The Household Level Impact of Public Health Insurance

Evidence from the Urban Resident Basic Medical Insurance in China

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April, 2014

This research uses data from China Health and Nutrition Survey (CHNS). I thanks the National Institute of Nutrition and Food Safety, China Center for Disease Control and Prevention, Carolina Population Center, the University of North Carolina at Chapel Hill, the NIH (R01-HD30880, DK056350, and R01-HD38700) and the Fogarty International Center, NIH for financial support for the CHNS data collection and analysis files from 1989 to 2006 and both parties plus the China-Japan Friendship Hospital, Ministry of Health for support for CHNS 2009 and future surveys.

I. Introduction

In 2007, China, as the largest developing country in the world, launched the most recent massive reform in its health care system. In the center of the China's reform lies the Urban Resident Basic Medical Insurance (URBMI), a newly created public health insurance program for the urban residents without a formal employment. Since the program started in July 2007, billions of dollars have been invested by the government. By the end of 2011, URBMI has been expanded to almost all the cities in China, covering more than 221 million people, around 16.5% of the entire Chinese population (National Bureau of Statistics, 2012). Given the vast amount of money the government has already spent and the program's potential impact on millions of people's health care condition, whether URBMI is effective or not has become a vitally important study topic for both the government and its people.

While the study topic is important, only a little empirical research has been done to evaluate the effects of URBMI primarily because of the fact that the program is still considered as a relatively new public health insurance. In fact, by the time of this paper, there are only two studies that formally analyze the treatment effects of URBMI. Both of them focus their study scale at the individual level.

Admittedly, the knowledge about the individual level treatment effects is fundamental in order to understand the effectiveness of a public health insurance. However, by focusing only on the individual level impacts, a substantial part of the story happening on the household level can be missed. For example, if a significant part of the medical bill of an insurance enrollee, especially for children or senior citizen, is actually paid by the other family members in or outside the household, the insurance can substantially reduce the financial burden for those who

actually pay the bill instead of the enrollee themselves. Moreover, a public health insurance can also reduce the household level precautionary saving behavior by dropping the expected health care expenditure of those covered by the insurance. Together, these impacts can bring a potential income shock to the household members other than the enrollee themselves, which may substantially change the household level health care as well as the other economic behaviors with profound long term impacts. However, by focusing only on the individual level impacts observed from the insurance enrollee, all of these effects could be overlooked. Therefore, to fully assess the effectiveness of a major public health insurance, such as URBMI, it is necessary as well as interesting for us to formally study the treatment effects on the household level. With that being said, I intend to use this paper to formally study the household level impacts of URBMI on the formal health care utilization, formal health care expenditure and income transfer from the other non-household friends or family members. Given the current available literatures, this study is also the first one aiming at understanding the effects of URBMI on the household level.

In order to rigorously study the household level impacts of URBMI, this paper uses the panel data from the China Health and Nutrition Survey (CHNS), which is a nationwide longitudinal survey conducted by the Carolina Population Center at the University of North Carolina at Chapel Hill and the National Institute of Nutrition and Food Safety at the Chinese Center for Disease Control and Prevention. Although a large part of the data from CHNS is stored on the individual level, I am able to convert the database into a household level data set thanks to the well documented household ID in the original survey. For the purpose of this study, the last two waves of data collected in 2006 and 2009 are mainly used. Given the fact that URBMI has been implemented since 2007, this feature of the data can potentially allow me to utilize the difference-in-differences (DID) approach as the main empirical strategy to better

control for the unobservable and the selection-bias issue (Heckman, 1990). In order to verify the assumption of the DID approach, two assumption tests have been conducted based on the idea of Liu and Zhao (2012). Both of them provide supportive evidence for the validity of my DID estimates.

In general, the study results show that URBMI has significantly[1] increased the household level formal health care utilization as a whole and the household level utilization of the outpatient service. However, no statistically significant household level result has been found on the utilization of the inpatient service, health care expenditure and income transfer from the other non-household friends or family members. Nevertheless, some evidence still exists to show that URBMI may increase the household level health care expenditure due to the increased utilization of the formal health care service and reduce the financial burden of the related individual outside of the household who actually pays the medical bill.

As a conclusion, these findings are consistent with the expectation based on the URBMI program design as well as the feature of the CHNS data. More importantly, the study results of this paper can provide evidence that a public health insurance can make the household members increase their formal health care utilization by reducing their precautionary saving behavior, even if they have not received any direct benefit from the insurance program at all.[2] This point can potentially help us to better understand the household level impact of a public health insurance program that is similar with URBMI. Moreover, it can also help to provide useful insights that should be taken into consideration for the future public health policy design.

[1] For the rest of this paper, a significant result means the result is both substantially and statistically significant.
[2] In addition, the reduced precautionary saving behavior actually does not increase the household members' usage of the preventive care, which is not included in the health care service in general. In fact, when their expected expenditure falls due to the eligible member enrolling into URBMI, the household members tend to be more generous only about the utilization of their formal health care service. This point will be explained with more details later in the paper.

For the rest of this paper, Section II introduces the background information of URBMI, Section III reviews the previous studies, Section IV describes the data and variables and Section V explains the DID model. The main results will be discussed in Section VI and the DID assumption tests will be conducted in Section VII. In the end, Section VIII concludes the study.

II. The Urban Resident Basic Medical Insurance

Implemented in 2007, URBMI is a large-scale government-run voluntary insurance program aiming at completing the nation's newly created public health care system after the state's economic reform in 1978. Prior to 2007, the public health insurance system in China mainly consisted of two primary programs: the Urban Employee Basic Medical Insurance (UEBMI) and the New Cooperative Medical Scheme (NCMS). UEBMI is a public health insurance system designed to provide cover only for the urban residents who are either currently holding or directly retired from a formal employment. NCMS is the public health insurance program used to cover the rural population in China. As a result, the third population cohort, around 420 million urban residents without a formal employment, was completely left out of the state health care safety net (Barber and Yao, 2010).

