



Examining the association between social health insurance participation and patients' out-of-pocket payments in China: The role of institutional arrangement

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ABSTRACT

Previous work on the relationship between social health insurance (SHI) participation and patients' out-of-pocket payments (OOP) in China has overlooked the mediating mechanisms of the institutional arrangement. This study establishes a conceptual framework involving the reimbursement, behavior management and purchasing mechanisms to elaborate on the institutional arrangement of SHI in China. Using structural equation modeling, data on 1645 hospitalized patients obtained from a nationally representative survey in China are analyzed. The results show that the behavior management and purchasing mechanisms of SHI perform poorly, undermining the function of the reimbursement mechanism and mitigating the association between SHI participation and OOP. As a result, SHI participation has a weak negative or even no significant association with the OOP of hospitalized patients. This seems to contradict the principles of SHI, which aims to reduce people's OOP and enhance their well-being. These findings are expected to provide valuable insights to the ongoing healthcare reform process in China.

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1. Introduction

A wave of social health insurance (SHI) initiatives has swept across many developing countries in recent years (Hsiao and Shaw, 2007; Wagstaff, 2007). SHI, as an approach to financing the mobilizing of funds and pooling of risk, is seen by many health planners as a “magic” solution to health financing and delivery problems (Hsiao and Shaw, 2007).

SHI has made remarkable progress in China from the end of the 1990s to the beginning of the 2010s, alongside the restoration of Chinese social security systems under economic transition. In 1998, the state established the Urban Employee Basic Medical Insurance (UEBMI) scheme for employees with formal contracts in urban areas, replacing the traditional Labor Medical Insurance program; in 2003, the New Cooperative Medical Scheme (NCMS) succeeded the traditional Cooperative Medical Scheme and offered cover to rural residents; after that, in 2007, the state piloted the Urban Resident Basic Medical Insurance (URBMI) scheme for unemployed

urban residents and then gradually expanded it to other cities. At the time of writing, the SHI system in China comprises four schemes: UEBMI, URBMI, NCMS, and Government Medical Insurance (GMI) for employees in government and public institutions, with GMI enrollees being gradually transformed to the UEBMI. By 2011, the SHI system in China had almost reached universal coverage, with over 90% of residents enrolled in these schemes (Yip et al., 2012).

The slogan favored by those who advocate SHI is that it decreases patients' out-of-pocket payments (OOP) and hence reduces health-related financial problems. However, the problem of the affordability of healthcare seems not to be mitigated by the development of SHI, even though such schemes now cover almost the whole population in China. A 2010 survey shows that public complaints about the problems of healthcare reform and affordability in urban areas increased from 21.1% in 2007 to 34.8% in 2009 (Horizon China Research and Consultation Group, 2010). Using data from three household surveys, Wagstaff and Lindelow (2008) suggest that SHI participation actually increases the risk of high and even catastrophic spending. Other studies note that participation in various SHI schemes has no measurable effect on the reduction of financial risk (Sun et al., 2009a,b; Yip and Hsiao, 2009;

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Wagstaff et al., 2009; Lei and Lin, 2009; Long et al., 2010; Liu and Tsegao, 2011). Nevertheless, other studies draw the opposite conclusion, arguing that different SHI schemes are indeed effective in reducing people's medical expenses and enhancing the affordability of healthcare (Liu et al., 2011; Jung and Liu, 2012).

Why is the impact of SHI participation on the problem of affordability and medical expenses so controversial? Specific effort should be devoted to investigating the mechanisms by which SHI participation affects patients' OOP in more depth. SHI is theoretically not only a financial intermediary which aims to reimburse its enrollees, but also a policy instrument to regulate care-seeking behaviors and an active purchaser involved in regulating and inspecting the perverse incentives to providers (Hsiao, 2007; Eggleston et al., 2008; Yip and Hanson, 2009). In practice, the development of SHI is one of the major methods used to improve the performance of the healthcare system in China (Central Committee of Communist Party of China and State Council, 2009; Ministry of Human Resource and Social Security, 2011). In the first three years (2009–2011) of the latest healthcare reforms, the government invested more than ¥1.4 trillion (Chinese yuan), of which about half was used to subsidize the demand to participate in various SHI schemes (Yip et al., 2012).

Previous studies attribute the problem of affordability and medical expenses in China to serious malfunctions in its healthcare systems, such as rapid cost inflation, distorted price schedules, perverse incentives for providers and supplier-induced demand for unnecessary care, passive purchasing performance and fee-for-service payments, failure of referral systems and tiered copayment requirements, non-evidence-based benefit packages and so on (Eggleston et al., 2008; Liu and Mills, 1999; Wagstaff and Lindelow, 2008; Yip et al., 2012; Yip and Hsiao, 2008, 2009). However, few studies investigate the mediating mechanisms of the institutional arrangement of SHI in linking participation to outcomes. Given the rapid development of SHI in China, an emerging question is whether its development can improve the performance of various parts of the healthcare system and, in turn, improve the affordability of healthcare.

