HEALTH INSURANCE GENEROSITY AND HEALTHCARE UTILIZATION - AN EVALUATION OF INTEGRATING URBAN AND RURAL RESIDENTS MEDICAL INSURANCE IN CHINA

A Thesis

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Master of Science

by

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ABSTRACT

How does generosity of health insurance impact health utilization? In this thesis, I estimated the impacts of the integration of urban and rural health insurance in China, in terms of health spending, healthcare services utilization, and health outcomes to understand the question. Using collected policy data and household survey data, I construct stagger difference-in-difference and event study models to evaluation the policy. I find that the policy increased the inpatient reimbursement rate by around 4% for rural populations but find that the integration had limited impacts on healthcare utilization and health outcomes.

BIOGRAPHICAL SKETCH

Yuhan Deng is currently completing a Master's degree in applied economics at Cornell University where she has focused on health economics and policy analysis. Yuhan will graduate in August.

Prior to graduate studies, Yuhan obtained a Bachelor's degree in Business Administration from Baruch College, City University of New York and Southwestern University of Finance and Economics in China.

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CHAPTER 1

INTRODUCTION

Understanding the impacts of health insurance policies is an important topic in health economics research. Many studies in this field conducted in developed and developing countries have shown that the introduction of health insurance would lead to higher healthcare utilization and potentially better health.[5,8,12,18] Health insurance expansion policies also have impacts on healthcare service utilization and may improve health outcomes and welfare. The results from the Oregon Medicaid expansion experiment and the Massachusetts insurance mandate are two examples.[3,10] However, fewer studies have been done on the impacts of benefit design or generosity changes. Card et al. find in their study on Medicare that people in more generous plan are more likely to incur higher healthcare expenditure.[5] Brot-Goldberg et al. use an experiment to show that enrolling in a high-deductible plan will lead to decrease in utilization.[19] How would a large-scale public health insurance generosity change impact utilization, health outcomes and enrollment in health insurance? Answering this question may help to guide future policy-making.

In 2016, the State Council of China announced that the government would integrate the urban and rural resident health insurance.[1] The policy aims at improving the benefit packages of the resident health insurance and the equality between the rural and urban populations. The new reimbursement rates would be increased to match the higher rate of the rural resident health insurance (New Cooperative Medical Scheme, NCMS), and the urban resident health insurance Urban Resident Basic Medical Insurance, (URBMI).[1] Measuring the impacts of this policy will help to answer the question that how changes of benefit packages would impact healthcare utilization and health outcomes since the integration may have impacts on a huge population. The coverage of health insurance reached 95 % by 2012 and about 1 billion population enrolled in NCMS and URBMI.[2]

While researchers have reached consensus that the launch of the NCMS, the URBMI, and the Urban Employee Basic Medical Insurance (UEBMI) for urban employees helped the country to reach the goal of universal coverage and increased healthcare utilization,[12,18] the results are mixed for the impacts of the integration. In terms of healthcare service utilization including inpatient care and outpatient care, Su et al.[16] and Zhou et al.[14] find no evidence of effects but Huang & Wu[11] find a 9% increase in rural residents' inpatient care utilization. For the reimbursement rate, Ren et al.[15] presents a significant improvement in outpatient benefit, while Huang & Wu[11] find a 26.7 % increase in inpatient reimbursement rate but no impact on that of outpatient care. Chen et al.[7] estimate a 2.8 % increase in total reimbursement rate. This study will help to figure out the impacts of the policy.

In this paper I empirically studied the effects of the integration of urban and rural health insurance in China. Using the data from the China Health and Retirement Longitudinal Study (CHARLS) in 2011, 2013, 2015, 2018 and the collected policy data, I form a panel dataset for further analysis. I use the time differentiation of policy implementation among cities as a natural experiment and establish staggered difference-in-difference and event study models to estimate the causal impact of the integration. First, I estimate the difference between urban and rural inpatient care benefit rates and find the inpatient reimbursement rate of NCMS is 4.1% lower than that of URBMI on average. In the results section, I examine the impacts on healthcare utilization and health outcomes but find no evidence of increase in healthcare spending and improvement of health status. Then, I estimate the policy effects on reimbursement rate but only find a small increase in inpatient benefits (about 4%) for rural residents. The event study model is used as a robustness check for the staggered DiD estimates. There is no evidence suggesting that pretrends differences exist for the treatment group and the control group. Moreover, the increase in inpatient reimbursement rate for enrollees of NCMS is statistically significant in the event study model. Next, I test if the integration increase enrollment in the health insurance but do not find any statistically significant evidence. Finally, I conclude that the policy had limited impacts on healthcare spending, healthcare service utilization, health outcome and enrollment in insurance plans. This study supports future study on more accurate estiamtion of the impacts on adverse selection in NCMS, if administrative data is available.

