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

JEL Codes: I13, O15

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Introduction

In recent years, China has gradually transformed its long-standing economic growth model, which relies on export trade and domestic investment, into a consumption-driven one. Stimulating consumption to increase domestic demand has become a key engine to drive economic growth. However, Chinese households generally have the problem of under-consumption and high savings. From 1998 to 2010, the savings rate of urban and rural residents rose from 20% to 30% and 26% respectively for urban and rural residents. At the same time, the consumption rate also showed a declining trend from 46.48% to 33.22% (Ling & Zhang, 2012). Multiple factors contribute to China's low consumption and high savings rate, including the widening income difference between urban and rural areas, income uncertainty, and the absence of investment avenues in the financial market. Some scholars have suggested that a series of social welfare system reforms including housing, education, health care security, and pension system that started in the 1980s have increased the uncertainty of residents' future, while these social welfare systems generally should reduce residents' uncertainty (Wang 2008, Wang & Gong 2007). Due to the presence of future uncertainties, households reduce current consumption and increase precautionary savings to protect themselves against future risks. Therefore, the key to improving the well-being of consumer individuals is how to improve the social security system. One way is to increase welfare by improving their health status. Another way is to increase consumption and reduce the need for precautionary savings. Since health expenditures are ongoing and generally increase with age, they significantly impact the uncertainty of a household's future financial condition. By reducing uncertainty about future spending on health services and reducing the health risks that residents may face, the introduction of health insurance may reduce the need for

precautionary savings and promote consumption. In August 2012, the Chinese government introduced the Critical Illness Insurance (CII) program as a supplement to the New Rural Cooperative Medical Scheme (NCMS) and Urban Residents Medical Insurance (URMI). The CII system is established by allocating a certain proportion of funds from NCMS and URMI funds, and subsequently a dual medical insurance system of "basic medical insurance and critical illness insurance" has been established for urban and rural residents. The CII scheme has effectively decreased out-of-pocket inpatient expenses and improved the health of older residents. Can the CII system further mitigate health concerns and promote consumption? The existing research on this issue is limited.

This study aims to determine whether the implementation of CII stimulates consumption and enhances the well-being of older adults. I use the doubly robust Difference-in-Differences estimator proposed by Callaway and Sant'anna (2021) to account for heterogeneous treatment effects and the staggered implementation of CII across regions in China. I find that the CII program significantly stimulates household consumption, and reduces savings. I further verify the reliability of the estimation results by the placebo test and robustness check. These findings suggest that the program provides additional protection and defuses health concerns, which considerably encourages consumption among older households.

This study adds to the limited literature on the impact of Critical Illness Insurance on household consumption and savings. The theory of "precautionary savings" suggests that when people face uncertainty in the future, they tend to save more and consume less to cope with the negative shock of uncertainty risk (Leland, 1978). Previous studies have highlighted the influence of future income and healthcare expenditure uncertainties on

current consumption behaviors (Carroll et al. 1992, Carroll 1994, Atella et al., 2005). Health insurance, as a risk transfer mechanism, can reduce the financial shock caused by the uncertainty of health care expenditures in the future, and therefore, to some extent, reduce people's incentive for precautionary savings. Studies conducted in various global contexts provide mixed insights about the effects of health insurance on household savings and consumption. Some studies indicate that individuals with health insurance have lower levels of wealth and higher consumption (Wagstaff & Pradhan 2005, Clark & Mitchell 2014), and reduced household savings (Chou et al. 2003, Kuan & Chen 2011).

In recent explorations in China, mixed results have been found regarding the relationship between health insurance and residents' consumption behaviors. Bai & Wu (2014) find that the NCMS increased households' non-medical expenditure consumption by more than 5 percentage points among rural households from 2003 to 2006. The effect was more significant among households with lower incomes or poorer health status. Cheung & Padieu (2015) suggest that the NCMS has a negative impact on middle-income savings, but it has no impact on the poorest participants. A Chinese study analyzes the impact of URMI on urban household consumption using DID and FE methods with data from 2007 and 2008. The results show that insured families have around 13% higher non-medical consumption expenditure compared to uninsured families, while medical consumption remained unchanged (Zang et al., 2012). Atella et al. (2015) conclude that the introduction of healthcare reform in China in 1998 increased the savings rate of low-income individuals in good health.

The literature on the impact of CII on consumption is still very limited. Zhao (2019) uses the data from the China Family Panel Studies (CFPS) in 2009, 2011 and

2013 and a DID approach to show that the CII program led to an increase in daily household consumption but not in household health expenditures for rural residents. A Chinese study by Gao & Ding (2021) uses data from the 2012 and 2014 China Labor Force Dynamics Survey (CLDS) and finds that the adoption of the CII increases rural household consumption by 4.25% and increases the share of non-medical consumption.

I provide new evidence on the impact of the Critical Illness Insurance program on older adults' consumption and savings. I collect more detailed information on the timing of implementation across prefecture cities in China compared to previous studies, which have examined province-level variation in the timing of implementation (Zhao 2019) or have focused on rural residents (Zhao 2019, Gao & Ding 2021). I build on this literature by using a Difference-in-Differences estimator to identify causal effects. My approach also accounts for the staggered implementation of the program across regions and potential heterogeneity in treatment effects.

Background on Health Insurance in China

Over the past 20 years, China has steadily reformed its healthcare sector with the goal of achieving universal health insurance coverage (Yip et al. 2019, Wagstaff et al. 2009, Meng & Tang 2013, Ta et al. 2020, Eggleston et al. 2008, Yip and Hsiao 2009). China began piloting a health insurance program reform in 1994. It completed two phases: establishing a basic health insurance plan from 1994 to 2008 and further comprehensive reform from 2009 to the present. Basic medical insurance (BMI) is the countrywide government system that serves as the primary third-party payer and the backbone for healthcare financing. BMI consists of three schemes, including the Urban Employees

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, *Guiding Opinions of the State Council on Piloting Urban Residents Medical Insurance* 2007). The central and local governments directly manage the basic medical insurance system (Barber & Yao, 2010). It covers urban employees, rural residents, and unemployed urban residents. In 2008, the insurance rates in China were about 65% and 90% in urban and rural regions, respectively (Meng & Tang, 2013). By the end of 2013, insurance coverage was over 95% in both rural and urban regions (*An Analysis Report of National Health Services Survey in China*, 2013). Residents who are registered with URMI or NCMS are also eligible for Critical Illness Insurance (CII), which I describe below. In addition, some regions have taken the lead in merging URMI with NCMS to implement a unified urban and rural resident medical insurance (URRMI). These individuals would also be eligible for CII.