Using data from the China Health and Retirement Longitudinal Study, this study aims to investigate the association between SHI participation and patients' OOP as well as the mediating role of institutional arrangement in this relationship. It is expected to fill the knowledge gap in previous studies which have overlooked these aspects of SHI. Moreover, to date most performance measurement targets in Chinese healthcare reform have been criticized as being input-based (such as finance, enrollment, training sessions, and buildings) rather than outcome-based (Yip et al., 2012). Without cost-effective institutional arrangements, the lion's share of health investment in China is likely to be wasted and to be captured by providers as higher income and profits rather than producing benefit and improved wellbeing for patients. This serious potential problem, along with the commendable development of SHI, makes it both necessary and urgent to investigate the performance of the institutional arrangement of SHI and to assess its role in transforming benefits and input into cost-effective services and the wellbeing of the people.

2. Institutional arrangement of SHI

Debates about the relationship between welfare rights of participation and people's wellbeing have been going on for a long time (Taylor, 2007; George and Wilding, 1994). Nevertheless, an increasing number of scholars deemphasize the nature of welfare rights *per se*, focusing instead on the rationality and efficiency of the institutional arrangement of social policies (Gilbert and Terrell, 2013; Le Grand, 1993). Institutional arrangements denote the

mechanisms in the policy process from welfare participation to outcome. A rational and efficient social policy can redistribute resources and improve people's wellbeing. Taking a resource allocation perspective, Dwyer (2000) uses the questions of *who gets what, how they get it and why they are seen as being entitled to it* to reveal the key elements of the institutional arrangement of welfare policy. Similarly, Gilbert and Terrell (2013) employ a benefit-allocation framework to interpret social welfare policies as choices among principles determining *what benefits are offered, to whom they are offered, how they are delivered, and how they are financed*.

Following these insights, five institutional components can be detected: the target of welfare benefits (who gets welfare benefits), benefits provision (what benefits are offered), provision rationale (why beneficiaries are seen as being entitled), provision mode (how benefits are delivered), and financing (how benefits are financed). This study considers the target of benefits to be in itself an institutional component, reflecting welfare participation, and SHI as an approach to health financing. Therefore, the study excludes the components of target and financing, and constructs a conceptual framework of institutional arrangements which involves benefits provision, provision rationale and provision mode to explore the vehicles for the delivery of SHI.

2.1. Benefits provision: the reimbursement mechanism

Social democracy theory sees welfare benefits as necessary to realize social solidarity. Structural inequality is seen as a major threat to freedom, and the provision of welfare benefits by government as an effective means of creating and increasing individual freedom (Titmuss, 1963). Thus, the logic of social democracy theory seems to be straightforward: one obtains welfare benefits through enrolling in welfare programs, and as a result enhances one's wellbeing. That is, the performance of benefits provision mediates the effect of participation in welfare programs on beneficiaries' wellbeing.

The reimbursement mechanism is the first and most important institutional arrangement of SHI to generate a risk-spreading function and to provide benefits. A SHI agency collects premiums and pools them into a shared account. Enrollees can have the lion's share of their medical expenses reimbursed by the pooled funds when they spend with the designated healthcare organizations (Hsiao and Shaw, 2007). The increase in the reimbursed fee indicates the improved performance of the reimbursement mechanism. Therefore, this study uses the variable *reimbursement rate* to represent such performance.

We thus develop the first hypothesis, namely that people enrolled in SHI schemes, whether GMI, UEBMI, URBMI, or NCMS, will enjoy a higher reimbursement rate than those who are uninsured, and further that reimbursement rate has a negative association with OOP (Hypothesis 1).

2.2. Provision rationale: the behavior management mechanism

Many neo-liberal and New Right scholars critique social democracy theory as focusing too much on the extent but not the nature of social policy (Taylor, 2007; George and Wilding, 1994; Mead, 1986). Universal welfare rights are regarded as socially damaging and the cause of many social problems such as welfare dependency and behavior dysfunctions of the underclass. Mead (1986) argues that the fundamental cause of these problems is the permissiveness of welfare programs rather than their size. If social programs are unavoidable, beneficiaries must take on some responsibilities, such as enrollment contribution and behavior management, before or after they enjoy the welfare rights offered. Welfare systems should therefore be concerned not only with

making services available, but utilizing welfare policy in an instrumental way to promote certain types of behavior (Deacon, 2002). The performance of a behavior management mechanism may thus have a mediating effect on the relationship between participation in welfare programs and beneficiaries' wellbeing.

The behavior management requirement corresponds with the regulation of the referral system (Gerdtham and Jonsson, 2000) and tiered copayment (Robinson, 2003) aspects of health insurance. Primary health facilities in many nations implementing SHI are treated as gatekeepers in the health service by referring patients to secondary and tertiary hospitals. Meanwhile, insurers set lower copayments and deductibles for treatments in primary healthcare organizations, and higher ones in secondary and tertiary hospitals. The aims of the two regulations are to encourage people to seek treatment from primary healthcare organizations and hence to improve the equitable allocation of medical resources. In this study, we use the variable *level of facility* used by patients to denote the performance of the behavior management mechanism.

