The Impact of Critical Illness Insurance on Consumption and Savings

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Abstract

China introduced the Critical Illness Insurance (CII) program in 2012 to address persistent concerns over high out-of-pocket medical expenditures and financial risk by providing additional coverage for substantial medical expenditures. To account for the staggered implementation across regions, I employ the Difference-in-Differences (DiD) approach proposed by Callaway and Sant'Anna (2021) to examine the impact of CII program on household consumption and savings. I find that the intervention of the CII program stimulates per capita household consumption, non-medical consumption and food consumption, and reduces savings. In addition, The CII program mainly promotes consumption and reduces savings among rural households and people aged 60 and above, but no incentives for poor families, leading to increased consumption inequality. Results from event-study specifications and placebo tests support the causal interpretation of the estimates. My findings suggest that the CII program was successful in improving the financial protection of older adults.

Keywords: Health Insurance, Inpatient Utilization and Spending, China, Difference-in-differences

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Medical Insurance (UEMI) initiated in 1998; the New Rural Cooperative Medical Scheme (NCMS) for rural residents, which was officially established in 2003; and the Urban Resident Medical Insurance (URMI), covering mainly urban residents without formal employment in 2007 (*Decision on further strengthening rural health work* 2002,

expenditures among the rural poor in China (Cheng et al., 2014). In fact, Wagstaff et al. (2009) and Cheng et al. (2014) find no evidence that the NCMS reduced out-of-pocket (OOP) expenses.

The Urban Residents Medical Insurance (URMI) provides coverage for urban residents without formal employment such as older people, students, and children. It primarily covers expenses related to inpatient care and some outpatient expenses for acute diseases (Dong, 2009). Individuals or families mainly pay premiums, and the state and local financial departments provide financial assistance under specific standards (*Guiding Opinions of the State Council on Piloting Urban Residents Medical Insurance*, 2007). However, research has shown that although the program significantly increased the utilization of medical services, it did not reduce total out-of-pocket health expenses (Liu & Zhao, 2014).

Critical Illness Insurance Policy

Data

The data used in this study are from the 2011, 2013, 2015, and 2018 waves of the China Health and Retirement Longitudinal Study (CHARLS) conducted by the Institute of Social Science Survey of Peking University (Zhao et al., 2020). CHARLS is a nationally representative longitudinal survey of residents in China aged 45 and older along with their spouses. The baseline survey collected data from 17,708 respondents in 10,257 households regarding a range of social, economic, and health topics. Since this study is conducted based on the prefecture cities' pilot characteristics of the CII, the construction of treatment groups required precision to the prefectures where the samples were located. The main analysis sample includes individuals aged 45 years or older enrolled in URMI, NCMS, or URRMI. Those not enrolled in URMI, NCMS, and NCMS are excluded as they would not be eligible for CII. The final sample contains 52,521 person-year observations and 13,463 individuals. Of these, 4,308 individuals reside in a prefecture city that implemented CII between the 2011 and 2013 waves ("group 2013"), 10,753 individuals reside in a prefecture city that implemented CII between the 2013 and 2015 waves ("group 2015"), 3,700 individuals reside in a prefecture city that implemented CII between the 2015 and 2018 waves ("group 2018"), and 660 individuals reside in a prefecture city that did not implement CII during our study period.

Variables

The main dependent variables include households' consumption and savings in a year. The CHARLS survey of older households' consumption includes three components: weekly household consumption, monthly household consumption, and annual household

Summary statistics for the full analysis sample and separately for each group defined by the timing of CII implementation are presented in Table 1, which summarizes key variables from the 2011 wave prior to the implementation of CII. Before the policy implementation, the per capita household consumption, per capita non-medical consumption, and per capita food consumption in group 2018 were higher than in group 2015. Savings per capita in the regions implementing the policy in 2018 are significantly higher than in other regions and are positive.

Table 1 Summary Statistics of the Sample in 2011 (Before CII Implementation)

	Group 2013	Group 2015	Group 2018	Group 0	Total
Household consumption	7426.235 (11061.427)	6790.712*** (9133.547)	7631.887 (10248.045)	6472.110 (5098.379)	7104.373 (9774.425)
Non-medical consumption	6449.634 (10215.267)	5844.028*** (7681.553)	6643.291 (8602.000)	5351.292* (3879.735)	6137.214 (8463.729)
Food consumption	3184.036 (7472.679)	2822.663*** (4109.974)	3139.337 (3845.270)	2341.774** (2143.346)	2955.150 (5012.457)
Savings	-818.533 (15613.095)	-653.824 (23583.657)	275.815*** (13835.336)	-1322.429 (7859.149)	-519.214 (19858.916)
Age					