The New Rural Cooperative Medical Insurance Scheme (NCMS) is a voluntary insurance program for rural residents that is funded via insurance premiums paid by individuals and subsidies provided by both the local and central governments (You & Kobayashi, 2009). The rural cooperative medical fund mainly subsidizes the extensive medical expenses or hospitalization expenses of farmers who participate in NCMS (*On the Establishment of New Rural Cooperative Medical System Notice of Opinions*, 2008). Although the coverage rate had reached 92.5% by the end of 2008 (Meng & Tang, 2013), the program only provided minimal financial protection for high medical and health care

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, but 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

To address concerns about the inadequate financial protection provided by NCMS, URMI and URRMI, the Critical Illness Insurance Policy was introduced as a form of supplemental insurance. In August 2012, the National Development and Reform Commission, the Ministry of Civil Affairs, the Ministry of Health, and three other departments jointly issued the "Guidance about Implementation of Critical Illness Insurance for Urban and Rural Residents", requiring the establishment of the critical illness insurance (CII) system as supplementary insurance to basic medical insurance, with the goal of further reducing individuals' financial burden caused by critical illnesses (*Guidance on the Implementation of Critical Illness Insurance for Urban and Rural*

Residents, 2012). The program was initially piloted in some regions beginning in 2012 and gradually expanded to cover 25 provinces by 2014 (Wang, 2014). By the end of 2014, 700 million people, 219 prefecture-level cities[2] and 1,563 counties (cities and regions) were covered by CII, with a total of CNY 9.7 billion ($1.6 billion) set aside for the program (National Health and Family Planning Commission, 2015). The development of CII system has gone through three phases: the pilot promotion phase from August 2012 to July 2015, the full implementation phase from August 2015 to February 2020, and the standardization and improvement phase from February 2020 to the present.

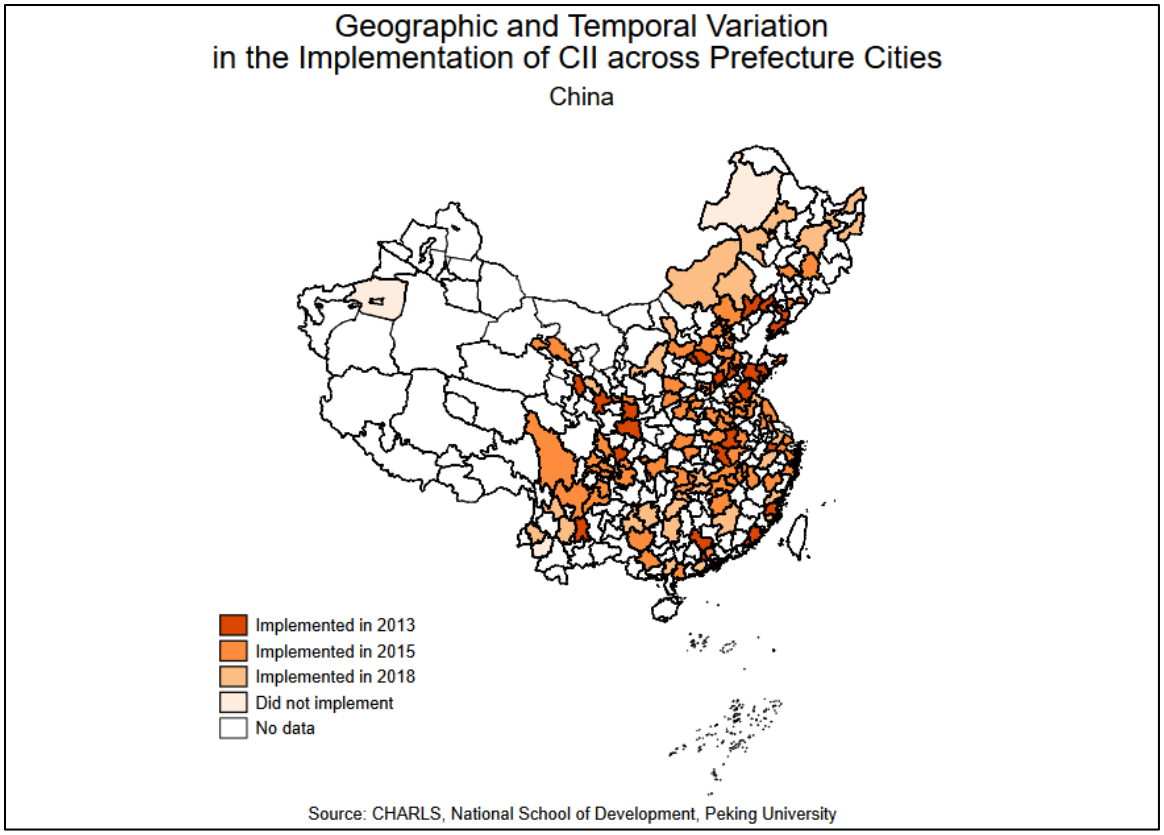
CII covers all enrollees of URMI, NCMS and URRMI. In other words, NCMS, URMI or URRMI enrollees automatically become insured under the CII. This program does not require an additional premium from the insured, and its funds are allocated from the NCMS, URMI and URRMI surpluses. On this basis, the CII mainly reimburses the eligible medical expenses that still need to be borne by individuals after the basic medical insurance compensation when the insured suffers from a major illness with high medical expenses. Therefore, CII, as a secondary reimbursement based on URMI, NCMS and URRMI, focuses on inpatient medical expenses and some outpatient expenses for common major diseases of the insured residents, and it does not cover minor illnesses such as colds or bruises. In the context of this policy, critical illness is a general term for all diseases that can cause patients to suffer from economic crises. It does not refer to a specific disease but can be understood as any disease that results in high medical expenses. After applying for basic medical insurance, all patients whose OOP still

[2] Prefecture cities, one of China's administrative divisions, has the same administrative status as a region, autonomous prefecture, or league, and is a prefecture-level administrative region, a city with the same establishment as a region, governed by a province or autonomous region. There are a total of 293 prefecture-level cities in China.

exceeded the deductible, which was usually the local per capita income, were eligible for additional reimbursement, regardless of the ailment (*Guiding Opinions of the State Council on Piloting Urban Residents Medical Insurance*, 2007).