This study contributes to health insurance policy literature, specifically, on how the benefit design and generosity of health insurance plan influence the healthcare utilization and health outcomes. The paper also builds on the prior works about China's health insurance system. Previous studies examining the impacts of the integration usually use data from 2011 to 2015, during which most cities had not implemented the policy.[11,16] Most studies employed a matching strategy in terms of methods due to data constraint.[11,14–16] In addition, the results are mixed for the impacts of the policy as stated before. This paper uses data in 2011, 2013, 2015 and 2018, which covers the period after the central government announced the integration and allows for a staggered difference-in-difference design with a formal test of parallel trends assumption using an event study model.

The rest of the paper proceeds as follows. Chapter 2 presents the background, including a brief introduction of China's health insurance system and details about the integration policy. Chapter 3 introduces the datasets, variables and shows summary statistics of the sample. Chapter 4 describes the staggered difference-in-difference model and the event study model used in this paper. Chapter 5 presents and discusses the results. The final chapter concludes this paper.

CHAPTER 2

BACKGROUND

2.1 China's Health Insurance System

China has a single insurer system. As stated in the previous section, 95% of the population is covered by three public health insurance plans managed by the Chinese government: Urban Employee Basic Medical Insurance (UEBMI), Urban Resident Basic Medical Insurance (URBMI) and the New Cooperative Medical Scheme (NCMS). While the three plans all have low coverage rate for outpatient care and more coverage for inpatient care, they differ in targeted population, level of pooling, source of funding and benefit design.

The UEBMI was launched in 1998, much earlier than the implementation of URBMI and NCMS.[4] The enrollment in UEBMI is compulsory. People enrolled in UEBMI are employed individuals who have urban hukou [1] and enjoy the highest reimbursement rate which is about 88.5% for inpatient care when compared to other two groups. The funding for UEBMI comes from the employee (2% of the monthly payroll) and the employer (6% of the monthly payroll).[4] The insurance plan is managed at prefecture or municipality level.

In 2009, the Chinese government launched URBMI, covering the residents who do not enroll in UEBMI and have urban hukou. The population mainly includes unemployed urban residents, students, children and residents who work in small companies not paying for UEBMI. The enrollment in URBMI is voluntary and is subsidized by the city government and the central government. Similar to UEBMI,

[1]Hukou is the household registration system in China, classifying each person as a rural or an urban resident. Source: https://pubmed.ncbi.nlm.nih.gov/20734556/

URBMI is also managed at prefecture or municipality level. However, the benefit packages for URBMI are less generous than UEBMI. In 2013, the reimbursement rate difference reached 40%.[4] Recently, in 2023, the reimbursement rate differences in certain provinces decreased to 10%, which is a huge step to equality in coverage for unemployed and employed populations. [2]

The NCMS was established in 2006 and covers rural population. The enrollment in NCMS is voluntary. In 2006, the premium for NCMS was 10 RMB [3] (about 1.6 dollars) and the remainder was subsidized mostly by the local government and partly by the central government considering the financial status of rural residents. The health insurance is managed at county level before the integration, thus it has smaller risk pools. The benefit packages of NCMS are less generous than that of UEBMI. However, no agreement has been reached regarding the benefit difference between NCMS and URBMI. Huang and Wu,[11] Ren et al.[15] and government news report [4] on the integration policy mentioned that a huge difference in reimbursement rate existed before the integration. However, Forgia and Burns[4] state that the reimbursement rate for inpatient care of NCMS was about 5% lower than the URBMI, with variation in cities and counties. The reports from the Ministry of Human Resources and Social Security of China in 2015 present that the reimbursement rate of NCMS is even higher than that of URBMI. [5] I verify the reimbursement difference in the data section and find a 4% difference in the reimbursement rate.

[2]Data source: National Bureau of Statistics of China. https://www.stats.gov.cn/english/Statisticaldata/yearbook/

[3]Data source: Ministry of Human Resources and Social Security of People's Republic of China. https://www.gov.cn/2003/content62600.htm

[4]Source: http://www.mohrss.gov.cn/SYrlzyhshbzb/zcfg/SYzhengcejiedu/201601/t20160112231639.html

[5]Source: http://www.xinhuanet.com/politics/2016-08/22/c129246108.htm

2.2 The Integration of Urban and Rural Health Insurance

The State Council of China announced the integration of urban and rural resident health insurance plans (NCMS and URBMI) in January, 2016. In the official document, the Opinion on Integrating the Basic Medical Insurance System for Urban and Rural Residents, the State Council clearly presented that the funding source, benefit packages, risk pools and management agencies would be the same for NCMS and URBMI after the integration.[1] The new reimbursement rate would be set at the higher of the URBMI and NCMS rates that were in effect prior to the integration.[1] The new health insurance plan would be named Urban and Rural Resident Basic Medical Insurance (URRBMI).