With the purpose of establishing a complete public health insurance system in China, URBMI is created to provide health protection for those urban residents without a formal employment in order to reduce the poverty resulting from poor health or serious illness. Following the basic guidelines provided by the State Council Policy Document 2007 No. 20, those who are eligible to enroll in URBMI are "urban young children aged under 18 years old, urban primary and secondary school students who are not covered by the Urban Employee Medical Insurance system (including students in professional senior high schools, vocational

middle schools and technical schools) and the other urban residents without a formal employment." The enrollment of URBMI is on a voluntary basis at the household level, which is a compromise between the high administrative costs from the mandatory enrollment and the adverse selection problem associated with the voluntary enrollment.[3] The actual implementation of URBMI is mainly carried out by the local administration based on the principal guidelines provided by the central government (Lin et al., 2009). After the pilot project launched at 79 cities in 2007, URBMI was rapidly expanded to about 50% of China's cities in 2008 and to almost all the cities by the end of 2009. By the end of 2011, URBMI had covered more than 221 million persons in China, which approximately made of 16.5% of the entire Chinese population (National Bureau of Statistics, 2012).

Although URBMI has been carried out based on the basic guidelines from the central government, considerable heterogeneity, including detailed policy design, reimbursement rate and the actual implementation process, indeed exists from city to city. In some areas, individual level enrollment is also allowed by the local administration (Liu and Zhao, 2012). Given such heterogeneity, it is important for us to control for the regional difference when studying the impacts of URBMI in a formal way, which will be explained with more details in Section IV.

Based on the fact that URBMI is such a state-wide large-scale project, the insurance is jointly financed by individual contributions and subsidies from the central and local governments, which is also the case for UEBMI and NCMS. Although the detailed situation varies depending on local policy and regional economic status, it is required by the central government that the individual contributions of URBMI should be generally lower than those of the UEBMI but

[3] As a result, the adverse selection problem remains to be a concern in terms of this study, because, even if the enrollment is at the household level, individuals can still self-select themselves into the insurance program if they are sick or expect a health deterioration in the foreseeable future. In order to address this concern, an assumption test are carried out later in the paper, where it will be described with greater details.

higher than those of the NCMS, considering the greater health care expenditure in urban areas. In addition, the total annual government subsidies for each URBMI participant is required to be not less than 40 RMB. In the relatively poorer central and western provinces, this annual minimum requirement is reduced to 20 RMB per participant, considering the relatively lower local health care expenditure and the limited budget of local governments. For the enrollees with special financial difficulties or a severe disability, the individual can receive an additional annual government subsidy of 60 RMB, half of which is required to be financed by the central government (State Council, 2007). In general, according to the official report of URBMI in 2008, the central and local government subsidies were accounted for around 36 percent of the financing cost for adults and about 56 percent for children on average (State Council Evaluation Group for the URBMI Pilot Program, 2008). This situation generally remains the same until the end of the study period (National Development and Reform Commission, 2012).

As URBMI is a public health insurance aiming at reducing the poverty resulting from poor health or serious illness, the insurance typically does not provide cover for the general outpatient service. Instead, URBMI is intended to mainly cover the inpatient service as well as the outpatient service for chronic or fatal diseases, such as diabetes or heart disease. On average, URBMI covered about 45% of the medical cost of the inpatient service during the study period, and it paid a much more generous reimbursement for the outpatient service related with catastrophic disease than the basic outpatient care in general (State Council Evaluation Group for the URBMI Pilot Program, 2008).

Given such a program design, it is reasonable for us to expect that URBMI can not only reduce the formal health care expenditure directly spent on the participant's serious health problem, but also drop the expected expenditure from the participant's potential catastrophic

disease in the future. These effects may impact the financial burden as well as the income transfer among the individuals in or outside a household. In addition, they may also affect the household level precautionary saving behavior. These scenarios will be explained with more details in the following section.

III. Previous Study

By the time of this paper, Lin et al. (2009) and Liu and Zhao (2012) are the only available studies that formally analyze the effectiveness of URBMI. Lin et al. (2009) uses a cross-sectional dataset collected in December 2007 shortly after the program's implementation to illustrate the basic condition of URBMI, including who actually participated in the program, who is more likely to benefit from the plan and whether the enrollees were satisfied about URBMI or not. Liu and Zhao (2012) uses the panel data from CHNS with a DID approach, which is also going to be used in this study, to formally evaluate the program's impacts on the individual level health care utilization and expenditure. Based on their study results, URBMI has increased the individual level health care utilization at the margin of 95% statistical significance, and there is no evidence that the insurance has reduced the individual level health care expenditure. Instead, some evidence exists showing that URBMI has actually increased the participants' health care expenditure, although these results are statistically insignificant.

In general, the previous individual level studies have provided valuable insights about the effectiveness of URBMI, yet there currently does not exist any study looking at URBMI's household level impacts. Admittedly, the individual level treatment effects are critical in the evaluation of a public health insurance. However, by focusing only on the individual level

treatment effects, the interesting part of the program impacts happening on the household level can be missed, which is especially the case of URBMI.

To begin with, considering that the eligible population of URBMI is made of urban residents without a formal employment, it is possible that a significant part of the medical bill of an URBMI enrollee is actually paid by the other working family members in or outside the enrollee's household. This case is especially true for the young children aged under 18 years old or the senior household members without any formal employment record and a stable income source. As a result, by enrolling into URBMI, the enrollee may actually reduce the financial burden for those who pay their medical bill instead of the enrollee themselves. In this way, even if URBMI does not have any significant impact on the individual level health care expenditure, it may have substantial effects on the household level health care expenditure as well as the income transfer from the other non-household friends or family members.

Furthermore, even if URBMI may not have any impact on the household level health care expenditure and the income transfer in the case that the enrollee has not experienced any serious health issue to receive the reimbursement, the insurance may still affect the other household members by changing their precautionary saving behavior. As an eligible individual enrolls into URBMI, the expected expenditure on the person's potential catastrophic health problem can be reduced. This may cause the other household members to increase the use or the quality of their own health care utilization, since there is no need for them to save that much money on the enrollee's potential heath disaster. Moreover, the reduced precautionary saving behavior may

even increase the household level investment[4] and/or consumption, which can potentially increase the household level income and stimulate the entire economy growth.

As a conclusion, by reducing the financial burden and the precautionary saving behavior among the related individuals in or outside a household, URBMI may have substantial treatment effects on the household level that cannot be observed by only looking at the individual level data. This point is consistent with the other study results about public health insurance. For example, Gertler and Gruber (1997) provides evidence that the household income change caused by a public health insurance program can be significantly greater than the change in the individual level health care expenditure. In addition, Russell (2004) shows that, under the impact of a public health insurance, the change of formal health care utilization on the household level can be significantly different with the change observed from the individual level data.