However, things are different in China, where there is an extreme inequity in health resource allocation. Personnel in rural areas are less qualified, different hospitals have different kinds of equipment and drugs, and some township and community health centers are poorly managed (Zhang and Kanbur, 2005). Despite resources being limited overall, they are over-allocated to tertiary hospitals in cities due to the special political and economic priorities which emphasize urban development. Furthermore, consumer information about either health insurance or the restricted choice of healthcare providers in China is limited (Xu and Van de Ven, 2012). The amount of equipment and drugs, and the scale of hospital facilities, are among the most important factors that attract the attention of patients (Xiong et al., 2012). Against this backdrop, insured patients may be more willing than uninsured ones to choose secondary or tertiary hospitals with good-quality resources but higher fees and copayments. This is because the reimbursed benefits provided by SHI may encourage insured patients to use higher-level facilities.

We thus develop the second hypothesis that patients who participate in SHI (that is, GMI, UEBMI, URBMI, or NCMS) may go to higher-level facilities for treatment than the uninsured, and that such facilities will induce patients to pay higher OOP (Hypothesis 2).

2.3. Provision mode: the purchasing mechanism

Social democracy, neo-liberalism, and New Right theories propose two different approaches to providing welfare: the first advocates for direct government provision and the latter two the free market (Dwyer, 2010; Taylor, 2007; George and Wilding, 1994). However, both approaches have been criticized as being too extreme to deliver welfare efficiently (Baldock et al., 2003). Since the 1970s, the new managerialism movement, a reform supporting the privatization and contracting out of public services, has dominated the social policy of many governments, resulting in a mixed economy of welfare. The introduction of a third-party purchaser changes the nature of power and politics in the welfare system, transforming the role of government from direct provider to monitor or regulator (Baldock et al., 2003). The performance of the purchasing mechanism is expected to play a salient mediating role in the relationship between welfare rights and people's wellbeing.

A purchasing mechanism was first introduced into health insurance reforms in the USA in the 1970s to restrict the cost inflation of healthcare and to enhance the efficiency and quality of delivery (Enthoven, 1988). In terms of SHI, the agency acts not only as a payer for enrollees, but also a purchaser in terms of purchasing health services collectively from providers. Such a SHI agency has to

be able to control fraudulent claims and supplier-induced demand for unnecessary services through developing and implementing adequate inspection and auditing mechanisms (Figueras et al., 2005; Hsiao, 2007). An active purchasing mechanism is expected to play a cost-containment function in terms of payments. This study thus used the variable *cost-containment level* to represent the performance of the purchasing mechanism in terms of medical costs. Specifically, we use two indicators, length of stay in hospital and type of treatment items (medication, tests involving high-tech equipment, surgery, and so on) to represent the cost-containment level of the purchasing mechanism.

Studies indicate that the purchasing mechanism in China is generally dysfunctional due to inefficient fee-for-service payment schemes and the lack of bargaining and contracting skills of SHI agencies (Gu, 2010; Meng, 2008; Yip and Hanson, 2009; Xu and Van de Ven, 2009). Therefore, the passive purchasing of SHI agencies may not deliver the cost-containment function, but rather stimulate perverse incentives for providers who take advantage of the reimbursement and risk-pooling of arrangements of SHI schemes to charge more for insured patients. Additionally, we also test for the association between facility level and the performance of the purchasing mechanism. Higher-level facilities are even harder to inspect and monitor than their lower-level counterparts, because the former have advanced status in terms of either information asymmetry or bargaining power. If, as we hypothesize, SHI participation makes patients move up the provider ladder from lower- to higher-level facilities, this may accentuate the informational asymmetry between provider and patient and cause providers to prescribe more high-tech and expensive care (Wagstaff and Lindelow, 2008).

Therefore, we develop the third hypothesis that patients participating in SHI schemes (that is, GMI, UEBMI, URBMI, or NCMS) will stay longer in hospital and receive more types of treatment items than the uninsured; a longer stay will increase the numbers of types of treatment items; a longer stay and more types of treatment items will raise patients' OOP; and the level of facilities that patients use will have a positive relationship with length of stay and type of treatment item (Hypothesis 3).

In summary, we construct a conceptual framework to understand the role of the institutional arrangement of SHI through three mechanisms: reimbursement, behavior management, and purchasing. Meanwhile, we use three mediating variables, namely reimbursement rate, facility level, and cost-containment level to represent the performance of each of the three mechanisms in the process from SHI participation to OOP. Three sets of hypotheses are developed, each testing one of the mechanisms of the institutional arrangement in the relationship between SHI participation and OOP. The conceptual framework of the study is presented in Fig. 1.

3. Methods

3.1. Data

The data used in this study were drawn from the latest wave of the China Health and Retirement Longitudinal Study, which was administered in 28 out of 31 provinces (Tibet, Ningxia and Hainan Province not included) in China in 2011. The sample is representative of people aged 45 and over. All samples were collected using a multi-stage cluster sampling method, drawn in four stages including county-, neighborhood-, household-, and respondent-level sampling with probabilities proportional to size sampling used in the former two stages. At the first stage, 150 counties/districts were selected randomly by region from over 2000 county-level units in 28 provinces according to the population size of each county. At the second stage, three administrative villages (*cun*)