The central government proposes general guiding principles and framework for the implementation of CII, and local governments need to formulate appropriate modes in line with their socio-economic development and medical expenditure. For example, the central government requires that the total reimbursement rate should be no less than 50% (adjusted to 60% in the 2019 government work report (*Report on the Work of the Government*, 2019) when the medical bills for necessary treatment after reimbursement by NCMS and URMI exceed the annual per capita income level (*Announcement of "Guidance on the Development of Critical Illness Insurance for Urban and Rural Residents"*, 2012). Based on the central government's request, Wuhan Municipal Government also allows eligible individuals to apply for reimbursement from CII if the annual OOP amount exceeds CNY 12,000 per year (*Wuhan City on Further Improving the Implementation of Urban and Rural Residents' Critical Illness Insurance*, 2016). The reimbursement rate is 55% for OOP expenses between CNY 12,000 and CNY 30,000; 65% for OOP expenses between CNY 30,000 and CNY 100,000; and 75% for OOP expenses of CNY 100,000 or more. The maximum annual payment is CNY 300,000 (*Wuhan City on Further Improving the Implementation of Urban and Rural Residents' Critical Illness Insurance*, 2016). The national average reimbursement rate was 50 – 70% (*Announcement of "Guidance on the Development of Critical Illness Insurance for Urban and Rural Residents"*, 2012).

Figure 1 Geographic and Temporal Variation in the Implementation of the Critical Illness Insurance Program.



Notes: Shaded areas represent prefectures that are included in the CHARLS data and our analysis sample while unshaded areas represent prefectures for which data is not available in CHARLS.

I consulted the government websites and related materials of various local regions and compiled information on the time when the CII was promulgated in each prefecture city in our sample. Appendix Table A1 presents the list of prefecture cities in our sample and their date of CII implementation which are collected from each government website and related materials of various provinces and cities. Figure 1 presents a geographic and temporal variation in the implementation of CII across prefecture cities in our sample, which we use to estimate the causal impact of the CII program on health expenditures and outcomes among older adults.

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

consumption. The total household consumption comprises the total expenditure of the family for a year, which is the sum of these three parts of consumption expenditure. To comprehensively analyze the influence of the CII on older households' consumption, I also examine non-medical expenditure and food expenditure.[3] In addition, household saving is the difference between annual household income and annual household consumption. All expenditure variables are adjusted for inflation using the Consumer Price Index published by the National Bureau of Statistics of China and setting 2010 as the base year (*China Statistical Yearbook* 2013, 2015, 2018).

I control for demographic and socioeconomic covariates that may affect enrollment in the URMI, NCMS, and URRMI. These include age, a binary indicator for male (female is the reference group), a binary indicator for being married (the reference category includes single, divorced, widowed), education (no formal education, incomplete primary education, elementary school, middle school, and high school and above), and hukou (agricultural hukou, non-agricultural hukou, and unified residence hukou). Hukou is a Chinese household registration system. It connects certain local social benefits to the hukou registration location (usually the place of birth). Notably, only those with non-agricultural hukou can register for URMI, and only those with agricultural hukou can register for NCMS. The number of family members is defined as the number of people living in this household. In addition, this study chose to include the GDP per capita and urbanization rate[4] of each prefecture city level in the corresponding year to control for prefecture characteristics that may affect individual healthcare utilization and health at the level of economic development.

[3] We also analyze the impact of CII on medical expenditure and non-food consumption, but since their effects are not significant, we will not discuss them here.
[4] Urbanization rate is the ratio of the urban population to the total population.

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 2013 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	7426.235	6790.712***	7631.887	6472.110	7104.373
consumption	(11061.427)	(9133.547)	(10248.045)	(5098.379)	(9774.425)
Non-medical	6449.634	5844.028***	6643.291	5351.292*	6137.214
consumption	(10215.267)	(7681.553)	(8602.000)	(3879.735)	(8463.729)
Food consumption	3184.036	2822.663***	3139.337	2341.774**	2955.150
	(7472.679)	(4109.974)	(3845.270)	(2143.346)	(5012.457)
Savings	-818.533	-653.824	275.815***	-1322.429	-519.214
	(15613.095)	(23583.657)	(13835.336)	(7859.149)	(19858.916)
Age	58.862	59.270	59.254	57.865	59.130
	(9.495)	(9.802)	(9.875)	(9.111)	(9.729)
Male	0.478	0.477	0.465	0.483	0.475
	(0.500)	(0.499)	(0.499)	(0.500)	(0.499)
No formal	0.334	0.300***	0.309**	0.293*	0.310
education	(0.472)	(0.458)	(0.462)	(0.456)	(0.462)
Incomplete primary	0.190	0.195	0.186	0.172	0.191
education	(0.392)	(0.396)	(0.389)	(0.378)	(0.393)
Elementary school	0.222	0.230	0.242*	0.300***	0.233
	(0.415)	(0.421)	(0.428)	(0.459)	(0.423)
Middle school	0.182	0.204***	0.191	0.185	0.196
	(0.386)	(0.403)	(0.393)	(0.389)	(0.397)
High school and	0.073	0.071	0.072	0.049*	0.071
above	(0.260)	(0.257)	(0.259)	(0.217)	(0.257)
Marriage	0.880	0.869	0.869	0.882	0.872
	(0.325)	(0.337)	(0.337)	(0.323)	(0.334)
Number of family	3.497	3.699***	3.973***	3.815***	3.709
members	(1.686)	(1.817)	(2.090)	(1.679)	(1.848)
Agricultural hukou	0.920	0.909*	0.904**	0.862***	0.909
	(0.271)	(0.287)	(0.295)	(0.345)	(0.287)
Nonagricultural	0.071	0.088***	0.095***	0.133***	0.087
hukou	(0.258)	(0.283)	(0.293)	(0.340)	(0.281)

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	30	3	126
Number of observations	3,124	7,284	2,649	406	13463

Source: CHARLS 2011.