As a result, in order to fully assess the effectiveness of URBMI, it is necessary for us to formally study the program's household level treatment effects, which can also be used to better understand the other similar public health insurance programs in China and abroad. In addition, it is also important for us to check if the individual level treatment effects discovered by Liu and Zhao (2012) still exist from the household level data. This endeavor is especially interesting considering that the findings from Liu and Zhao (2012) are in general consistent with the study results from the developed countries (Card et al., 2008; Chen et al., 2007; Cheng and Chiang, 1997; and Currier and Gruber, 1996a, 1996b, 1997, 2001), while the similar public health insurance program in rural China has been estimated to have much more limited program impacts due to its relatively lower subsidy level and reimbursement rate (Lei and Lin, 2009). With that being said, this paper is the first study to formally evaluate the household level impacts

[4] To be more precise, the household level investment here refers to both of the investment in financial asset and the investment in physical asset that can be used to improve production.

of URBMI on the formal health care utilization, formal health care expenditure and income transfer from the other non-household friends or family members.

In order to study the household level impacts of URBMI in a rigorous way, the next section is used to describe the CHNS database and how the household level data has been constructed.

IV. Data and Variables

Conducted as a nationwide longitudinal project collaborated between the Carolina Population Center at the University of North Carolina at Chapel Hill and the National Institute of Nutrition and Food Safety at the Chinese Center for Disease Control and Prevention, the China Health and Nutrition Survey (CHNS) is designed to examine the effects of the health and nutrition programs implemented by the central and local governments of China and to see how the social and economic transformation of the Chinese society is affecting the health and the nutritional status of its population. The survey is based on a multistage, random cluster sampling procedure to draw the sample from nine representative provinces in China, covering approximately 45% of China's total population. Within each of the sampled provinces, counties are initially stratified into low, middle and high income groups, then a weighted sampling procedure is used to randomly select four counties in each province. In addition, the provincial capital and a representative low income city are selected when feasible. In the case that the provincial capital cannot be used to represent a high income city in the province, another representative large city is selected instead. After the sampled counties and cities have been decided, villages and townships within the counties and urban and suburban neighborhoods within the cities are then randomly selected. In the end, professional interviewers are assigned to

each sampled village or township to conduct the survey for all the households inside and all the members within each household.

In general, the content of CHNS is comprehensive, covering a wide range of individual, household and community characteristics. The household/individual survey, which is mainly used for this study, contains detailed data on the medical care usage, health status, health insurance, health behaviors, economic status and socio-demographic characteristics for each of the sampled households and each of the members within the household. By the time of this paper, CHNS has completely collected eight waves of data (1989, 1991, 1993, 1997, 2000, 2004, 2006 and 2009). For the purpose of this study, the last two waves of data collected in 2006 and 2009 are mainly used.

Although a large part of the data from CHNS is stored on the individual level, I am able to convert the database into a household level data set thanks to the well documented household ID in the original survey. However, before the household level data can be constructed, the individual level data must be cleared up. As a result, my study begins with the replication of the individual level data used in Liu and Zhao (2012).

To begin with, considering that URBMI is a public health insurance provided for the urban residents, the replication of the individual level data starts by restricting the study sample to those living in the urban areas with a valid urban resident registration. Following the official guidelines provided by the State Council Policy Document 2007 No. 20, I further constrain the study sample to the eligible population of URBMI, including young children aged under 18 years old, primary and secondary school students, including those in professional senior high schools, vocational middle schools and technical schools, and the other individuals without a formal

employment. To be more precise, the individuals without a formal employment are defined as those who currently do not have a job or report themselves as a temporary worker, which is the usual classification standard used by China's local administration in the reality. In addition, all the individuals in the study sample are required to be not covered by either of the other two public health insurances in China, namely, UEBMI and NCMS. [5]

Comparing with the study sample defined in Liu and Zhao (2012), the study sample described above is based on a less detailed subgroup category but follows the official guidelines more directly. Considering the fact that the official guidelines provided by the central government are required to be followed during the URBMI implementation in general, the study sample defined in this paper should not be significantly different with the one used in the previous study. As a result, by using an alternative study sample, the individual level treatment effects replicated by this study can be used not only to double check the relative correctness of my individual level data, but also as a robustness check for the study results of Liu and Zhao (2012).

As a result of the sample restriction, my study sample is formed by an imbalanced panel of 2327 individuals, including 1223 in 2006 and 1104 in 2009. Furthermore, none of the individuals in 2006 enrolled into URBMI while around 51% of the individuals in 2009 participated in the program. This is consistent with the fact that URBMI has not been implemented until 2007. Moreover, this feature of the data can allow me to utilize the DID

[5] Based on the fact that the CHNS interview has been conducted by professional interviewers in a formal and rigorous manner, and all the interview data has been double checked by the data center, the information about each individual's insurance enrollment status should be considered as reasonably accurate.

approach to better control for the unobservable and the selection-bias issue (Heckman, 1990), which will be described with more details in the next section.[6]

Based on the CHNS database, the key individual level independent variables can be made of two binary variables. One of them indicates whether an observation is in 2009. The other of them indicates whether an observation has a URBMI enrollment in 2009, which is used to define the individual level treatment group.

The key individual level dependent variables measuring URBMI's impacts on formal health care can be classified into two categories: the variables about formal health care utilization and the variables about formal health care expenditure. The variables about formal health care utilization include one binary variable indicating whether an individual has any formal medical care utilization in the past four weeks, one binary variable indicating whether an individual has any inpatient visit in the past four weeks, one continuous variable measuring an individual's hospital days in the past four weeks and one binary variable indicating whether an individual uses any outpatient service in the past weeks. The variables about formal health care expenditure contains one continuous variable measuring an individual's total health care expenditure in the past four weeks, including fees and expenditures for hospital registration, medicines, treatment, inpatient cares and so on, and one continuous variable measuring an individual's out-of-pocket health care expenditure, which is all the total health care expenditure that is not reimbursed by any health insurance.[7]

In addition to the key variables described above, other independent variables can also be added to control for the covariates affecting the individual level regression outcomes. These

[6] As the CHNS data has been collected based on the multistage, random cluster sampling procedure described earlier in this section, no additional sampling weight is used in the data of this study.
[7] Both of the expenditure variables are inflated to 2011 Chinese Yuan.

variables contain binary variables indicating an individual's education level, including illiterate, primary school degree, junior high school degree, senior high school degree, technical school degree and college degree, a continuous variable measuring an individual's total household income inflated to 2011 Chinese Yuan, and the other demographic variables, including two continuous variables measuring an individual's age and household size and three binary variables measuring an individual's gender, marital status and student status. In addition, provincial dummies and each individual's community ID are added into the individual level regression model in order to capture the unobserved regional and community differences.