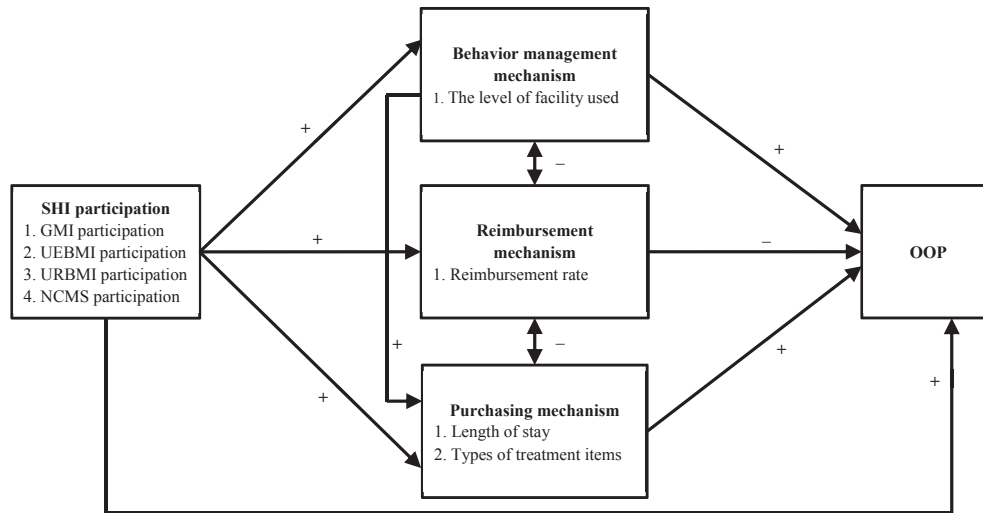


Fig. 1. Hypothesized model.

in rural areas and neighborhoods (*shequ*) in urban areas were selected randomly from each selected county/district adjusted for the population size of villages and neighborhoods. At the third stage, 80 households from each village/neighborhood were selected randomly with the assistance of a specialized Geographical Information System program. Finally, at the fourth stage, one person aged 45 or older and his/her spouse were randomly selected from each eligible household, while one person aged between 40 and 44 was also selected for future rounds of the survey. A total of 17,587 participants were finally selected out of 10,257 households, with a response rate of 80.51% (Zhao et al., 2013).

In this study, we have selected those participants from the original sample who had been hospitalized in the past year out, giving a sample of 1645. The reason we did not select participants who received outpatient services was that not all places in China have established a pooling for this type of care. In other words, patients who participate in SHI schemes cannot get their outpatient expenditure reimbursed in places where only inpatient services are insured. Thus we could not compare the insured with the uninsured in terms of the relationship between SHI participation and OOP for outpatient services. The procedure of the study were approved and monitored by the Survey and Behavioral Research Ethics Committee of The Chinese University of Hong Kong. The descriptive statistics of our sample are displayed in Table 1.

3.2. Measures

3.2.1. OOP

Participants reported their OOP for their last hospitalization. In this study, we measure it using ¥1000 as the unit.

3.2.2. SHI participation

Participants were asked if they participated in any of the SHI schemes, including GMI, UEBMI, URBMI, and NCMS. In the analysis, SHI participation was recoded into 4 dummy variables: *GMI participation* (1 = yes; 0 = no insurance), *UEBMI participation* (1 = yes; 0 = no insurance), *URBMI participation* (1 = yes; 0 = no insurance), and *NCMS participation* (1 = yes; 0 = no insurance), with uninsured patients as the reference group.

3.2.3. Institutional arrangement

Reimbursement rate of SHI was measured by reimbursed fees divided by the total medical cost of the last hospitalization. *Facility*

level was assessed by the level of the healthcare agencies visited by patients during their last inpatient care, with a value of 1 indicating “healthcare post/village clinic/private clinic,” 2 indicating “township/community health center,” 3 indicating “county/district hospital,” 4 indicating “city/regional hospital,” and 5 indicating “provincial/ministry/military hospital.” *Length of stay* was measured by the number of inpatient days during the last hospitalization. Participants were also asked to report the *types of treatment items* provided by doctors during their last hospitalization, based on a multiple choice question, including five main categories: medications, tests involving high-tech equipment (X-ray, CT, B-ultrasonic, and MRI), surgery, injections and laboratory tests.

3.2.4. Control variables

Several variables were controlled for when testing the hypothesized model, including age, gender, place of residence, education, employment, facility location, health status, and economic status. Participants were asked to report their *age*, *gender* (1 = male; 0 = female), *place of residence* (1 = urban area; 0 = rural area), *educational level* (1 = no education; 2 = elementary school; 3 = middle school; 4 = high or vocational school; 5 = bachelor's or associate degree; 6 = master's or doctoral degree) and the *location of the facilities* they visited in their last hospitalization (1 = this street/village; 2 = this district/township; 3 = this city/county; 4 = this province; 5 = other province). They were also asked to report their *employment status*, including unemployed or never worked, employed, self-employed, farming, and retired. We recorded employment status into 4 dummy variables: employed (1 = yes; 0 = unemployed or never worked), self-employed (1 = yes; 0 = unemployed or never worked), farming (1 = yes; 0 = unemployed or never worked), and retired (1 = yes; 0 = unemployed or never worked), with the unemployed or those who had never worked as the reference group. Health status and economic status were assessed as two latent constructs. The observed indicators forming the latent construct of *health status* included self-reported health status, chronic conditions, and functional limitations, which have been reported to be good indicators (Gu et al., 2009; Idler and Benyamini, 1997). Self-reported health status was measured by one question, “Would you say your health is excellent, very good, good, fair, poor, or very poor?” The response category of “excellent” was scored as 1, “very good” as 2, “good” as 3, “fair” as 4, “poor” as 5, and “very poor” as 6. Chronic