Before the announcement, some cities implemented the policy such as Shenzhen, Guangzhou and Chengdu. 26 cities out of 122 cities integrated NCMS and URBMI before 2016 while most cities launched the program in 2017. A small portion of cities had not implemented the policy by 2018. Figure 2.1 shows the detailed distribution of the implementation.

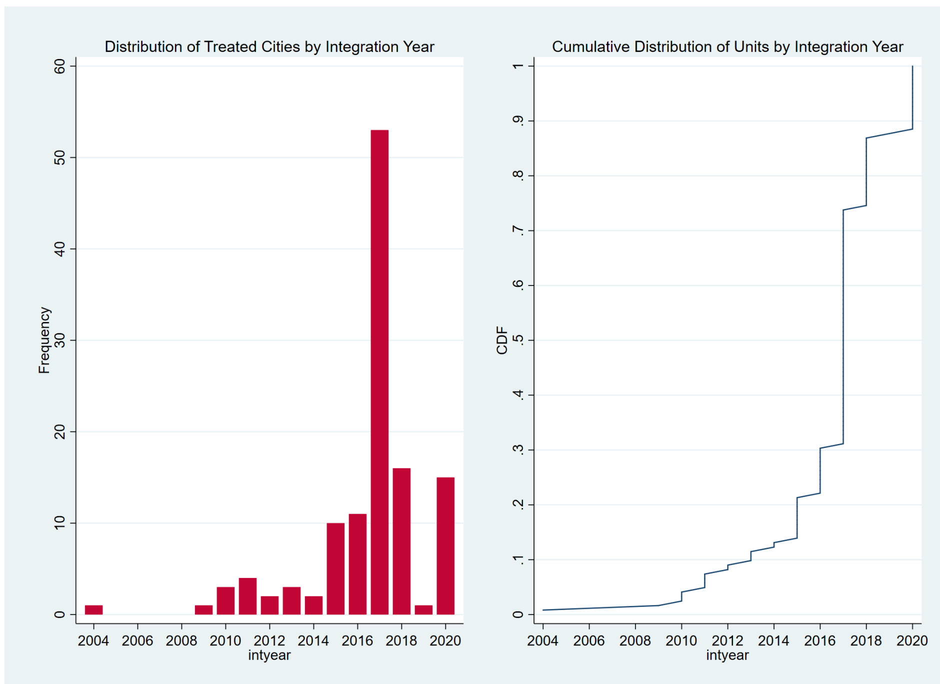


Figure 2.1: Distribution of integration year

The figure on the left hand side shows the probability density function of the integration while the right side one presents the cumulative density function of the implementation.

CHAPTER 3

DATA

The data used in this study are from two sources. The policy dataset was collected from the local government websites and the Peking University Law dataset. I successfully matched the policy implementation year to 122 cities in the panel dataset. Figure 2.1 shows the probability density function and cumulative density function of the policy implementation. As I mentioned in the background section, we can see that nearly 80% of the cities implemented the policy after the announcement of the central government in 2016.

The individual panel dataset is from the China Health and Retirement Longitudinal Study (CHARLS). CHARLS collects a high quality sample of Chinese residents over 45 years old. Compared to other large-scale household surveys in China, CHARLS has a focus on health related information, including healthcare spending, healthcare service utilization, health outcomes and health insurance status[20] and is suitable for health economics research. The baseline survey was conducted in 2011 and every two years after 2011. I use the 2011, 2013, 2015 and 2018 data to construct a balanced panel dataset and combine the dataset with the policy dataset. First, I exclude the individuals who did not incur any healthcare costs during all the four survey waves. This would not impact the results largely since these observations would not be included in the reimbursement rate regressions. For other dependent variables, including these observations would not impact the statistical insignificance. Then I drop the cities that implemented the policy before 2009 due to the concern that they may be systematically different from the cities which implemented the policy later. I deleted the individuals who do not have hukou. The cleaned sample contains 7,309 observations each year and

29,236 observations in total. To further examine the policy impact on the targeted population, the rural residents, I constructed a rural sample which only includes individuals having rural hukou in every wave of the data. The targeted sample contains 5,750 observations each year and 23,000 observations in total.