As a conclusion, the final individual level study sample of this paper after the variable clearing up ends up with an imbalanced panel of 2300 individuals, including 1208 individuals in 2006 and 1092 individuals in 2009. Among the 1092 individuals in 2009, 566 of them enrolled into URBMI and 232 of them were also surveyed in 2006. Together, this group of 798 individuals makes up the individual level treatment group. All the other individuals in the study sample form the individual level control group. In general, the final individual level study sample of this paper is relatively similar with the one used for the regressions in Liu and Zhao (2012). The main variables and summary statistics of the final individual level study sample are shown in Table 1. The replication of the individual level treatment effects is described later in Section VI.

Based on the individual level study sample described above, the household level sample can then be constructed. To begin with, each of the individuals in the individual level study sample can be grouped with his or her household members in the CHNS database based on their household ID, no matter whether the other household members hold a urban resident registration or not. In this way, the individual level study sample can be grouped into 1477 households,

including 1113 of them have all the household members participated in the CHNS. In order to avoid the potential problems caused by the missing household members, the household level sample of this study is restricted to the households that fully participated in the CHNS. Among the 1113 households that fully participated in the survey, 317 of them have all of their URBMI eligible members enrolled into URBMI in 2009 and 672 of them have all of their eligible members stayed out of the program in 2009. Considering the fact that the URBMI enrollment is based on the household level in general, my study defines the treated households as those whose eligible members were fully enrolled in URBMI in 2009. Consequently, the control households are defined as those whose eligible members completely stayed out of the insurance program in 2009. As a result, the household level study sample is formed by the households that fully participated in the CHNS and contains at least one URBMI eligible individuals. Furthermore, the partial enrollment of URBMI in 2009 is not allowed for all the households in the study sample. As a conclusion, the household level study sample is formed by an imbalanced panel of 989 households, including 534 households in 2006 and 455 households in 2009. In the end, there are 317 households in the household level treatment group and the rest of the households are in the household level control group.

Once the household level study sample is organized, the household level data can be converted by collapsing all the individual level data by the corresponding household. With the purpose of capturing the impact of household size, the average value has been taken during the collapse process. As a result, in the household level data, a previous individual level continuous variable is now a continuous variable measuring the average value of the household, a previous individual level binary variable is now a continuous variable between 0 and 1 measuring the fraction of the household members whose binary variable value is 1 and a previous household

level variable in the individual level data will remain the same after the collapse process. In addition, in order to evaluate the impact of URBMI on the income transfer among the individuals in or outside a household, one key dependent variable is added into the household level data, which is a continuous variable measuring the total household income transferred from the other non-household friends or family members in the past year inflated to 2011 Chinese Yuan. As a conclusion, the main variables and summary statistics of the final household level study sample are shown in Table 2.

Based on the data and variables built from the CHNS database, two important data limitations must be brought into attention. First of all, although the CHNS database provides precious data that can be used to formally study the public health insurances in China, all the variables about formal health care in the CHNS are based only on a time period of the past four weeks. Such a relatively short period of time may not be able to make the study data perfectly represent the general situation, which can lower the accuracy of the relevant URBMI impact estimations by bringing in potential sample bias and/or increasing the variance of the DID estimates. With that being said, it would be worthy for the future study to use the variables that cover a relatively longer period of time, if such type of data can become available. In addition, it would also be interesting for us to see what type of treatment effects can be observed from URBMI even with the relatively limited time period constraint in the currently available data.

Secondly, and probably the most importantly, considering that it is likely for an individual to take more than four weeks to recover from a catastrophic disease, those participated in the survey and were able to report their formal health care status by themselves are likely to be a group of healthy people that has not experienced too many serious health issues in the past four weeks. As a result, the study samples constructed from the CHNS database can potentially

contain certain sample bias. And the treatment effects discovered in this study are more likely to be the URBMI's impacts on a group of relatively healthy people that has not received too much reimbursement from the insurance program, if at all, which can actually provide some interesting insights about the effects of a public health insurance in general.

In order to study the effectiveness of URBMI in a rigorous way, the next section is used to describe the DID approach, which is the main empirical strategy of this paper.

V. The DID Approach

Based on the feature of the CHNS data and the implementation timeline of URBMI, the difference-in-differences estimator can be used as the main empirical strategy of this study to better control for the unobservable and the selection bias issue (Heckman, 1990). For the purpose of this paper, the DID estimator is applied first with the individual level treatment status to replicate the previous study results. Then, it is applied with the treatment status defined on the household level. In general, the DID estimator tracks the outcomes of the treatment group before and after the URBMI's implementation and compares the changes in the outcomes of the treatment group with the corresponding changes from the control group. Based on the general notation given by Liu and Zhao (2012), the simple DID estimator can be written as

$$\Delta_{URBMI} = (\hat{Y}_{(treated,after)} - \hat{Y}_{(treated,before)}) - (\hat{Y}_{(control,after)} - \hat{Y}_{(treated,before)})$$

where Δ_{URBMI} indicates the impacts of URBMI on the main treatment outcomes, and $\hat{Y}_{treated}$ and $\hat{Y}_{control}$ correspondingly represent the sample averages of the treatment and the control group outcomes before and after the URBMI's implementation, given by the corresponding subscripts.

The main advantage of the DID estimator is that it can control for the unobservable that is time-invariant or time-variant but following a common time trend between the treatment and the control group. However, to obtain an unbiased estimate from the DID approach, it is also required that the URBMI enrollment should not be correlated with the other time-variant unobservables that do not have a common time trend between the treatment and the control group and can directly affect the treatment outcomes. In order to test whether the study results are actually driven by such type of unobservable, two assumption tests are carried out in Section VII, where they will be described with more details.

In the end, to better control for the other observed variables that can impact the treatment outcomes, the DID regression model used in this study can be written as

$$Y_i = \beta_0 + \beta_1 \mathit{After}_i + \beta_2 \mathit{Treat}_i + \beta_3 (\mathit{After}_i * \mathit{Treat}_i) + \beta_4 \alpha_i + \beta_5 \omega_j + \beta_6 \tau_k + \varepsilon_i$$

where i indicates each individual or household, j indicates each community and k indicates each province. Y_i is the main treatment outcome variable for the observation i, After_i is the binary variable indicating whether the observation i comes from the wave of 2009 and Treat_i is the binary variable indicating whether the observation i is in the treatment group. In addition, α_i is a vector of observed individual or household characteristics for each observation i, ω_j indicates the unique community ID, τ_k measures the provincial fixed effect and ε_i is the error term of the regression model. Based on the basic idea of the DID estimator, the coefficient β_1 represents the common time-series change in the control and the treatment group outcome, β_2 indicates the time-invariant difference in the outcome of the control and the treatment group, and β_3 measures the treatment effect on the treated, which is the primary research interest of this study.