All monetary measures are deflated to 2010 CNY. A t-test was used to assess the difference in means between group 2013 and the other three groups. All variables are measured in 2011 before the implementation of CII. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively. All measures of consumption and savings are per capita. Non-medical consumption is total household consumption minus household medical expenditures. Here, household medical expenses include direct or indirect medical expenses. Indirect medical expenses include transportation expenses, nutrition expenses, and family companionship expenses incurred for medical treatment. The term "unified resident hukou" refers to the reform of the hukou system in some places, which no longer distinguishes between agricultural and non-agricultural hukou, but rather unifies them into "resident hukou". URRMI: The "Urban and Rural Residents' Medical Insurance" refers to some regions that have taken the lead in merging URMI with NCMS to implement a unified urban and rural residents' medical insurance system.

Empirical Method

Since the DiD setup has more than two time periods and variation in treatment timing, I use Callaway and Sant'Anna's (2021) difference-in-differences approach that exploits variation in the timing of CII implementation across prefecture cities to estimate the causal impact of the insurance program on household consumption and savings. The approach allows for arbitrary treatment effect heterogeneity and dynamic effects. Several recent studies have highlighted the issue of biased estimates in two-way fixed effects regression models in the presence of variation in treatment timing and heterogeneous treatment effects (Goodman-Bacon, Callaway and Sant'Anna, Abraham and Sun,

deChaisemartin and deHaultfoeuille). I use the doubly-robust estimator proposed by Callaway and Sant'Anna, which addresses the concerns regarding biased estimates by comparing treated groups to untreated or not-yet-treated groups. First, this study imposes nonparametric identification of group-time average treatment effects, *ATT* (*g*, *t*)'s, which are defined as the average treatment effect in period *t* for the group of units first treated in period g using the following estimator. For example, $ATT(2013, 2015)$ represents the average treatment effect in 2015 for the group that was first exposed to CII in 2013.

$$ATT_{dr}(g,t) = \mathbb{E}\left[\left(\frac{G_g}{\mathbb{E}[G_g]} - \frac{\frac{p_g(X)C}{1-p_g(X)}}{\mathbb{E}\left[\frac{p_g(X)C}{1-p_g(X)}\right]}\right)\left(Y_t - Y_{g-1} - m_{g,t}(X)\right)\right]$$

Where, G_g is an indicator for being first treated (i.e., exposed to the CII program) in period g. In my application, I have three groups - groups that were first treated in 2013, 2015, and 2018, and one untreated group. These groups were created by matching the month and year of interview for each survey respondent in our sample with the month and year of CII implementation in their prefecture of residence. Since CHARLS is a biennial survey, I aggregate all dates of implementation between waves into a single group. For example, persons interviewed in July 2015 would be assigned to group 2015 if CII was implemented in their prefecture of residence any time between January 2014 and July 2015. This ensures that household consumption and savings are measured after exposure to the CII program. The division of each city into treatment groups is shown in Table 1 of Appendix.

$Y_t(0)$ represents the untreated potential outcome if the person had not been treated at time period t. $Y_t(g)$ is the treated potential outcome experienced at time *t* if they were first treated at time period g. As described above, I use various measures of household

consumption and savings as outcome variables. In addition, $p_g(X)$ represents the propensity score or the probability of being treated (i.e. exposed to the CII program) for the first time at time g, conditional on pre-treatment covariates X. C is an indicator for the control group, which includes "never treated" or "not-yet-treated" units but does not include "already treated" units. $m_{g,t}(X)$ represents the outcome regressions for the control group by time t. $\mathbb{E}$ denotes the expectations operator.

Identification is based on the conditional parallel trends assumption, which requires that conditional on covariates there are no other unobserved factors leading to differential trends between the treatment and control groups in the absence of treatment. In other words, we assume that conditional on covariates, the trends in household consumption and savings of not-yet-treated cities would be parallel to the trends in household consumption and savings of treated cities in the absence of the CII program. The doubly-robust approach of Sant'anna and Zhao (2020) combines the outcome regression approach of modeling the conditional expectation of the outcome evolution with the inverse probability weighting approach of modeling the conditional probability of being treated (Sant'Anna & Zhao, 2020). Therefore, the doubly-robust approach only requires that either one (not necessarily both) is correctly specified. Once the individual group-time average treatment effects ($ATT_{dr}(g,t)$) are estimated, I aggregate them by group, calendar time, and event time to assess treatment effect heterogeneity. Aggregated treatment effects by length of exposure to the CII program (event time) are used to assess the conditional parallel trends assumption. If there are differential trends between the treatment and control groups before the implementation of CII in a region, this would suggest that the identifying assumption is not satisfied and our estimates are biased. I also

perform a placebo test to assess the validity of our identifying assumption. I use the sample of persons who are not enrolled in URMI, NCMS, or URRMI to estimate the placebo average treatment effects. These individuals are not eligible for CII and therefore should not be affected by its implementation in their prefecture of residence. If I find signficant effects for the placebo sample, this would suggest that our main estimates may be driven by unobserved factors correlated with geographic and temporal variation in CII implementation.