Unified hukou	0.008	0.003**	0.002**	0.005	0.004
	(0.091)	(0.055)	(0.039)	(0.070)	(0.063)
Rural	0.972	0.942**	0.925**	0.931**	0.946
	(0.165)	(0.233)	(0.263)	(0.254)	(0.227)
URMI	0.031	0.058**	0.085**	0.054*	0.057
	(0.173)	(0.233)	(0.279)	(0.227)	(0.231)
NCMS	0.966	0.923**	0.908**	0.926**	0.930
	(0.180)	(0.267)	(0.290)	(0.262)	(0.255)
URRMI	0.006	0.023**	0.008	0.025**	0.016
	(0.078)	(0.149)	(0.091)	(0.155)	(0.126)
Per Capita GDP	33818.460	30032.403**	30758.873**	33561.184	31160.290
	(18229.063)	(17848.360)	(21913.272)	(13133.623)	(18751.286)
Urbanization rate	48.026	44.397**	44.601**	53.328**	45.548
	(14.968)	(13.359)	(13.037)	(17.003)	(13.957)
Number of cities	27	66			

the CII program on consumption remains significant for non-medical consumption. The pre vs post change in household non-medical consumption for the treated groups is 832.031 CNY higher than the pre vs post change for the control group. Medical insurance is used to affect medical expenses by reducing medical expenses paid for by the population. The considerable increase in non-medical consumption supports the idea that the CII program's stimulating effect on consumption results from the decline in precautionary savings. The CII program significantly increased per capita food consumption by 430.391 CNY, decreased per capita saving by 1755.062 CNY.

Table 2: Effect of CII on Household Consumption and Savings

	(1) Estimate (Std. Error) [Mean of Dep. Var.]	(2) Estimate (Std. Error) [Mean of Dep. Var.]

Next, I aggregate group-time average treatment effects by group, calendar time, and exposure time to assess treatment effect heterogeneity and the results show in Table 3. From Table 3, I find evidence of heterogeneous treatment effects under conditional parallel trends.

	(395.052)	(741.111)	(1121.583)	(689.830)

(b) Per capita non-medical consumption

Group-specific effects	Group 2013	Group 2015

Figure 2: CII Group-time Average Treatment Effects on Consumption and Savings.
Notes: The effect of the CII on per capita household consumption is Panel (a), per capita non-food consumption is Panel (b), per capita food consumption is Panel (c), and per capita saving is Panel (d).

As another test of the identifying assumption, I perform a placebo test using the

expenditures and reduced saving, but the results of urban samples are not significant. The disparity between rural and urban basic health insurance coverage capacity may account for this result. Most of the rural sample is enrolled in NCMS, which has substantially lower reimbursement rates and coverage than URMI and does not have the same capacity for coverage as URMI or the combined URRMI. Rural middle-aged and older households have, in theory, more preventative savings for medical treatment than urban households

In addition, the annual per capita household income of the sample was sorted by quartiles, and the sample was divided into low-income, middle-income, and high-income groups. The results are shown in the last three columns of Table 5. We find that the CII program significantly increase middle-income group's non-medical consumption by 1670.849 CNY and decrease saving by 2018.756 CNY at the 10% level. The CII program results has no significant effect on consumption and saving for the low-income group. For the treatment effect of high-income groups, CII intervention only significantly reduced their family savings at the level of 10%. High-income households are more resistant to the financial risks associated with illness, so their consumption behavior is less significantly affected by the CII program. For low-income residents, the starting threshold for the CII is high, usually at the local per capita disposable income of the previous year. The income of the low-income group cannot even reach this threshold, so the positive effect of the system is limited. The CII policy will therefore have a greater impact on the consumption of middle-income households.

Table 5: Results of Heterogeneity Analysis on Consumption and Savings.

Variables	Rural	Urban	Middle-aged	Older	Low income	Middle

Robustness Checks

The following two robustness checks are undertaken in this study to assess the reliability of the results regarding the impact of CII on household consumption and savings. The regression results in this section were obtained by excluding those who were enrolled in other health insurance and excluding those who were enrolled in URRMI, respectively. First, there may be a portion of urban and rural residents who participate in other medical insurance such as public health care, employee health insurance, or

something to something better" improvements. To accurately identify the effects of CII, we exclude the sample with registered URRMI to ensure the robustness of the study design. The results in the third column of Table 6 The results show that the coefficients and significance of the effects of CII implementation on total household consumption, non-medical consumption, food consumption, and saving do not show substantial changes, which are basically consistent with the base measurement results, indicating that the empirical results are relatively robust.