Furthermore, β_4, β_5, and β_6 are used to control the impacts of the other observed variables on the treatment outcome.

Based on the DID regression model explained above, the replication of the individual level study results and the evaluation of the household level treatment effects of URBMI can be conducted in the next section.

VI. Main Results

The main results of this paper are shown in Table 3 and Table 5, where Table 3 describes the replication of the individual level study results and Table 5 describes the household level treatment effects of URBMI. In addition, Table 4 shows the original study results from Liu and Zhao (2012), which can be used to compare the replication results of this study.

According to Table 3, the replication of the individual level treatment effects shows that the enrollment of URBMI has increased the probability for an individual to have any formal health care utilization in the past four weeks by about 6 percentage at the margin of 95% statistical significance. And there is no evidence that URBMI has any significant impact on the other key outcome variables at the 95% statistical significance level, including whether an individual has used any inpatient service in the past four weeks, whether an individual has used any outpatient service in the past four weeks, the number of an individual's inpatient days, the natural logarithm of an individual's total health expenditure and the natural logarithm of an individual's out-of-pocket health expenditure.[8] These findings are consistent with the study results from Liu and Zhao (2012). Moreover, comparing with Table 4, the detailed replication results are very close with those reported from the previous study, either in term of the

[8] All the expenditure variables are measured in natural logarithm to keep consistency with the previous study. To be more specific, all the expenditure variables are measured in the form of ln(expenditure + 1) in order to handle the 0 expenditure situation.

magnitude or the standard error. Considering that the individual level treatment effects of this paper are actually based on a different study sample, the individual level replication described above can be considered as successful.

The successful individual level replication can bring two important results. First of all, the replication can show that the study results from Liu and Zhao (2012) is actually robust to the alternative study sample, which can provide additional evidence to support the findings from the previous individual level study. In addition, the successfully replication also indicates that the individual level data used in this study, from which my household level data is constructed, is indeed reasonably consistent with those used in Liu and Zhao (2012).

Based on the successful individual level replication, the household level impacts of URBMI are evaluated. To begin with, according to the results shown in Table 5, URBMI has significantly increased the fraction of the household members who has reported any formal health care utilization in the past four weeks by about 10 percentage points with a P-value of 0.009. Furthermore, URBMI has significantly increased the fraction of the household members who has reported any use of outpatient service in the past four weeks by about 9 percentage points with a P-value of 0.011. However, no statistically significant impact of URBMI on the utilization of household level inpatient care in the past four weeks or the household average hospital days in the past four weeks has been found, although the coefficients of the two variables are both positive.

These findings are consistent with the explanation that URBMI can encourage the household level health care utilization by directly releasing the financial burden through the reimbursement and/or indirectly reducing the household members' precautionary saving

behavior through reducing the expected health care expenditure. Moreover, considering that URBMI generally does not provide cover for the outpatient service, the significant positive impact on the household level outpatient service utilization can provide evidence that the health care utilization URBMI is increasing is likely to come from the health care that is not covered by the insurance program. This point is consistent with the potential sample bias of the CHNS database, where my study sample is likely to be formed by a group of relatively healthy people, which can also be used to explain the relatively small and statistically insignificant impacts about the household level inpatient service utilization.

In addition to the variables about the household level health care utilization, the results from Table 5 show that URBMI actually does not have any statistically significant impact on the household level total health care expenditure in the past four weeks, household level out-of-pocket health care expenditure in the past four weeks and income transfer from the other non-household friends or family members in the past year. Comparing to the individual level treatment effects, where the coefficient is positive on the individual's total health care expenditure but negative on the individual's out-of-pocket expenditure, the coefficients of the two variables on the household level both turn to positive, which provides some evidence that URBMI is increasing the household level health care expenditure due to the increased utilization of the formal health care service. Moreover, the coefficient of the income transfer variable is -0.13, which is consistent with the expectation that URBMI may reduce the financial burden of the related individual outside of the household who actually pays the medical bill.

Combining with the household level treatment effects about the health care utilization, the findings about the household level health care expenditure and income transfer can have two results. First of all, these findings are consistent with the expectation that my study sample is

formed by a group of relatively healthy people, which means the increase in the health care utilization is likely to be caused only by the reduced precautionary saving behavior, instead of a direct change in the household's financial budget through the URBMI reimbursement. Secondly, even if the relatively healthier household members increase their health care utilization, the scale of the increase is limited so that it won't bring any dramatic change in the household's health care expenditure as well as the income transfer among the individuals in or outside the household.

In general, the household level impacts discovered in this study look similar with the individual level findings. However, in terms of the interpretation, they are not exactly the same. Instead, the household level impacts found in this paper can provide evidence that the public health insurance can make the relatively healthier household members increase their formal health care utilization through the channel of reducing their precautionary saving behavior, even if they have not received any direct benefit from the insurance program at all. This point can potentially help us to better understand the household level impact of a public health insurance that is similar with URBMI in China and abroad.

In addition, the point that the household members can actually increase their formal health care utilization due to the reduced precautionary saving behavior from the insurance program can have a much broader implication. First of all, by increasing their formal health care utilization, the household members can reduce the probability that they wait until the last second to discover a catastrophic health problem. In the long run, this can potentially increase the health status of the household members, which can potentially increase the household level productivity and the household income. Furthermore, by reducing their precautionary saving behavior, the household members may choose to not only increase the use of formal health care, but also

increase their level of investment or consumption, which may increase the household income in the future and even stimulate the growth of economy in general.

In the end, considering that the similar public health insurance program in rural China has not been observed with any significant impact in terms of either the health care utilization or the health care expenditure due to its limited subsidy level and reimbursement rate (Lei and Lin, 2009), while the findings from this study are in general consistent with those from Liu and Zhao (2012) as well as those from the developed countries, this paper may be able to provide some useful insights to improve the future public health policy design. Based on the findings of this study, by slightly increasing the subsidy level and reimbursement rate to a relatively more comfortable level, the public health insurance program in China can still behave in a similar way like the programs implemented in the developed countries but with a much more generous benefit package. Combining with the potential broader implication of the reduced precautionary saving behavior discovered in this paper, this point can be particular useful to be taken into consideration for the relevant policy makers and their future policy design.