Results

Preferred Estimates

To avoid possible estimation bias due to extreme values, the main variables were Winsorized and the proportion was set to 1%. Table 2 presents aggregated treatment effects for several indicators of household consumption and savings using the approach suggested by Callaway and Sant'anna (2021). Column 1 presents unconditional estimates while column 2 presents estimates conditional on covariates. According to the results of column 2, I find statistically significant effect on saving and four other kinds of consumption. Specifically, the estimate for the simple weighted average treatment effect shows that the CII policy increases per capita household consumption by 1234.511 CNY, compared to 2011, increased by 17.4% in the treatment group. This finding is comparable to Zhao's (2019) conclusion (significant increase of 15%), but the effect coefficient is slightly larger in this study. The reason for this could be that the sample has data from 2018, and the largest and statistically significant effect is reached in 2018, as seen in the calendar time effects results (Table 3). In addition, I also find that the stimulus effect of

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)	(2)
	Estimate (Std. Error) [Mean of Dep. Var.]	Estimate (Std. Error) [Mean of Dep. Var.]
	Unconditional Estimates	Conditional Estimates
Per Capita Household Consumption	263.205 (292.408) [7104.373]	1234.511*** (438.067) [7104.373]
Per Capita Non-medical Consumption	4.688 (245.073) [6137.214]	832.031** (337.913) [6137.214]
Per Capita Food Consumption	146.502 (97.082) [2955.150]	430.391*** (116.481) [2955.150]
Per Capita Saving	-1252.221*** (367.061) [-519.214]	-1755.062*** (525.662) [-519.214]
Number of observations	52,521	52,521

The table presents the simple weighted average of group-time treatment effects. Standard errors are in parenthesis and the mean of the dependent variable from 2011 is in square brackets. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

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 - regions that adopted CII in 2015 and 2018 experienced larger and statistically significant increases in household total consumption and non-medical consumption while areas that expanded in 2013 does not experience a statistically significant increase in household total consumption and non-medical consumption. Household food consumption increased after the CII adoption but only residents in areas that implemented CII in 2015 experienced a significant increase in household food consumption. I find a larger decrease in savings for regions that implemented CII in 2015 compared to regions that implemented CII in 2013 (2864.151 CNY versus 519.029 CNY), suggesting that treatment effects are heterogeneous across groups. The decrease in savings after 5 years of exposure to CII is 3057.016 CNY compared to a decrease of 190.791 CNY in the year of CII implementation. This confirms that the introduction of the CII program reduces household savings and increases household consumption.

Table 3: CII Aggregated Treatment Effect Estimates on Consumption and Savings.

	Aggregated Treatment Effects			
(a) Per capita household consumption				
Group-specific effects	Group 2013	Group 2015	Group 2018	
	-310.214	2189.102***	2959.672**	
	(365.872)	(579.466)	(1343.722)	
Calendar time effects	T=2013	T=2015	T=2018	
	-471.647	420.838	2421.675***	
	(310.550)	(426.351)	(824.170)	
Event study	T+0	T+2	T+3	T+5
	687.746*	263.438	3902.897***	-669.119

	(395.052)	(741.111)	(1121.583)	(689.830)
(b) Per capita non-medical consumption				
Group-specific effects	Group 2013	Group 2015	Group 2018	
	-363.356	1639.175***	1823.065*	
	(342.522)	(404.839)	(1075.516)	
Calendar time effects	T=2013	T=2015	T=2018	
	-446.436*	148.643	1799.309***	
	(247.792)	(376.329)	(588.974)	
Event study	T+0	T+2	T+3	T+5
	300.665	140.280	3144.606***	-737.060
	(330.809)	(638.811)	(703.152)	(741.914)
(c) Per capita food consumption				
Group-specific effects	Group 2013	Group 2015	Group 2018	
	72.706	685.985***	504.719	
	(130.396)	(167.423)	(477.668)	
Calendar time effects	T=2013	T=2015	T=2018	
	-124.466	116.762	847.789***	
	(131.300)	(137.950)	(178.050)	
Event study	T+0	T+2	T+3	T+5
	146.661	27.491	1243.766***	300.467
	(131.116)	(210.855)	(261.808)	(279.700)
(d) Per capita saving				
Group-specific effects	Group 2013	Group 2015	Group 2018	
	-519.029	-2864.151***	-524.846	
	(651.568)	(591.933)	(2667.293)	
Calendar time effects	T=2013	T=2015	T=2018	
	560.011	52.119	-3850.461***	
	(454.241)	(376.350)	(1026.023)	
Event study	T+0	T+2	T+3	T+5
	-190.791	1137.437	-5349.470***	-3057.016*
	(534.673)	(789.199)	(1161.421)	(1627.122)

The table presents the treatment effects aggregated by group-specific, calendar time and time of exposure to CII. Estimates are conditional on covariates. The "Group-Specific Effects" row summarizes the average treatment effects by the time of CII implementation; here, g indicates the year in which a city was first treated. The "Event Study" row reports the average treatment effect of exposure to CII implementation; here, e indicates the time of exposure to treatment. The "Calendar Time Effect" row reports the average treatment effect by year; t indicates the annual index. The estimates use the doubly robust estimator. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.1 levels, respectively.

Identification Tests

As discussed earlier, identification is based on the assumption of parallel trends in the absence of treatment. Although this assumption is inherently untestable, we evaluate

its plausibility by analyzing group-specific event study estimates. Figure 2 presents coefficient estimates and simultaneous 95% confidence intervals from the group-time average treatment effects for household savings and three types of consumption expenditures. Appendix Table 2 presents the coefficient estimates and confidence intervals corresponding to this graph. All inference procedures use clustered standard errors at the prefecture city level and account for the autocorrelation of the data. Blue plots are pre-treatment estimates used to "pre-test" the parallel trend assumption, and orange plots correspond to post-treatment estimates of the treatment effect. As can be seen in the figure, for all consumption outcomes, none of the pre-treatment coefficient estimates are statistically significant under conditional parallel trends assumption. The p-value for the joint test of zero pre-treatment effects is 0.61 for per capita total household consumption, 0.56 for per capita non-medical consumption, 0.25 for per capita food consumption, and 0.18 for per capita saving. We cannot reject the joint null hypothesis that all pre-treatment effects are equal to zero. In other words, there is no evidence of differential trends between treated and control groups before treatment, suggesting that the parallel trends assumption is likely to hold for household consumption and savings. The findings show that group-time average treatment effects support the hypothesis that CII implementation resulted in lower household savings and stimulate household consumption under the conditional parallel trends assumption, suggesting that the results are robust.