3.1 Variables

The outcome variables include healthcare service utilization, health outcomes, reimbursement rates and share of enrollment in health insurance. To estimate the healthcare service utilization, I use the outpatient and inpatient total expenditure and out-of-pocket payments. Since the distribution of those variables are highly skewed, I use the log forms. The changes in hospitalization, inpatient visits, treatment of chronic diseases are also measured. The inpatient and outpatient reimbursement rates are calculated based on the total expenditure and out-of-pocket payments. Self-rated health status is a categorical variable. It takes a value from a 1 to 5 scale, representing very poor health to very good health. The share of enrollment in health insurance in a certain city is calculated by dividing the population using the enrolled group.

For the integration indicator, To account for the time difference between the announcement and implementation of the policy, I added one year to the integration year for cities that announced changes in the second half of the year.

The control variables are income, marital status, education, age and employment status. The variable names and definitions are presented in Table 3.1.

Table 3.1: Variable List

Variable	Definition
loginoop	The natural log of inpatient out-of-pocket payments during last 12 months
logintot	The natural log of inpatient total expenditure during last 12 months
logoutoop	The natural log of outpatient out-of-pocket payments during last month
logouttot	The natural log of outpatient total expenditure during last month
inrate	inpatient reimbursement rate
outrate	outpatient reimbursement rate
inpatient	=1 if see a doctor last month
outpatient	=1 if hospitalized last year
ncddiag	=1 if diagnosed a chronic disease
ncdtreat	=1 if got treatment for chronic disease
health	self-reported health status
enrollment	Share of population enrolled in NCMS/URRBMI in a city

3.2 Summary Statistics

Table 3.2 shows the summary statistics of the variables. The outpatient care reimbursement rate is around 15% which is much lower than 42% of inpatient care, consisting of the characteristics of the benefit packages of resident basic medical insurance. The health insurance plans do not provide generous coverage for outpatient care.

The differences between full sample and rural sample are not huge. But it is notable that the mean inpatient care reimbursement rate of rural sample is 41.8% which is 2.3% lower than that of full sample. In addition, the outpatient reimbursement rate is lower for rural population.

However, the differences between urban sample and rural sample are substantial. The mean healthcare expenditure for urban citizens are higher than rural population. The mean inpatient reimbursement rate of urban sample is 52.3%, around 10% higher than that of rural sample. The difference in outpatient reimbursement rate is also around 10%. In addition, the urban population has higher mean healthcare service utilization, including hospitalization, outpatient visits, diagnosed with a chronic disease and treatment for the chronic disease.

The drivers for the differences are unclear when only looking at the summary statistics. As I mentioned in the background section, the benefit gap between urban and rural resident insurance (URBMI and NCMS) is unclear. Therefore, I formally test the difference using the all the observations before the treatment. The results are presented in Table 3.3. The benefit gap between NCMS and URBMI is statistically significant before the integration. The reimbursement rate difference is about 4.1%. I do not find evidence that there is a benefit gap between URBMI and NCMS regarding to the outpatient care. This is reasonable since the outpatient reimbursement rate is low for both NCMS and URBMI. After including UEBMI, the reimbursement rate differences become more significant. Given that only very small portion of the sample joined the UEBMI (around 800 observations per year), the benefit gaps between resident health insurance and employee health insurance are larger.

Table 3.2: Summary Statistics

Variable	Mean	SD	Min	Max
Panel A: Full sample				
loginoop	1.550	3.185	0.000	12.429
logintot	1.770	3.515	0.000	13.459
logoutoop	1.587	2.580	0.000	12.044
logouttot	1.696	2.711	0.000	13.592
inoop	1336	6988	0.000	250000
intot	2510	12356	0.000	700000
outoop	257	2193	0.000	170000
outtot	406	5761	0.000	800000
inrate	0.441	0.312	0.000	1.000
outrate	0.160	0.284	0.000	1.000
inpatient	0.214	0.410	0.000	1.000
outpatient	0.299	0.458	0.000	1.000
ncddiag	0.821	0.383	0.000	1.000
ncdtreat	0.618	0.486	0.000	1.000
health	3.172	0.919	1.000	5.000
enrollment	0.755	0.219	0.000	1.000
Panel B: Rural sample				
loginoop	1.468	3.107	0.000	12.346
logintot	1.677	3.416	0.000	13.122
logoutoop	1.597	2.566	0.000	12.044
logouttot	1.684	2.679	0.000	13.592
inoop	1218	6509	0.000	230000
intot	2155	10795	0.000	500000
outoop	253	2229	0.000	170000
outtot	393	6314	0.000	800000
inrate	0.418	0.312	0.000	1.000
outrate	0.141	0.260	0.000	1.000
inpatient	0.206	0.404	0.000	1.000
outpatient	0.304	0.460	0.000	1.000
ncddiag	0.815	0.388	0.000	1.000
ncdtreat	0.613	0.487	0.000	1.000
health	3.208	0.929	1.000	5.000
Panel C: Urban sample				
loginoop	1.886	3.465	0.000	12.429
logintot	2.146	3.871	0.000	13.459
logoutoop	1.535	2.641	0.000	11.513
logouttot	1.745	2.858	0.000	11.513
inoop	1808	8923	0.000	250000
intot	3999	18189	0.000	700000
outoop	293	2281	0.000	100000
outtot	492	3143	0.000	100000
inrate	0.523	0.297	0.000	1.000
outrate	0.256	0.366	0.000	1.000
inpatient	0.246	0.431	0.000	1.000
outpatient	0.274	0.446	0.000	1.000
ncddiag	0.842	0.365	0.000	1.000
ncdtreat	0.639	0.480	0.000	1.000
shlta	3.002	0.868	1.000	5.000