VII. DID Assumption Tests

As explained earlier in Section V, in order for the study results discussed above to be unbiased, the DID estimates of this study are required to be not driven by any time-varying unobservable that has a different time trend between the treatment and the control group. However, by using the CHNS data and the DID model themselves, no evidence exists to suggest this point to be true. As a result, following the suggestion provided in the previous study (Liu and Zhao, 2010), two assumption tests are carried out in this section in order to examine the validity of the DID estimates of this paper.

To begin with, an additional wave of the CHNS data collected in 2004 is used in order to construct an individual as well as a household level study sample with the data from 2004 and 2006, where the implementation of URBMI does not exist in the reality. The study samples, along with the corresponding dependent and independent variables, are constructed following the same procedure described in the Data and Variables section. In addition, based on the panel nature of the CHNS database, the treatment status of each study sample can be defined in the same way as before using the 2009 data, while the binary variable previously indicating whether an observation is in 2009 can be recoded to indicate whether an observation is in 2006. In this way, a placebo test can be conducted by applying the same DID estimators used before to the 2004 and 2006 data to estimate the impacts of the nonexistent URBMI. If the study results described in Section VI are in fact driven by certain time-varying unobservable with a different time trend, then the placebo test is expected to pick up similar treatment effects as those discovered in the previous section, as it is the unobservable with a different trend instead of URBMI that is responsible for the main findings.

As shown in Table 6 and Table 7, the results of the placebo test show that URBMI has no significant impact on any of the main outcome variable for either of the two placebo test study samples. As a consequence, the placebo test described above can provide supportive evidence that the main findings discussed in Section VI are likely to capture the effects of URBMI, instead of the effects of the unobservable.

Although the results of the placebo test can provide positive evidence to verify the main findings of this paper, the possible bias caused by the adverse selection during the study period

still remains to be a concern.[9] As a common problem in the health insurance literature, the adverse selection happens when individuals choose to participate in an insurance because they are expecting a certain deterioration of their health in the foreseeable future regardless of their current health status. This type of self-selection usually cannot be observed by the researchers. Moreover, if the self-selection scenario is true, then it is possible that the insurance enrollees will use more health care service than those in the control group during the study period even if URBMI has no effect at all, which can bring bias into the results of this study.

In order to address this concern, an assumption test can be carried out by utilizing the preventive care variables offered by the CHNS database. In addition to the health care variables that have already been used, the CHNS database also contains preventive care variables measuring the individual level information about general physical examination and the other more specific preventive cares that are not parts of the health care service in general, including tumor screening, blood test, blood pressure screening and etc. Following the procedure described in the Data and Variables section, I am able to convert the individual level preventive care variables to the household level. Then, the assumption test can be carried out by applying the DID model with the previously used 2006 and 2009 data to estimate the impacts of URBMI on both the individual and household level preventive care variables. The rationale of this assumption test is that if an enrollee self-selects into URBMI with a certain expected health deterioration in the foreseeable future, then it is possible that this individual will use a specific type of preventive care substantially greater than the others.[10] In this way, if the assumption test

[9] This point is especially true if the adverse selection only exists for the time period after 2006, which is outside the time interval of the placebo test.

[10] This point is particularly useful considering the study samples of this paper are likely to be made up by a group of relatively healthy people. That is to say, even if an individual self-selects into URBMI based on certain expected health deterioration in the foreseeable future, the individual is still likely to be healthy at the current stage. Thus, he or she may be more likely to use the preventive care to monitor their health status and prevent the expected health deterioration instead of directly going for the corresponding formal health care service.

picks up any significantly positive treatment effect, the adverse selection problem can then become a potential concern behind the main findings of this paper.

According to Table 8 and Table 9, the DID estimates of the assumption test are consistently insignificant in terms of either the preventive care utilization or expenditure.[11] As a result, the assumption test can provide evidence to relax the concern about the adverse selection. Moreover, the results of the assumption test can also provide evidence that the reduced precautionary saving behavior described in the previous section actually does not increase the use of preventive care by the household members. Instead, when their expected expenditure falls due to the eligible member enrolling into URBMI, the household members tend to be more generous only about the utilization of their formal health care service.

In general, the above assumption tests are obviously not a perfect proof of the exogeneity of this paper's main study results. However, they can at least provide some supportive evidence for the basic assumption about the unbiased DID estimates. Based on the results of the assumption tests, even if there exists any potential bias stemming from the time-varying unobservable with a different time trend, including the problem of adverse selection, such type of bias should be relatively small so that it won't cause any significant impact in the main findings of this paper. With that being said, the study results discussed in the previous section should be considered as reasonably valid.

VIII. Conclusion

Based on the CHNS database and the DID approach, this paper is the first formal study to evaluate the household level impacts of the Urban Resident Basic Medical Insurance (URBMI)

[11] All of the preventive care expenditure variables are inflated to 2011 Chinese Yuan.

in China. The key dependent variables included in this study contain the variables measuring the household level formal health care utilization, the household level formal health care expenditure and the income transfer from the other non-household friends or family members. The study results of this paper show that URBMI has significantly increase the household level formal health care utilization in general and the household level utilization of the outpatient service. However, no statistically significant household level result has been found on the utilization of the inpatient service, health care expenditure and income transfer from the other non-household friends or family members. Nevertheless, some evidence still exists to show that URBMI may increase the household level health care expenditure due to the increased utilization of the formal health care service and reduce the financial burden of the related individual outside of the household who actually pays the medical bill. In addition, in order to verify the assumption of the DID approach, two assumption tests have been carried out following the suggestion provided in Liu and Zhao (2012). Both of them provide supportive evidence for the validity of the main results of this paper.

In general, the findings of this study are consistent with the expectation based on the URBMI program design as well as the fact that my study sample is likely to be formed by a group of relatively healthy people. More importantly, the study results of this paper can provide evidence that a public health insurance can make the household members increase their formal health care utilization by reducing their precautionary saving behavior, even if they have not received any direct benefit from the insurance program at all. Furthermore, the assumption test about the adverse selection also provides evidence that the reduced precautionary saving behavior only makes the household members be more generous about the utilization of their formal health care service, instead of increasing the use of the preventive care at the same time.

These points can potentially help us to better understand the household level impact of a public health insurance program that is similar with URBMI. In addition, it can also indicate the existence of the potential long term program impacts on the household's health status, income and productivity. In fact, whether such type of potential long term impacts exist in URBMI or not can be an interesting study topic for the future research.