Table 1
Descriptive statistics.^a

	Frequency	Percent	Mean	S.D.
SHI participation				
GMI	43	2.6		
UEBMI	218	13.3		
URBMI	61	3.7		
NCMS	950	57.8		
No insurance	246	15.0		
Facility level				
Healthcare post/village clinic/private clinic	34	2.1		
Township/community health center	364	22.1		
County/district hospital	860	52.3		
City/regional hospital	222	13.5		
Provincial/ministry/military hospital	78	4.7		
Length of stay (days)			13.25	11.21
Types of treatment items			2.86	1.60
Reimbursement rate				
GMI			.58	.37
UEBMI			.58	.28
URBMI			.45	.31
NCMS			.33	.29
No insurance			.00	.00
OOP (¥1000 yuan)			4.64	10.42
Age			62.32	10.59
Gender				
Male	810	49.2		
Female	835	50.8		
Place of residence				
Urban	717	43.6		
Rural	928	56.4		
Education				
No education	480	29.2		
Elementary school	669	40.7		
Middle school	309	18.8		
High or vocational school	144	8.8		
Bachelor's or associate degree	37	2.2		
Master's or doctoral degree	0	0		
Employment				
Unemployed or never worked	548	36.3		
Employed	149	9.1		
Self-employed	86	5.2		
Farming	472	28.7		
Retired	305	18.5		
Facility location				
This street/village	223	13.6		
This district/township	446	27.1		
This city/county	765	46.5		
This province	126	7.7		
Other province	43	2.6		
Health status				
Self-reported health status			4.44	.77
Chronic conditions			2.20	1.67
Functional limitations			15.69	6.63
Economic status				
Household income (¥10,000 yuan)			2.56	3.28
Household wealth (¥10,000 yuan)			14.13	25.43

^a SHI = Social health insurance; OOP = Out-of-pocket payment; GMI = Government Medical Insurance; UEBMI = Urban Employee Basic Medical Insurance; URBMI = Urban Resident Basic Medical Insurance; NCMS = New Cooperative Medical Scheme.

conditions were assessed by asking participants the number of chronic diseases from which they suffered. Functional limitations were measured by the 11-item adjusted version of the Instrumental Activities of Daily Living Scale (Lawton and Brody, 1969). Participants were asked to use a 4-point response scale ranging from “I don't have any difficulty (1)” to “I cannot do it (4)” to indicate whether they had difficulty performing any of the following activities: dressing, bathing, eating, getting into or out of bed, using the toilet, controlling urination and defecation, doing household

chores, preparing hot meals, shopping for groceries, managing money, and taking medications. The Cronbach's alpha of the scale in this sample was .912. In this study, the standardized sum score of the scale was used as an observed indicator to assess the functional limitations of participants. Finally, two variables, household income and household wealth, were used to form the latent construct of *economic status* (Stewart, 2009). Household income was calculated by asking participants to indicate all types of income received by members. Household wealth was assessed by asking participants to evaluate the total value of all types of asset possessed by household members including houses, land, equipment, and financial assets less debt. In this study, we measured the two indicator variables using ¥10,000 as the unit.

The measures of all the above variables are summarized in Table 2.

3.3. Statistical analysis

We used structural equation modeling (SEM) with maximum likelihood estimation, conducted using AMOS 20 (Arbuckle, 2011), to test the hypothesized model.

Three indicators of goodness of fit were used. Firstly, the chi-square coefficient (χ^2) where a nonsignificant χ^2 represents a closer fit of the hypothesized model to the perfect fit (Bollen, 1989). Secondly, the Compared Fit Index (CFI), with values above .90 representing a good fit (Bentler, 1990), and thirdly, the Root Mean Square Error of Approximation (RMSEA) where a value of less than .05 indicates a close fit, between .05 and .08 indicates a reasonable fit, and above .10 indicates a poor fit (Steiger, 1990; Kline, 2005).

It is important to acknowledge the methodological limitations of this study. Firstly, the average age of the sample is higher than in the population as a whole. Secondly, our investigation is cross-sectional, so causal relationship cannot be inferred. Thirdly, the variable types of treatment items in the model may not accurately reflect the cost of treatment. Finally, we were unable to control for some possible confounding variables, such as regional differences and the type and severity of diseases which may influence both SHI participation and OOP.

4. Results

The measurement model of the two latent constructs, namely health and economic status, offered a good fit to the data ($\chi^2 = 20.043$, $df = 4$, $p < .001$; CFI = .982; RMSEA = .049), with all the observed variables loading significantly on the corresponding latent construct. The standardized factor loadings of the indicators for each latent construct are presented in Table 3.

A test of the hypothesized structural model showed that it provided a good fit to the data ($\chi^2 = 251.098$, $df = 58$, $p < .001$; CFI = .977; RMSEA = .045). A total of 24.6% of the variance in the OOP of hospitalized patients was explained by this model.

