)	(0.039)
URBMI	0.022	0.010	0.025
	(0.028)	(0.025)	(0.047)
NCMS	0.032*	0.024	0.034
	(0.017)	(0.020)	(0.040)
Multiple/Other insurances	0.034	0.033*	0.041
	(0.021)	(0.020)	(0.044)
N	10,323	10,315	10,337
Panel D: Inpatient OOP spending, GLM			
UEBMI	−0.923***	−0.586***	−0.217
	(0.308)	(0.205)	(0.263)
URBMI	−1.012***	−0.365	−0.319
	(0.324)	(0.245)	(0.263)
NCMS	−0.429**	−0.178	−0.163
	(0.199)	(0.189)	(0.202)
Multiple/Other insurances	−0.241	−0.628***	−0.374
	(0.318)	(0.230)	(0.257)
N	877	1,005	1,091

Notes Sampling weights are applied in all models to obtain the estimates. Average marginal effects (probabilities) are reported for logit models, whereas coefficients are reported for GLM models. Clustered standard errors at the county level are in parentheses. ***, **, and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All the covariates in Online Appendix Table A2 and provincial fixed effects are controlled for but not reported here.

Table A5: Percentage distribution of variables across resident status

	Percentages							
	Urban residents		Rural migrants		Rural residents		Total	
	%	s.e.	%	s.e.	%	s.e.	%	s.e.
Insurance status								
No insurance	7.71	(0.63)	11.58	(1.09)	4.06	(0.23)	5.33	(0.26)
UEBMI	46.08	(1.99)	2.32	(0.61)	0.74	(0.10)	10.79	(0.86)
URBMI	18.08	(1.20)	1.28	(0.41)	0.60	(0.22)	4.48	(0.44)
NCMS	11.52	(1.68)	79.65	(1.48)	90.50	(0.45)	72.49	(1.38)
Multiple/Other	16.60	(0.85)	5.17	(0.61)	4.10	(0.28)	6.91	(0.34)
Total	100.00		100.00		100.00		100.00	
Insurance account location								
No insurance	7.71	(0.63)	11.58	(1.09)	4.06	(0.23)	5.33	(0.26)
Local insurance	85.93	(0.74)	70.03	(1.95)	91.28	(0.46)	88.78	(0.45)
Elsewhere insurance	6.36	(0.51)	18.38	(1.62)	4.66	(0.40)	5.89	(0.35)
Total	100.00		100.00		100.00		100.00	
Education level								
Below primary	18.49	(1.06)	50.76	(1.90)	52.12	(0.95)	44.65	(0.96)
Primary	17.63	(0.80)	21.09	(1.35)	22.94	(0.56)	21.66	(0.48)
Middle school	28.14	(0.95)	21.00	(1.35)	18.84	(0.58)	21.02	(0.52)
High school+	35.74	(1.40)	7.15	(0.81)	6.10	(0.30)	12.67	(0.61)
Total	100.00		100.00		100.00		100.00	
Per capita household consumption								
1^{st} quintile	7.43	(0.71)	18.14	(1.36)	23.98	(0.74)	20.01	(0.67)
2^{nd} quintile	11.09	(0.68)	17.83	(1.18)	22.93	(0.47)	20.03	(0.45)
3^{rd} quintile	15.59	(0.65)	18.41	(0.98)	21.45	(0.39)	19.98	(0.36)
4^{th} quintile	25.88	(0.82)	22.81	(1.19)	18.00	(0.48)	20.02	(0.44)
5^{th} quintile	40.01	(1.63)	22.81	(1.45)	13.65	(0.56)	19.96	(0.75)
Total	100.00		100.00		100.00		100.00	
N	7,107		2,029		23,251		32,387	

Notes This table reports the frequency distribution of certain variables in column percentages across urban residents, rural migrants, and rural residents. Standard errors are in parentheses.