In the end, given the fact that billions of dollars have been invested into the newly created public health insurance, whether URBMI is effective or not is a critical topic for both of the government and its people. Considering that the URBMI similar public health program in rural China has been estimated to have much more limited program impacts due to its relatively lower subsidy level and reimbursement rate (Lei and Lin, 2009), I hope the household level treatment effects of URBMI discovered in this study may be able to provide more helpful insights for the relevant policy makers to improve their future policy design.

References

Barber, S. L. and Yao, L. (2010) "Health Insurance System in China: A Briefing Note", *World Health Report Background Paper* 37.

Card, D.; Dobkin, C.; Maestas, N. (2008) "The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare", *American Economic Review* 98 (5): 2242-2258.

Chen, L.; Yip, W.; Chang, M. C.; Lin, H. S.; Lee, S. D.; Chiu, Y. L.; Lin, Y. H. (2007) "The Effects of Taiwan's National Health Insurance on Access and Health Status of the Elderly", *Health Economics* 16 (3): 223-242.

Cheng, S. H.; Chang, T. L. (1997) "The Effects of Universal Health Insurance on Health Care Utilization in Taiwan: Results from a Natural Experiment", *JAMA* 278 (2):89-93.

Currie, J. and Gruber, J. (1996 a) "Health Insurance Eligibility, Utilization of Medical Care and Child Health", *Quarterly Journal of Economics* 111 (2): 431-466.

Currie, J. and Gruber, J. (1996 b) "Saving Babies: The Efficacy and Cost of Recent Changes in the Medicaid Eligibility of Pregnant Women", *Journal of Political Economy* 104 (6): 1263-1296.

Currie, J. and Gruber, J. (1997) "The Technology of Birth: Health Insurance, Medical Interventions and Infant Health", *National Bureau of Economic Research Working Paper* No. 5985.

Currie, J. and Gruber, J. (2001) "Public Health Insurance and Medical Treatment: The Equalizing Impact of the Medicaid Expansions", *Journal of Public Economics* 82 (1): 63-89.

Gertler, P. and Gruber, J. (1997) "Insuring Consumption against Illness", *National Bureau of Economic Research Working Paper* No. 6035.

Heckman, J. J. (1990) "Varieties of Selection Bias", *American Economic Review* 80 (2): 313 - 318.

Lei, X. and Lin, W. (2009) "The New Cooperative Medical Scheme in Rural China: Does More Coverage Mean More Service and Better Health?", *Health Economics* 18 (S2): S25-S46.

Liu, H. and Zhao, Z. (2012) "Impact of China's Urban Resident Basic Medical Insurance on Health Care Utilization and Expenditure", *IZA Discussion Paper* No. 6768.

Lin, W.; Liu, G.; Chen, G. (2009) "The Urban Resident Basic Medical Insurance: A Landmark Reform towards Universal Coverage in China", *Health Economics* 18 (S2): S83-S96.

National Bureau of Statistics (2012) "Statistical Communique of the People's Republic of China on the 2011 National Economic and Social Development", The National Bureau of Statistics of the People's Republic of China.

National Development and Reform Commission (2012) "Report on China's Economic, Social Development Plan to the Annual People's Congress", The National Development and Reform Commission of the Government of the People's Republic of China.

State Council (2007) "Instructions on Establishing the Urban Employee Essential Medical Scheme", State Council Document No. 20, The State Council of the People's Republic of China.

State Council Evaluation Group for the URBMI Pilot Program (2008) "Report on URBMI Pilot Programs", The State Council Evaluation Group for the URBMI Pilot Program.

Russell, S. (2004) "The Economic Burden of Illness for Households in Developing Countries: A Review of Studies Focusing on Malaria, Tuberculosis, and Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome", *American Journal of Tropical Medicine and Hygiene* 71 (Supp. 2): 147-155.

Table 1. Summary Statistics of the Individual Level Study Sample

	Full Sample		Wave 2006			Wave 2009		
			Treatment	Control		Treatment	Control	
Sample Size	2300		232	976		566	526	
Variable	Mean	S.D.	Mean	Mean		Mean	Mean	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Main Dependent Variables								
Any formal medical care utilization	0.142	0.349	0.164	0.133		0.178	0.108	***
Any inpatient visit	0.011	0.104	0.013	0.008		0.016	0.01	
Inpatient hospital days	0.106	1.332	0.013	0.085		0.181	0.103	
Any outpatient service	0.124	0.33	0.143	0.115		0.158	0.097	***
Total health care expenditure	161.289	2662.18	69.736	183.208		176.611	144.873	
Out-of-pocket health care expenditure	122.295	2544.25	54.717	175.413		53.201	124.568	
Main Explanatory Variables								
Education: Illiterate	0.32	0.466	0.453	0.294	***	0.276	0.356	***
Education: Primary school	0.17	0.376	0.22	0.15	***	0.201	0.152	**
Education: Junior high school	0.278	0.448	0.224	0.284	*	0.304	0.262	
Education: Senior high school	0.139	0.346	0.069	0.166	***	0.14	0.12	
Education: Technical school	0.061	0.24	0.03	0.073	**	0.049	0.067	
Education: College	0.032	0.175	0.004	0.033	**	0.03	0.044	
Total household income (k)	31.634	39.726	22.72	25.514		40.286	37.611	
Age	40.222	25.262	45.603	38.352	***	46.966	34.061	***
Household size	3.503	1.483	3.612	3.407	*	3.456	3.683	**
Female	0.59	0.492	0.655	0.6		0.595	0.538	*
Married	0.488	0.5	0.543	0.474	*	0.595	0.375	***
Student	0.246	0.431	0.211	0.275	**	0.186	0.272	***

Note:
1) All the main dependent variables are based on the time period of the past four weeks. The household income variable is based on the time period of the past year. The total health care expenditure, out-of-pocket health care expenditure and total household income variables are inflated to 2011 Chinese Yuan.
2) Column (5) indicates if the differences between column (3) and column (4) are statistically significant. Column (8) indicates if the differences between column (6) and column (7) are statistically significant. * $P < 0.1$, ** $P < 0.05$, *** $P < 0.01$.