The standardized solution for the test of the structural model is presented in Fig. 2. For the sake of parsimony, only the significant paths are displayed. Moreover, we used bootstrapping methods to test the significance of the indirect effects hypothesized in the model. The unstandardized and standardized direct, indirect and total effects are presented in Table 4.

Firstly, the behavior management mechanism of all four SHI schemes (GMI, UEBMI, URBMI and NCMS) demonstrated effects as hypothesized. Patients enrolled in any of the four schemes were significantly more likely to seek healthcare from higher-level hospitals than the uninsured. Meanwhile, the level of facility used had a significant positive association with OOP, with one unit increase matched by an increase of ¥2602 in the OOP.

Table 2
Variables and measures.

Concepts	Variables	Measurements
OOP	OOP	Out-of-pocket medical payment for the last hospitalization (¥1000)
SHI participation	GMI participation	1 = yes; 0 = no insurance
	UEBMI participation	1 = yes; 0 = no insurance
	URBMI participation	1 = yes; 0 = no insurance
	NCMS participation	1 = yes; 0 = no insurance
Reimbursement mechanism	Reimbursement rate	Reimbursed fees/total medical cost for the last hospitalization
Behavior management mechanism	Facility level	1 = healthcare post/village clinic/private clinic; 2 = township/community health center; 3 = county/district hospital; 4 = city/regional hospital; 5 = provincial/ministry/military hospital
Purchasing mechanism	Cost-containment level	
	Length of stay	No. of inpatient days for the last hospitalization
	Types of treatment items	No. of types of treatment items for the last hospitalization
Control variables	Age	Age
	Gender	1 = male; 0 = female
	Place of residence	1 = urban areas; 0 = rural areas
	Facility location	1 = this street/village; 2 = this district/township; 3 = this city/county;
		4 = this province; 5 = other province
	Education	1 = no education; 2 = elementary school; 3 = middle school; 4 = high
		or vocational school; 5 = bachelor's or associate degree; 6 = master's or doctoral degree
	Employment	
	Employed	1 = yes; 0 = unemployed or never worked
	Self-employed	1 = yes; 0 = unemployed or never worked
	Farming	1 = yes; 0 = unemployed or never worked
	Retired	1 = yes; 0 = unemployed or never worked
	Health status	
	Self-reported health status	1 = excellent; 2 = very good; 3 = good; 4 = fair; 5 = poor; 6 = very poor
	Chronic conditions	No. of Chronic diseases
	Functional limitations	Instrumental Activities of Daily Living Scale (11 items)
	Economic status	
	Household income	Amount of income received by all household members (¥10,000)
	Household wealth	Total value of household houses, land, equipment and financial assets – total value of household debts (¥10,000)

Secondly, our analysis of the purchasing mechanism of SHI demonstrated similar effects. Patients who participated in GMI were more likely to extend their length of stay in hospital than the uninsured. On average, a GMI patient stayed 5.952 days longer than a patient with no insurance. Patients enrolled in UEBMI and NCMS were more likely to receive more types of treatment items than the uninsured. All three direct effects were statistically significant. In addition, taking the mediation of the level of facility and length of stay into consideration, participation in all four schemes had a significant and positive indirect relationship with either length of stay or types of treatment items. Finally, length of stay in hospital had significant positive direct and indirect association with OOP, with one more day of stay increasing total OOP by ¥319. Type of treatment items also had a significant and positive direct association with OOP, with the provision of one more type of treatment items raising OOP by an average of ¥512.

Thirdly, the reimbursement mechanism of SHI played a significant role in reducing OOP. Participation in any of the four schemes had a significant and positive association with the reimbursement rate of medical expenses. Reimbursement rate, in turn, had a

significant negative association with OOP. Compared with an insured patient who received total reimbursement of all of his/her medical expenses (reimbursement rate = 1, OOP = ¥0), the average uninsured patient had to pay ¥6828 more out-of-pocket.

Finally, the association between the reimbursement mechanism and OOP was seriously undermined by malfunctions in the behavior management and purchasing mechanisms. Although the OOP of patients enrolled in GMI, UEBMI, URBMI and NCMS was reduced by ¥3482 (–.510*¥6828), ¥3612 (–.529*¥6828), ¥2984 (–.437*¥6828), and ¥3114 (–.456*¥6828) respectively through the mediation of reimbursed rate, at the same time it increased by ¥3151 (=¥3482–¥331), ¥2254 (=¥3612–¥1358), ¥1675 (=¥2984–¥1309), and ¥1544 (¥3114–¥1570) respectively by means of the level of facility used, length of stay, and types of treatment items. In terms of total effect, the OOP of patients participating in UEBMI and URBMI was significantly reduced by ¥3135 and ¥3074, respectively. Although participation in GMI also exerted a negative total effect on OOP, this was statistically insignificant. Finally, the effect of participation in NCMS was controversial. It exerted a significant and positive direct effect on OOP despite its negative indirect effects, with patients enrolled in NCMS paying ¥1921 more than the uninsured. Therefore, taking the direct and indirect effects together, patients enrolled in NCMS had to pay ¥351 more out-of-pocket than the uninsured, although this total effect was statistically insignificant.

Table 3
Standardized factor loadings of observed variables on latent constructs.