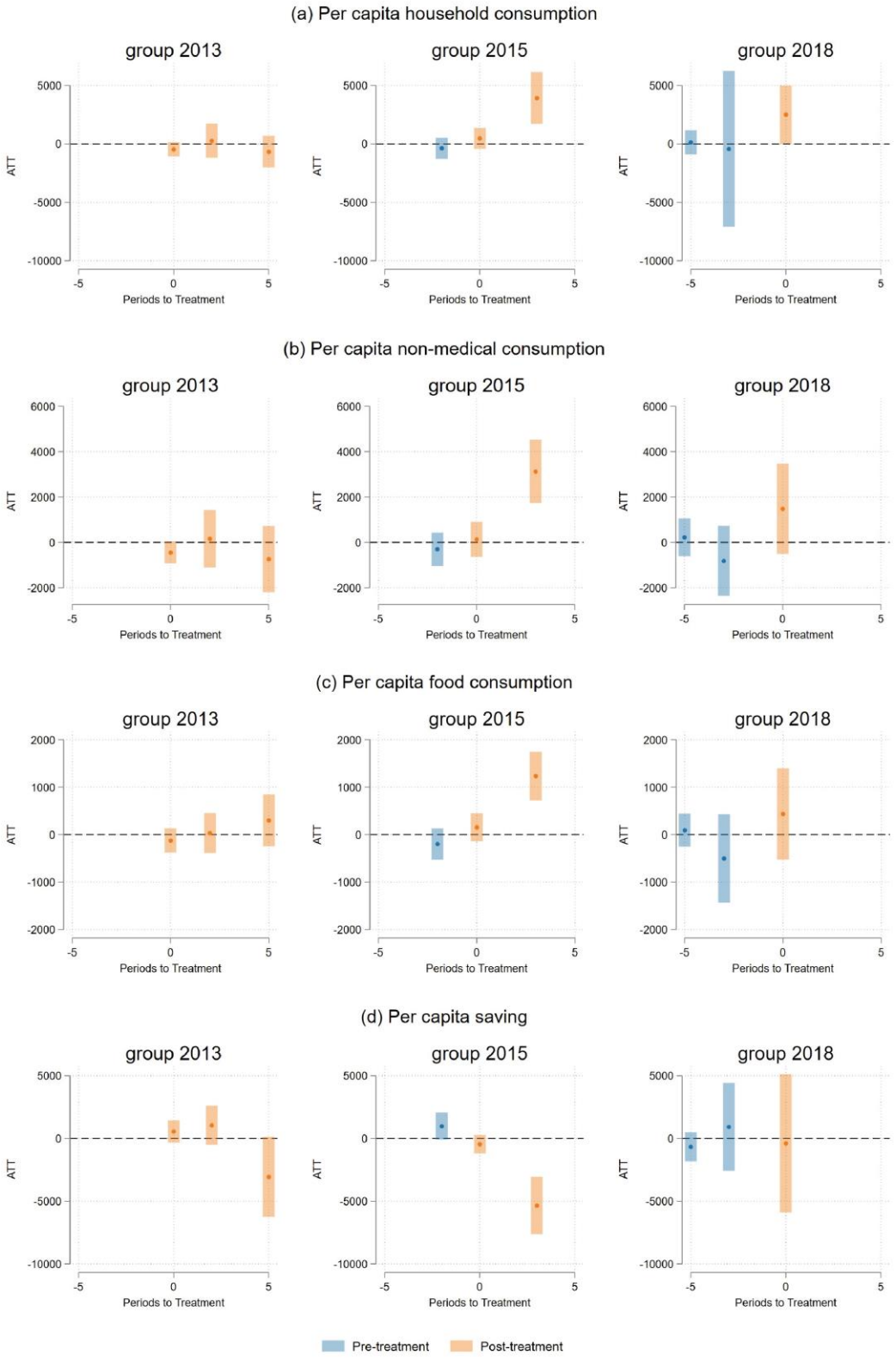


Figure 2: CII Group-time Average Treatment Effects on Consumption and Savings.
Notes: The effect of the CII on per capita household consumption is Panel (a), per capita non-medical consumption is Panel (b), per capita food consumption is Panel (c), and per capita saving is Panel (d).

As another test of the identifying assumption, I perform a placebo test using the sample of persons who are not enrolled in NCMS, URMI, and URRMI to rule out the possibility that these changes in consumption and savings are driven by unobserved policies or shocks. Specifically, I estimate the same regressions for the sample of persons who are not enrolled in NCMS, URMI, and URRMI with a total of 11,233 observations. These individuals are not eligible for CII and therefore we should find no effect if our estimates represent the causal effect of CII. However, these persons would be exposed to the same unobserved policies or economic shocks as the persons in our main analysis sample. Therefore, if the estimates are confounded by the effects of unobserved policies or shocks, I expect to find increases in household consumption and decreases in savings for persons who are not eligible for CII. Table 4 demonstrates the simple weighted average treatment effect estimates of the placebo test along with the p-values for a joint test of the null hypothesis that all pre-treatment effects are zero for household consumption and saving outcomes. According to the results of the placebo test reported, I find an increase but insignificant in any household consumption, non-medical consumption and food consumption, and a decrease but insignificant in any saving following the adoption of CII. We find a larger coefficient for household consumption in the placebo test, but it is not significant at all. The coefficient is smaller but significant in the main results. This may be due to the small sample size of the placebo test. Therefore, I find no evidence of a significant change in household consumption, non-medical consumption, food consumption or savings for the placebo sample, indicating that our main estimates are not driven by unobserved policies or shocks.

Table 4: Placebo Estimates on Consumption and Savings.

Variables	Simple weighted average	Pre-trend p-value
Per Capita Household Consumption	3440.956 (2120.281)	0.751
Per Capita Non-medical Consumption	533.362 (1863.892)	0.280
Per Capita Food Consumption	561.285 (436.218)	0.613
Per Capita Saving	-437.436 (3003.307)	0.778
N	11233	

The table reports the simple weighted average treatment effects and the p-value of a joint test of pre-trend estimates. Standard errors are in parenthesis. All estimates are conditional on covariates and are estimated for the placebo sample of persons who are not enrolled in NCMS, URMI, and URRMI. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.1 levels, respectively.