Note.– N = 29,236 for panel A, N = 23,000 for panel B, N = 6,236 for panel C.

Table 3.3: Difference between urban and rural reimbursement rates

	NCMS and URBMI	NCMS and URBMI, UEBMI
Inpatient benefit difference	0.041**	0.105**
	(0.020)	(0.01)
Outpatient benefit difference	0.009	0.027**
	(0.154)	(0.013)

Note.– The table shows the test results for the difference between urban and rural reimbursements rate. Col.1 presents the results for the difference between NCMS and URBMI, excluding the observations enrolled in UEBMI. The results in col.2 show the reimbursement difference between urban and rural population, including the UEBMI enrollees.
Standard errors in are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

CHAPTER 4

METHODS

As Figure 2.1 shows, cities implemented the integration at different time points. Using the time differentiation, I established a staggered difference-in-difference with two-way fixed effects model to estimate the causal impacts of the integration on various outcomes. The timing of the implementation is the first difference and the location: treated cities and untreated cities, is the second difference. The equation below shows the specification:

$$Y_{ist} = \beta_0 + \beta treat_{st} + \delta_t + \gamma_s + \alpha X_{ist} + \epsilon_{ist} \tag{4.1}$$

In (4.1), Y_{ist} is the outcome of interest for person i, in city s, at time t. In addition, self-rated health status The main independent variable $treat_{st}$ is an indicator denoting whether city s integrates the urban and rural residents health insurance at year t. It takes a value of 1 if city s has implemented the policy by year t, in other words, city s is in the treatment group. β is the estimated average treatment effect. δ_t controls for the time fixed effects and γ_s controls for the city fixed effects. X represents control variables including income, age, education, marital status and employment status. ϵ is the error term. The standard error is clustered at city level.

The staggered DiD model may produce biased estimation of treatment effects because the estimator (β in my model) is in fact a weighted-average of all possible 2×2 estimators.[9] Cengiz et al.[6] mentioned in their work that event study can be used as a falsification test for the staggered DiD model, since event study aligns events (in this paper, the integration in different cities) by event-time not calendar time. Unlike staggered DiD model, the event study does not have a negative weighting problem.[17] Moreover, I can formally test the parallel trends assumption which is the core assumption for a DiD design and measure dynamic treatment effect.

The event study model is shown below:[13]

$$Y_{ist} = \left(\sum_{j\in[-3,3],\neq -1} \beta_j * D_{i,t-j}\right) + \gamma_s + \delta_t + \alpha X_{ist} + \epsilon_{ist} \tag{4.2}$$

The main difference between equation (4.1) and (4.2) is the first term in (4.2). $D_{i,t-j}$ indicates that for person i, in calendar year t, the policy was implemented j years ago. I use -1 period which is one year before the integration as a reference point. I measure the dynamic treatment effects of the policy in a [-3,3] event window. β_j provide dynamic effects when $j \geq 0$ and can be used to test the parallel trends assumption when $j < 0$.

CHAPTER 5

RESULTS AND DISCUSSION

First, I examine the treatment effects on healthcare expenditure and healthcare service utilization of full sample. The results are shown in Table 5.1 and Table 5.2. Table 5.1 shows the impacts on healthcare expenditure. The results in column 1, column 2, column 3 and column 4 indicate that the integration does not have impact on the outpatient expenditure and out-of-pocket payments. The coefficients are not statistically significant and the magnitudes are close to zero. This is not surprising regarding the low reimbursement rate of outpatient care of NCMS and URBMI. However, the treatment effects on inpatient expenditure are also not statistically significant and close to zero. The results for healthcare utilization are similar to the results for healthcare spending, as shown in Table 5.2. The integration has limited impact on hospitalization, outpatient visits, diagnosis of chronic diseases and treatment of chronic diseases. Given that the there is no evidence showing the policy influences the healthcare service utilization, it is reasonable that the coefficient for self-rated health status is not statistically significant, as shown in Table 5.3. Then, I test the changes in reimbursement rates and do not find any evidence on the increase in inpatient and outpatient benefits, which provides an explanation for the results of healthcare spending and healthcare service utilization. To sum up, the policy does not affect the utilization, health outcomes and does not increase the reimbursement rate for the full sample.