	Standardized factor loading
Health status	
Self-reported health status	.788
Chronic conditions	.468
Functional limitations	.486
Economic status	
Household income	.727
Household wealth	.578

5. Discussion

The statistical evidence presented above supports most of our hypotheses about how the reimbursement, behavior management, and purchasing mechanisms of SHI mediate the relationship between SHI participation and OOP. As a result, SHI participation has a

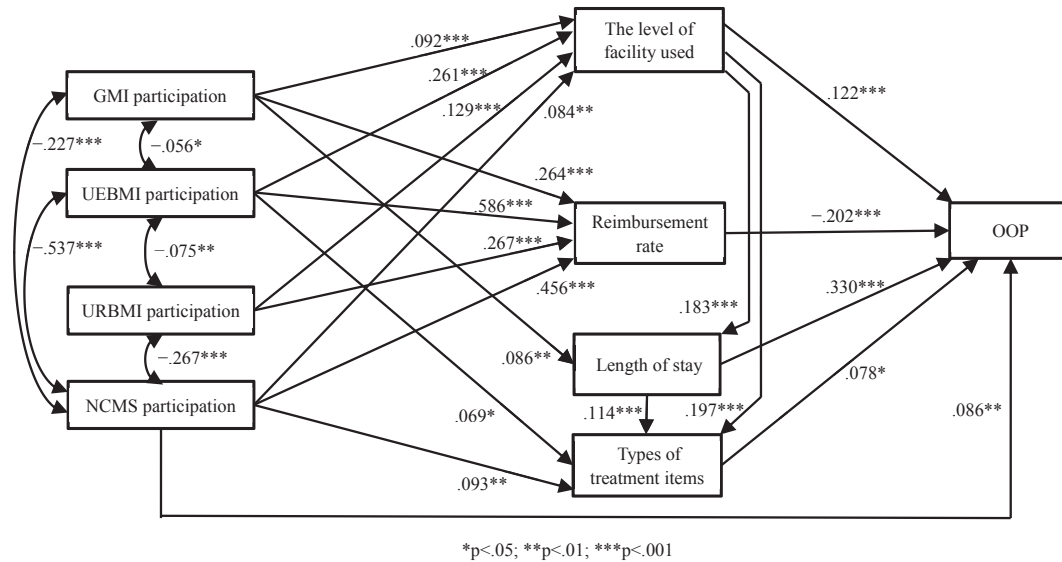


Fig. 2. Standardized solutions for the structural model. * $p < .05$; ** $p < .01$; *** $p < .001$.

weak negative association (for UEBMI and URBMI) or no significant association (for GMI and NCMS) with the OOP of hospitalized patients.

5.1. Reimbursement mechanism

The findings indicate that the reimbursement mechanism offers considerable benefit to insured patients. As the essence of SHI, in terms of protecting enrollees from health-related financial problems, reimbursement is a policy priority for the Chinese government alongside expanding SHI coverage. Although the reimbursement mechanism of SHI has been criticized for its high copayment rate, unreasonable reimbursement formularies of drug, health service and medical technology, inadequate ceiling amount, and so on (Gu, 2010), it still plays a salient role in reducing the likelihood of sustaining catastrophic medical expenses. Compared with the collapse of the health security system in the previous three decades, this “zero to one” change marks a remarkable milestone in the restoration of a health security system in China.

Looking at the mixed-premium contribution system, that is, the premium of UEBMI being paid by the employer and the individual and of GMI, URBMI and NCMS by the government and the individual, the policy implication of this study is that these contributors, especially the government, should act together to raise reimbursement rate still further. This could be done either by paying higher premiums or by adjusting the reimbursement formularies to incorporate more cost-effective drugs and services. However, we must be cautious of the allocation of responsibility for this process. The contribution rate of employer and employee to social insurance (old age, medical, unemployment, workers' compensation and maternity), which accounts for about 40% of wages in China, has been held to be too high (Zhou, 2012). Therefore, further scientific and rigorous investigation of this issue is warranted.

5.2. Behavior management mechanism

Although the reimbursement mechanism benefits enrollees, the malfunction of the behavior management mechanism undermines this effect. The SHI regulations, in terms of requiring either a referral or tiered copayment, fail to guide enrollees to utilize

primary health facilities efficiently. On the contrary, the reimbursement benefits provided by SHI may stimulate them to access higher-level facilities.

Previous investigations have attributed this anomaly to the extreme inequity of health resource allocation and the lack of information for consumers in China (Zhang and Kanbur, 2005; Xu and Van de Ven, 2012). Therefore, relying on the regulation of referral mechanisms and the tiered copayment requirement to guide people's care-seeking behavior is not enough. More efforts should be devoted to reforming the allocation of limited health resources between rural and urban areas, between different levels of facilities, and across regions, to promote greater equity. Meanwhile, strategic promotion should be conducted to guide consumer choice of healthcare services. These efforts, emphasizing the broader reform of China's healthcare system, call for joint actions among various government departments and between the state and its people.

5.3. Purchasing mechanism

This study has also provided helpful evidence of the malfunction of the purchasing mechanism of SHI in China. SHI participants are inclined to stay longer in hospital and receive more types of treatment items than the uninsured, either directly or through the mediating effect of facility level. This reflects an unsolved but prevalent problem with the purchasing mechanism in China.