Heterogeneity Analysis

The impact of CII on consumption and savings may vary by age, income, and location. The previous analysis only reflects the effect of participation in CII on the consumption and savings of the full sample of older households but does not account for their heterogeneity. To further explore the heterogeneity of the impact of CII on household consumption and savings of older adults, this study presents a heterogeneous analysis of the impact of CII participation on consumption and savings from three perspectives: urban and rural area, age, and income, and is shown in Table 5. Rural and urban areas differ in terms of consumption levels and consumption habits, as well as basic medical insurance systems. To assess whether the effect of CII differs across these regions I stratify the total sample into urban and rural areas according to household registration and the type of basic health insurance enrolled. As shown in the estimates in the first two columns of Table 5, the CII program significantly increased all consumption

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 to withstand illness risk shocks (Bian & Li, 2021). The implementation of CII can reduce the uncertainty of medical expenditure due to future disease shocks and assist rural households release their precautionary savings, hence increasing their non-medical consumption.

Then, I categorize the middle-aged and older groups in the sample according to China's classification standards, i.e., the group under 60 years of age in the sample is the middle-aged group and those over 60 years of age are the older groups. The results are reported in the third and fourth columns of Table 5. The results indicate that the CII program significantly increase total household consumption by 881.041 CNY and food consumption by 243.934 CNY and decrease saving by 2204.729 CNY among older adults (60+ years) but has no significant effect on consumption for middle-aged adults. The older population is under pressure from both lower incomes and increased health risks, so consumer demand will be restrained. The introduction of CII, while not having a direct impact on their income, can effectively mitigate the health risks they face thereby reducing precautionary savings. Therefore, the promoting effect of the CII program on the consumption of the older population is likely to be more sensitive.

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. I 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 income	High income
Household consumption	1334.801***	2787.748	-28.539	881.041**	696.673	1853.815	884.742
	(383.748)	(3963.798)	(518.270)	(396.309)	(460.608)	(1171.190)	(1497.273)
Non-medical consumption	1008.346***	1521.465	47.974	377.260	499.886	1670.849*	368.631
	(350.463)	(1976.598)	(508.575)	(349.011)	(485.295)	(996.137)	(1429.961)
Food consumption	391.392***	-318.691	47.066	243.934*	-109.735	-196.296	-67.828
	(121.627)	(1324.222)	(224.725)	(145.632)	(275.511)	(293.009)	(281.371)
Saving	-1785.093***	-4989.369	1222.505	-2204.729**	-421.813	-2018.756*	-3112.945*
	(501.255)	(3207.360)	(799.813)	(910.092)	(385.186)	(1053.950)	(1668.809)
N	49345	3176	25053	27468	17236	17223	17223

The table reports the simple weighted average treatment effects of heterogeneity analysis for household consumption and savings. The variables are taken per capita value. The estimates use the doubly robust estimator. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.1 levels, respectively.

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 commercial health insurance, which affects their financial affordability and consumption behavior, thus affecting the reliability of the empirical results. Therefore, I eliminate those samples that participated in government medical insurance, medical aid, urban employee medical insurance, or commercial medical insurance by further identifying and locking the medical insurance participation information of all samples, and then conducting regression analysis. The results, shown in the second column of Table 6. Second, the Urban and Rural Residents' Medical Insurance system (URRMI) may have similar effects to the CII policy, and thus may affect the outcome of the effect of the CII policy. In 2016, China's State Council issued the Opinions on Integrating the Urban and Rural Residents Basic Medical Insurance System, which required the integration of NCMS and URMI and the establishment of a unified urban and rural residents' medical insurance system to unify the medical insurance catalog, coverage, and treatment, etc. (*Opinions on Integrating the Urban and Rural Residents Basic Medical Insurance System*, 2016). However, the reform of the integrated urban and rural residents' basic medical insurance system is similar to the reform of the CII policy, and they are both "from

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 Estimates	Without other health insurance[5]	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)	(355.498)	(301.793)
Per Capita Food Consumption	430.391***	304.239***	354.574***
	(116.481)	(114.297)	(103.869)
Per Capita Saving	-1755.062***	-1762.287***	-1950.985***
	(525.662)	(544.139)	(483.523)
N	52521	50011	49328

The table reports the simple weighted average treatment effects of robustness check for consumption and saving outcomes under conditional parallel trends assumption. The estimates use the doubly robust estimator. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.1 levels, respectively.

Conclusion

Increasing consumption is essential for China's economic growth. As their physical functions decrease, middle-aged and older households are more susceptible to disease shocks than other age groups. According to the theory of precautionary savings,

[5] Other medical insurance such as public health care, employee health insurance, or commercial health insurance.

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 1,234.511 CNY, with non-medical consumption increasing by 832.031 CNY and food consumption increasing by 430.391 CNY and decreases per capita saving by 1,755.062 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
Anhui	Haozhou	2014	People's Welfare Projects of Bozhou
	Lu'an	Jan. 2013	The People's Government of Lu'an Municipality
	Anqing	2014	Anqing Municipal People's Government
	Suzhou	2014	Suzhou Municipal People's Government Suzhou Municipal People's Government
	Chaohu	2013	Chaohu Municipal People's Government
	Huainan	2014	The People's Government of Huainan Municipality
	Fuyang	2014	Fuyang Municipal Human Resources and Social Security Bureau
Beijing	Beijing	Jan. 2014	Beijing Municipal Commission of Development Reform
Chongqing	Chongqing	Dec. 2013	Chongqing Municipal People's Government
Fujian	Ningde	2016	Ningde Municipal People's Government
	Zhangzhou	Jan. 2013	The People's Government of Zhangzhou Municipality
	Fuzhou	Jan. 2013	Fuzhou Municipal People's Government
	Putian	2016	Putian Municipal People's Government
Gansu	Lanzhou	2017	Lanzhou Municipal People's Government
	Dingxi	2013	Dingxi Municipal People's Government
	Pingliang	Mar. 2015	Pingliang Municipal People's Government
	Zhangye	Apr. 2015	Pingliang Municipal People's Government
Guangdong	Foshan	Jul. 2013	Foshan Municipal People's Government
	Guangzhou	Sep. 2014	The People's Government of Guangzhou Municipality
	Jiangmen	Jan. 2016	Social Insurance Fund