Referring to Table 3.3, the benefit packages for the NCMS were not so generous as the benefit packages for the URBMI. A possible explanation for the results of full sample is that the inclusion of urban sample dilutes the potential treatment effects on the rural sample. Therefore, I drop the observations with urban hukou

Table 5.1: Impacts on healthcare expenditure (full sample)

	(1) logoutoop	(2) logoutoop	(3) logouttot	(4) logouttot	(5) loginoop	(6) loginoop	(7) logintot	(8) logintot
treat	0.007	-0.006	0.013	0.001	0.027	0.007	0.011	-0.005
	(0.093)	(0.098)	(0.099)	(0.105)	(0.053)	(0.051)	(0.054)	(0.054)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, Col.5, Col.7 shows the treatment effects on log outpatient out-of-pocket-payments, log outpatient total expenditure, log inpatient oop, log inpatient total expenditure. Col.2, Col.4, Col.6, Col.8 include a set of control variables.

Table 5.2: Impacts on healthcare services utilization (full sample)

	(1) inpatient	(2) inpatient	(3) outpatient	(4) outpatient	(5) ncddiag	(6) ncddiag	(7) ncdtreat	(8) ncdtreat
treat	0.004	0.002	0.004	0.003	-0.017	-0.014	-0.014	-0.007
	(0.007)	(0.007)	(0.015)	(0.015)	(0.013)	(0.013)	(0.015)	(0.015)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, Col.5, Col.7 shows the treatment effects on hospitalization, outpatient visit, diagnose of chronic diseases, chronic disease treatment status. Col.2, Col.4, Col.6, Col.8 include a set of control variables.

Table 5.3: Impacts on health outcome and reimbursement rates (full sample)

	(1) inrate	(2) inrate	(3) outrate	(4) outrate	(5) health	(6) health
treat	0.013	0.013	-0.001	-0.001	-0.014	-0.001
	(0.015)	(0.014)	(0.019)	(0.018)	(0.038)	(0.037)
Controls	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, and Col.5 shows the treatment effects on inpatient care reimbursement rate, outpatient care reimbursement rate, and self-rated health status. Col.2, Col.4, and Col.6 include a set of control variables.

and construct a rural sample. I run the models for the rural sample and the results are presented in Table 5.4 and Table 5.5. I fail to find the impacts on healthcare spending and utilization. The coefficients are not statistically significant and most of the coefficients are negative, though the magnitudes are close to zero. The impacts of the integration on rural population are also limited. However, the treatment effects on the inpatient care reimbursement rate is statistically significant at 10% level when controlling for the individuals' education, marital status, income etc. The result is in Table 5.6. The integration is associated with a 3.2% increase in the inpatient care reimbursement rate. The small magnitude is consistent with the 5% difference between the inpatient benefit of the NCMS and the URBMI, shown in Table 3.3. An extra estimate of the effects is done by restricting the sample to the always enrolled population. The sample includes the individuals who were enrolled in the NCMS for all of the four waves (in 2011, 2013, 2015 and 2018). Table 5.7 shows that the integration increased the inpatient care reimbursement rate for the enrolled population by 4.4%. The result is statistically significant at 5% level.

The event study estimates for the inpatient reimbursement rate changes of rural sample and enrolled sample are shown in Table 5.9 and Figure 5.1. The results indicate that the parallel trends assumption holds. The coefficients for the pre-

Table 5.4: Impacts on healthcare expenditure (rural sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	logoutoop	logoutoop	logouttot	logouttot	loginoop	loginoop	logintot	logintot
treat	-0.014	-0.030	-0.025	-0.042	-0.021	-0.063	-0.032	-0.070
	(0.106)	(0.116)	(0.111)	(0.123)	(0.049)	(0.050)	(0.051)	(0.052)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, Col.5, Col.7 shows the treatment effects on log outpatient out-of-payments, log outpatient total expenditure, log inpatient oop, log inpatient total expenditure. Col.2, Col.4, Col.6, Col.8 include a set of control variables.