Studies have attributed this problem to the inefficient fee-for-services payment method, low purchasing incentives for SHI agencies, and the distorted price schedule of drugs and healthcare services. The lagged payment method for SHI agencies is being gradually replaced with different kinds of prospective methods such as capitation, diagnosis-related group payment, global budgets, and so on (Meng, 2008; Yip and Hanson, 2009). However, local SHI agencies still lack either the incentive to be prudent purchaser or the tools this requires, such as actuarial cost estimates, strong negotiating skills, and a consolidated information platform for inspection. Moreover, SHI agencies are also constrained by the larger political economy. For instance, there is insufficient room for municipal and county SHI agencies to negotiate the prices of drugs and healthcare services whose regulation is left to provincial price bureaux (Xu and Van de Ven, 2009). It is widely claimed, however,

Table 4
Direct, indirect and total effects.^a

Facility level	Length of stay		Types of treatment items		Reimbursement rate OOP	
	Direct	Indirect	Total	Direct	Indirect	Total
GMI	.459*** (.092)	1.161*** (.086)	7.113** (.103)	.107 (.011)	.298*** (.030)	.405 (.041)
UEBMI	.613*** (.261)	1.551*** (.048)	3.101** (.096)	.321* (.069)	.292*** (.063)	.613*** (.131)
URBMI	.547*** (.129)	1.384*** (.024)	1.695 (.029)	.291 (.034)	.243*** (.029)	.534* (.063)
NCMS	.143*** (.084)	-.172 (-.007)	.188 (.008)	.318** (.093)	.059* (.017)	.377*** (.111)
Facility level						
Length of stay	2.531*** (.183)		2.531*** (.183)	.393*** (.197)	.042*** (.021)	.435*** (.218)
Types of treatment items				.016*** (.114)		.016*** (.114)
Reimbursement rate						
Age	-.003 (-.042)	-.074* (-.071)	-.082* (-.079)	-.009* (-.057)	-.003** (-.017)	-.011* (-.075)
Gender	.034 (.021)	2.372*** (.107)	2.458*** (.111)	.106 (.033)	.054*** (.017)	.160 (.050)
Place of residence	.113** (.070)	.595 (.027)	.881 (.039)	-.069 (-.021)	.059** (.018)	.010 (-.003)
Education	.020 (.025)	-.1070** (-.097)	-.1021** (-.093)	-.076 (-.048)	-.009 (-.006)	-.085 (-.053)
Employed	-.115 (-.041)	-.2446* (-.064)	-.2737* (-.071)	-.136 (-.024)	-.091* (-.016)	.226 (-.041)
Self-employed	-.004 (-.001)	-.2181 (-.044)	-.2189* (-.044)	.065 (.009)	-.037 (-.005)	.028 (.004)
Farming	-.143** (-.080)	-.1270 (-.052)	-.1630 (-.066)	-.029 (-.008)	-.083*** (.023)	-.112 (-.031)
Retired	.081 (.039)	.953 (.033)	1.158 (.041)	.348* (.085)	.051 (.012)	.398* (.097)
Health status	-.002 (-.001)	3.373*** (.156)	3.367*** (.156)	-.149 (-.048)	.055* (.018)	-.094 (-.030)
Economic status	.004* (.088)	.037 (.056)	.048 (.072)	.006 (.063)	.002* (.026)	.009 (.088)
Facility location	.399*** (.452)	.792* (.065)	1.802*** (.148)	.156** (.088)	.187*** (.106)	.342** (.194)

* $p < .05$; ** $p < .01$; *** $p < .001$.^a Unstandardized regression coefficients are shown by numbers without brackets; standardized regression coefficients are shown by numbers within brackets.

that the distorted price schedule whereby the government sets the price of basic services below cost and of high-tech interventions above cost gives providers strong incentives to overprescribe more profitable tests and treatments (Eggleston et al., 2008).

Against this backdrop, this study provides evidence of a unique phenomenon in China, that is, the collective purchasing power of SHI agencies may not be more efficient than individual purchasing, due to either the perverse incentives for providers or the low bargaining incentives of SHI agencies. More efficient investment in improving SHI agencies' contracting incentives and skills, establishing an inspection information platform, and further reforming the distorted price schedule are thus proposed to enhance the collective purchasing power of SHI agencies.

It should be noted that it may not be unreasonable for insured persons to spend more than the uninsured to enjoy good-quality health services. However, it is hard to judge whether this is the preference of patients themselves or is induced by doctors. This must be investigated further, based on more micro-level data. Meanwhile, the malfunction of the behavior management mechanism also contributes to the high medical costs borne by insured patients. This should be adjusted as it is unfavorable to the equitable distribution of healthcare resources.

To conclude, taking SHI reform in China as an example, this study has set out to combine theoretical studies of the institutional arrangements from social policy and empirical studies of SHI to develop a systematic insight into the association between SHI participation and patients' OOP in China. This initiative is in response to the debates raised by different theories of institutional arrangement and provides specific evidence of the malfunctions of SHI in China. The behavior management and purchasing mechanisms have been shown to offer relatively poorer performance, which undermines the function of the reimbursement mechanism, thus mitigating the association between SHI participation and OOP. These findings are expected to provide valuable insights into the ongoing healthcare reform in China.

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