Table 6: Robustness Check on Consumption and Savings

	(1)	(2)	(3)
Variables	Preferred Estimate	Without other health insurance	Without URRMI
Per Capial Household Consumption	1234.511***	1207.242**	1222.449***
	(438.067)	(533.127)	(341.252)
Per Capita Non-medical Consumption	832.031**	813.000**	787.898***
	(337.913)		

middle-aged and older households will preserve their current surplus income for the risk of uncertain future medical expenses. Using the DiD approach with doubly robust estimator, this study evaluates the effects of CII on consumption and saving outcomes of middle-aged and older households. We find that the adoption of CII significantly increases household per capita consumption by 3415.21 CNY, with non-medical consumption increasing by 3282.031 CNY and food consumption increasing by 0.4391 CNY and decreases per capita saving by 5076.52 CNY. Second, the analysis of heterogeneity demonstrates that the adoption of CII has a greater impact on rural households' consumption and saving than on urban households with middle-aged and older adults. In terms of age grouping, the CII program has a significant effect on total per capita consumption, food consumption and saving among individuals aged 60 and older. The CII program is found to effectively increase the non-medical consumption and reduce saving of middle-income households, taking into account the household economic situation. Based on the URMI and NCMS, the CII policy provides additional protection and defuses health concerns, which considerably encourages consumption among older households.

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Appendix

Table A1: Timeline of CII implementation across prefecture-cities in the study sample

Province	City	Implementation Date	Resources and Link

			Administration of Jiangmen Municipality
	Shenzhen	2014	T

			Government
	Chengde	Jul. 2014	Chengde Municipal People's Government
	Cangzhou	Sep. 2014	Office of the People's Government of Cangzhou City
	Shijiazhuang	Mar. 2013	Shijiazhuang Municipal People's Government

			Mongolia Autonomous Region
	Xilingol League	Dec. 2015	People's Government of Inner Mongolia Autonomous Region
Jiangsu	Suqian	Oct. 2013	The People's Government of Suqian Municipality
	Xuzhou	Dec. 2013	The People's Government of Xuzhou Municipality
	Yangzhou	Jan. 2014	The People's Government of Yangzhou Municipality
	Taaizhou	2016	The People's Government of Jiangsu Province
	Yancheng	Dec. 2013	The People's Government of Yancheng Municipality
	Suzhou	Apr. 2018	The People's Government of Jiangsu Province
	Lianyungang	Sep. 2015	The People's Government of Jiangsu Province

Qinghai	Haidong	2013	China Government Website
Shandong	Linyi	2013	The People's Government of Shandong Province
	Weihai	2014	The People's Government of Weihai Municipality
	Dezhou	2014	The People's Government of Dezhou Municipality
	Zaozhuang	2014	The People's Government of Zaozhuang Municipality
	Jinan	Feb. 2013	The People's Government of Jinan Municipality
	Binzhou	2014	The People's Government of Binzhou Municipality
	Weifang	Mar. 2013	The People's Government of Weifang Municipality
	Liaocheng	2013	The People's Government of Liaocheng Municipality
	Qingdao	2013	The People's Government of Qingdao Municipality
Shanghai	Shanghai	Jun. 2014	Shanghai Municipal Development Reform Commission
Shaanxi	Baoji	May. 2013	The People's Government of Baoji Municipality
	Yulin	2017	The People's Government of Shaanxi Province
	Hanzhong	May. 2013	The People's Government of Shaanxi Province
	Weinan	2014	The People's Government of Wein Municipality
Shanxi	Linfen	2015	The People's Government of Shanxi Province
	Xinzhou	2015	The People's Government of Shanxi Province
	Yuncheng	Sep. 2013	The People's Government of Shanxi Province
	Yangquan	May. 2013	Yangquan Municipal People's Government
Sichuan	Neijiang	Dec. 2014	The People's Government of Neijiang Municipality
	Liangshan Yi Autonomous Prefecture	2014	The People's Government of Liangshan Yi Autonomous Prefecture
	Nanchong	Jan. 2013	The People's Government of Sichuan Province

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Table A2: Group-time Average Treatment Effects on Household Consumption and Savings

	Total household consumption	Non-medical consumption	Food consumption	Saving
Group 2013				
t 2011-2013	-471.647	-446.436*	-124.466	560.011
	(310.550)	(247.792)	(131.300)	(454.241)
t 2011-2015	270.722			