Table 5.5: Impacts on healthcare services utilization (rural sample)

	(1) inpatient	(2) inpatient	(3) outpatient	(4) outpatient	(5) ncddiag	(6) ncddiag	(7) ncdtreat	(8) ncdtreat
treat	-0.001	-0.006	0.001	-0.001	-0.007	-0.005	-0.010	-0.003
	(0.007)	(0.007)	(0.016)	(0.017)	(0.011)	(0.011)	(0.017)	(0.017)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, Col.5, Col.7 shows the treatment effects on hospitalization, outpatient visit, diagnose of chronic diseases, chronic disease treatment status. Col.2, Col.4, Col.6, Col.8 include a set of control variables.

Table 5.6: Impacts on health outcome and reimbursement rates (rural sample)

	(1) inrate	(2) inrate	(3) outrate	(4) outrate	(5) health	(6) health
treat	0.033	0.032*	-0.030	-0.030	-0.025	-0.014
	(0.019)	(0.017)	(0.019)	(0.020)	(0.045)	(0.043)
Controls	No	Yes	No	Yes	No	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1). Col.1, Col.3, and Col.5 shows the treatment effects on inpatient care reimbursement rate, outpatient care reimbursement rate, and self-rated health status. Col.2, Col.4, and Col.6 include a set of control variables.

Table 5.7: Inpatient care reimbursement rate: enrolled population

	(1) inpatient reimbursement rate	(2) inpatient reimbursement rate
treat	0.044**	0.041*
	(0.020)	(0.022)
Controls	No	Yes
City FE	Yes	Yes
Year FE	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1) for the inpatient care reimbursement rate of NCMS/URBMI enrollees. Col.1 shows the treatment effects on inpatient care reimbursement rate of the enrolled population. The estimation in Col.2 includes a set of control variables.

policy periods are not statistically significant. The coefficients for period 1 which is 1 year after the integration and period 3 is significant and positive, consistent with the staggered DiD results. For the rural sample, the inpatient care reimbursement rate increased by 5% one year after the integration and increased by 8% three years after the integration. For the enrollees of the NCMS, the reimbursement rate increased by 5.6% in average one year after the integration.

Though the inpatient care reimbursement rate increased for the rural population, it did not incentivize the rural residents to increase their healthcare utilization. It could be that the change in benefit is too small. Another plausible explanation is the enrollment status for the population. As mentioned in the official document,[1] by integrating the NCMS and the URBMI, the government can eliminate duplicate enrollment in both of the insurance programs. In addition, the

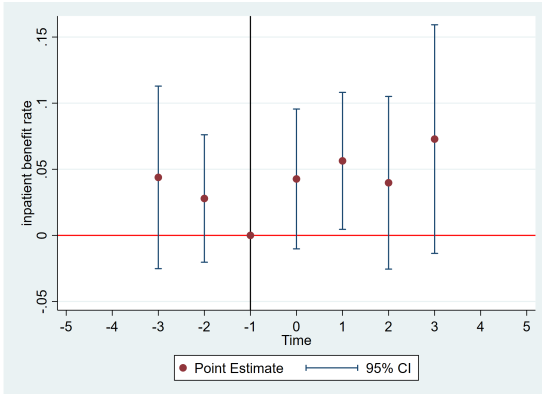
Table 5.8: Event study: inpatient care reimbursement rate

	(1) inrate rural	(2) inrate enrolled	(3) inrate enrolled
lead3	0.029	0.044	0.044
	(0.031)	(0.034)	(0.034)
lead2	0.022	0.028	0.028
	(0.021)	(0.023)	(0.023)
lag0	0.026	0.043	0.043
	(0.020)	(0.026)	(0.026)
lag1	0.050**	0.056**	0.056**
	(0.023)	(0.025)	(0.025)
lag2	0.029	0.040	0.040
	(0.020)	(0.032)	(0.032)
lag3	0.081**	0.073*	0.073*
	(0.037)	(0.042)	(0.042)
Controls FE	Yes	No	Yes
City FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

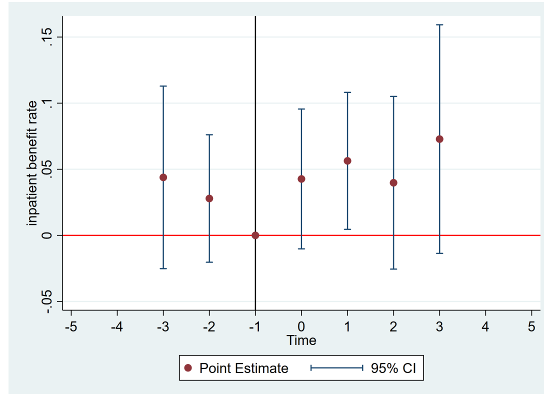
Note. – The table presents the event study estimates of (4.2). Col.1 shows the treatment effects on inpatient care reimbursement rate for the rural sample, which is corresponding to Table 5.6 column 2. Col.2 and col.3 present the event study estimates for the impacts on inpatient reimbursement rate of enrolled population.

possible premium increase due to the benefit packages change may lead to drop-out of enrollees. At the same time, the benefit changes may attract the new enrollees. The decrease in utilization of previous enrollees and the increase in utilization of new enrollees may offset each other and lead to no change in utilization. I test the enrollment status of the observations and find that the change in enrollment is not statistically significant and close to zero (-0.6%). The results are shown in Table 5.9.