Table 2. Summary Statistics of the Household Level Study Sample

	Full Sample		Wave 2006			Wave 2009		
			Treatment	Control		Treatment	Control	
Sample Size	989		81	453		236	219	
Variable	Mean	S.D.	Mean	Mean		Mean	Mean	
	1	2	3	4	5	6	7	8
Main Dependent Variables								
Household formal medical care utilization	0.132	0.257	0.109	0.126		0.177	0.105	***
Household inpatient visit	0.017	0.098	0.019	0.013		0.023	0.016	
Household average inpatient hospital days	0.186	1.385	0.019	0.174		0.253	0.202	
Household outpatient service	0.112	0.241	0.087	0.108		0.15	0.088	***
Household average health care expenditure	105.464	623.532	51.614	65.38		138.304	172.843	
Household average out-of-pocket health care expenditure	55.608	398.598	21.611	52.742		64.772	64.062	
Household income transfer (k)	1.136	3.718	1.157	1.135		1.364	0.806	*
Main Explanatory Variables								
Household education: Illiterate	0.238	0.338	0.321	0.236	**	0.214	0.236	
Household education: Primary school	0.134	0.25	0.194	0.121	**	0.157	0.113	*
Household education: Junior high school	0.259	0.299	0.203	0.252		0.273	0.279	
Household education: Senior high school	0.159	0.25	0.078	0.172	***	0.164	0.157	
Household education: Technical school	0.112	0.216	0.117	0.119		0.094	0.115	
Household education: College	0.097	0.206	0.087	0.099		0.096	0.098	
Total household income (k)	32.485	36.739	30.086	26.923		39.082	37.767	
Household average age	47.365	17.638	49.237	46.314		51.489	44.404	***
Household size	2.759	1.122	2.642	2.779		2.589	2.945	***
Household level female	0.549	0.239	0.565	0.565		0.517	0.542	
Household level married	0.618	0.341	0.688	0.611	*	0.646	0.577	**
Household level student	0.133	0.179	0.145	0.142		0.109	0.137	*

Note:
1) All the main dependent variables except for the household income transfer are based on the time period of the past four weeks. The household income transfer and total household income variables are based on the time period of the past year. The household average health care expenditure, household average out-of-pocket health care expenditure, household income transfer and total household income variables are inflated to 2011 Chinese Yuan.
2) Column (5) indicates if the differences between column (3) and column (4) are statistically significant. Column (8) indicates if the differences between column (6) and column (7) are statistically significant. * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 3. Individual Level Replication Results

	DID Estimate	Standard Error	P-Value
Any formal medical care utilization	0.06	0.03	0.059*
Any inpatient visit	0.002	0.01	0.839
Inpatient hospital days	0.12	0.13	0.35
Any outpatient service	0.05	0.03	0.081*
Ln(total expenditure + 1)	0.15	0.17	0.384
Ln(out-of-pocket + 1)	-0.08	0.15	0.612

Note:
1) All the outcome variables are based on the time period of the past four weeks. The total health care expenditure and out-of-pocket health care expenditure variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 4. Original Results from the Previous Study

	DID Estimate	Standard Error	P-Value
Any formal medical care utilization	0.05	0.03	**
Any inpatient visit	0.002	0.005	
Inpatient hospital days	0.13	0.09	
Ln(total expenditure + 1)	0.15	0.13	
Ln(out-of-pocket + 1)	-0.05	0.1	

Note:
1) All the outcome variables are based on the time period of the past four weeks. The total health care expenditure and out-of-pocket health care expenditure variables are inflated to 2011 Chinese Yuan.
2) The detailed P-Value is not reported in the previous study. * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 5. Household Level Study Results

	DID Estimate	Standard Error	P-Value
Household formal medical care utilization	0.1	0.04	0.009***
Household inpatient visit	0.005	0.02	0.766
Household average inpatient hospital days	0.22	0.22	0.304
Household outpatient service	0.09	0.04	0.011**
Ln(average expenditure + 1)	0.16	0.21	0.447
Ln(out-of-pocket + 1)	0.23	0.18	0.2
Ln(income transfer + 1)	-0.13	0.72	0.855

Note:
1) All the outcome variables except for the household income transfer are based on the time period of the past four weeks. The household income transfer variable is based on the time period of the past year. The household average health care expenditure and household average out-of-pocket health care expenditure and household income transfer variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 6. Individual Level Assumption Test Results Using the 2004 and 2006 Data

	DID Estimate	Standard Error	P-Value
Any formal medical care utilization	-0.02	0.04	0.598
Any inpatient visit	-0.002	0.01	0.847
Inpatient hospital days	-0.12	0.13	0.345
Any outpatient service	-0.02	0.04	0.534
Ln(total expenditure + 1)	0.02	0.2	0.911
Ln(out-of-pocket + 1)	0.03	0.18	0.85

Note:
1) All the outcome variables are based on the time period of the past four weeks. The total health care expenditure and out-of-pocket health care expenditure variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 7. Household Level Assumption Test Results Using the 2004 and 2006 Data

	DID Estimate	Standard Error	P-Value
Household formal medical care utilization	-0.007	0.04	0.87
Household inpatient visit	0.02	0.02	0.167
Household average inpatient hospital days	0.17	0.25	0.498
Household outpatient service	-0.04	0.04	0.317
Ln(average expenditure + 1)	0.06	0.23	0.781
Ln(out-of-pocket + 1)	-0.12	0.2	0.546
Ln(income transfer + 1)	0.76	0.7	0.28

Note:
1) All the outcome variables except for the household income transfer are based on the time period of the past four weeks. The household income transfer variable is based on the time period of the past year. The household average health care expenditure and household average out-of-pocket health care expenditure and household income transfer variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 8. Individual Level Assumption Test Results about the Adverse Selection Problem

	DID Estimate	Standard Error	P-Value
Any preventive care utilization	0.02	0.02	0.214
Ln(total expenditure + 1)	0.06	0.05	0.308
Ln(out-of-pocket + 1)	0.02	0.05	0.694

Note:
1) All the outcome variables are based on the time period of the past four weeks. The total preventive care expenditure and out-of-pocket preventive care expenditure variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.

Table 9. Household Level Assumption Test Results about the Adverse Selection Problem

	DID Estimate	Standard Error	P-Value
Household preventive care utilization	0.006	0.02	0.811
Ln(average expenditure + 1)	-0.07	0.11	0.537
Ln(out-of-pocket + 1)	0.01	0.08	0.877

Note:
1) All the outcome variables are based on the time period of the past four weeks. The household average preventive care expenditure and household average out-of-pocket preventive care expenditure variables are inflated to 2011 Chinese Yuan.
2) * P < 0.1, ** P < 0.05, *** P < 0.01.