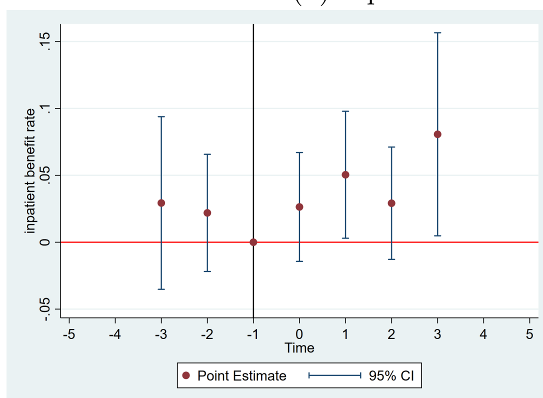
Overall, I conclude that the integration policy has limited impacts on urban and rural population by analyzing the datasets using a staggered DiD model and an event study model. To improve the benefits of resident basic medical insurance and health for the targeted population, the government may need to consider integrate



(a) Rural inpatient reimbursement rate



(b) Inpatient reimbursement rate: enrolled



(c) Inpatient reimbursement rate: enrolled

Figure 5.1: Event Study Results

Figure (a) corresponds to the result in Table 5.8 column 2, inpatient reimbursement rate changes for enrolled population without controls. Figure (b) shows the result for inpatient reimbursement changes for enrolled population with controls. Figure (c) shows the result for rural sample.

Table 5.9: Impacts on enrollment in resident health insurance

	(1) enrollment	(2) enrollment
treat	-0.006	-0.004
	(0.027)	(0.024)
Controls	No	Yes
City FE	Yes	Yes
Year FE	Yes	Yes

Note. – The table presents the staggered DiD estimates of (4.1) for the effect on enrollment in NCMS/URBMI/URRBMI. Col.1 shows the result without any controls while Col.2 includes a set of control variables.

the UEBMI and the resident insurance, since a larger difference in healthcare benefits exists between the employed and the unemployed population.

However, the conclusion is based on the estimates in this study and this paper has several limitations. The datasets used in the study are household surveys, which means the expenditure, utilization and enrollment status data are self-reported and may contain measurement errors. For instance, the healthcare costs are usually integers such as 1000, 1500, 2000 and so on. Usually, patients can recall the out-of-pocket payments but may not be able to report the total expenditure accurately. In addition, the reimbursement rates are calculated based on the self-reported out-of-pocket payments and the total expenditure and may be inaccurate. For the enrollment status, the respondents may not be able to distinguish between the NCMS and the URRBMI after the integration. They may report that they were enrolled in the NCMS after the integration and lead to the inaccuracy of enrollment status data. I assume that the measurement errors in dependent variables are random.

Having access to administrative data and claims data can help researchers to estimate the impacts more precisely. What's more, a study on the adverse selection problem in the health insurance system in China can be done using administrative data. There are anecdotal news reports about the drop-out problem of the NCMS and URBMI. The integration of urban and rural residents medical insurance changed the risk pooling mechanism of the insurance programs and may have positive impact on the adverse selection problem. However, a study using the administrative data has not been seen and future studies can produce a more comprehensive evaluation of the policy.

CHAPTER 6

CONCLUSION

In this paper, I evaluate the integration of urban and rural health insurance in China using staggered DiD and event study models. I find that the policy had limited impacts on healthcare spending, healthcare utilization and health outcome despite the fact the the policy did increase the reimbursement rate for the targeted population. The results have policy implications, indicating that small changes in benefit packages may not have large impacts on healthcare utilization and health insurance enrollment.

Though the equality between urban and rural resident health insurance was improved, the inequalities of health insurance benefits between employed and unemployed populations are larger and still exist. To reach the goal of universal coverage and improving population health, more policies need to be introduced and implemented in the future.

However, the policy may have positive impacts on other aspects that I cannot detect using the datasets in this paper. Integration of the two resident health insurances may help the government to improve the efficiency of management and also combine the risk pools of the two insurances and create a larger risk pool. Due to the data constraint, I cannot model adverse selection in the health insurance and cannot formally test if the policy have an impact on the potential drop-out problem of the health insurance. The methods used in this study may contribute to future research about the adverse selection in resident health insurance programs and the impacts of the integration using administrative data.

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