			Administration of Jiangmen Municipality
	Shenzhen	2014	The People's Government of Shenzhen Municipality
	Qingyuan	2013	The People's Government of Qingyuan Municipality
	Chaozhou	2013	The People's Government of Chaozhou Municipality
	Maoming	Jun. 2014	The People's Government of Maoming Municipality
Guangxi	Guilin	Dec. 2015	The People's Government of Guilin Municipality
	Nanning	2014	The People's Government of Nanning Municipality
	Hechi	Apr. 2015	The People's Government of Hechi Municipality
	Yulin	2017	The People's Government of Yulin Municipality
Guizhou	Qiandongnan Miao and Dong Autonomous Prefecture	2016	The People's Government of Qiandongnan
	Qiannan Buyi and Miao Autonomous Prefecture	2016	The People's Government of Qiannan
Henan	Xinyang	2015	The People's Government of Xinyang Municipality
	Zhoukou	Jan. 2015	The People's Government of Zhoukou Municipality
	Anyang	2014	The People's Government of Henan Province
	Pingdingshan	2014	The People's Government of Henan Province
	Luoyang	2014	The People's Government of Henan Province
	Puyang	2014	The People's Government of Henan Province
	Jiaozuo	2014	The People's Government of Henan Province
	Zhengzhou	Jul. 2013	The People's Government of Henan Province
Hebei	Baoding	2014	Baoding Municipal People's Government Baoding Municipal People's

			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
Heilongjiang	Jiamusi	Dec. 2015	The People's Government of Jiamusi Municipality
	Harbin	Aug. 2015	The People's Government of Harbin Municipality
	Harbin city	Aug. 2015	The People's Government of Harbin Municipality
	Jixi	2016	Heilongjiang Province People's Government
	Qiqihar	Dec. 2015	The People's Government of Qiqihar Municipality
Hunan	Loudi	2016	The People's Government of Loudi Municipality
	Yueyang	2016	The People's Government of Yueyang Municipality
	Changde	Dec. 2013	The People's Government of Changde Municipality
	Yiyang	Dec. 2014	The People's Government of Yiyang Municipality
	Shaoyang	Dec. 2015	The People's Government of Shaoyang Municipality
	Changsha	Dec. 2015	The People's Government of Shangsha Municipality
Hubei	Enshi Tujia and Miao Autonomous Prefecture	2014	The People's Government of Hubei Province
	Jingmen	2014	The People's Government of Hubei Province
	Xiangyang	Sep. 2013	The People's Government of Xiangyang Municipality
	Huanggang	Apr. 2013	The People's Government of Hubei Province
Inner Mongolia	Hinggan League	Dec. 2015	People's Government of Inner Mongolia Autonomous Region
	Hulunbeier	Dec. 2018	People's Government of Inner Mongolia Autonomous Region
	Hohhot	Dec. 2015	People's Government of Inner Mongolia Autonomous Region
	Chifeng	Dec. 2015	People's Government of Inner

			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
Jiangxi	Shangrao	2014	The People's Government of Shangrao Municipality
	Jiujiang	2014	The People's Government of Jiujiang Municipality
	Nanchang	Sep. 2014	The People's Government of Jiangxi Province
	Ji'an	2014	The People's Government of Jian Municipality
	Yichun	2015	The People's Government of Yichun Municipality
	Jingdezhen	2014	The People's Government of Jingdezhen Municipality
	Ganzhou	2015	The People's Government of Ganzhou Municipality
Jilin	Jilin	2014	The People's Government of Jilin Province
	Siping	2014	The People's Government of Jilin Province
Liaoning	Dalian	2013	The People's Government of Liaoning Province
	Chaoyang	2013	The People's Government of Liaoning Province
	Benxi	Jan. 2014	Benxi Municipal People's Government
	Jinzhou	2013	The People's Government of Liaoning Province
	Anshan	2013	The People's Government of Liaoning 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 Weinan 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
	Yibin	2014	The People's Government of Sichuan Province

	Guang'an	Apr. 2015	The People's Government of Guangan Municipality
	Chengdu	2014	The People's Government of Sichuan Province
	Tibetan Autonomous Prefecture of Garzê	2014	The People's Government of Sichuan Province
	Meishan	2014	The People's Government of Meishan Municipality
	Mianyang	Jan. 2015	The People's Government of Sichuan Province
	Ziyang	2014	The People's Government of Ziyang Municipality
Tianjin	Tianjin	July. 2014	Tianjin Municipal Human Resources and Social Security Bureau
Xinjiang	Aksu	2019	The People's Government of Aksu Municipality
Yunnan	Lincang	2018	The People's Government of Lincang Municipality
	Lijiang	2017	The People's Government of Lijiang Municipality
	Baoshan	2016	The People's Government of Baoshan Municipality
	Kunming	Jan. 2013	The People's Government of Kunming Municipality
	Zhaotong	Jun. 2014	The People's Government of Zhaotong Municipality
	Chuxiong	Dec. 2015	The People's Government of Chuxiong Yi Autonomous Prefecture
Zhejiang	Lishui	2015	The People's Government of Lishui Municipality
	Taizhou	2015	The People's Government of Taizhou Municipality
	Jiaxing	2014	The People's Government of Jiaxing Municipality
	Ningbo	2014	The People's Government of Ningbo Municipality
	Hangzhou	Dec. 2015	The People's Government of Hangzhou Municipality
	Huzhou	Feb. 2013	The People's Government of Huzhou Municipality

The implementation dates of CII policies for each prefecture city were compiled by consulting websites.

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	155.666	31.373	1051.254
	(748.741)	(645.446)	(215.575)	(797.080)
t 2011-2018	-669.120	-737.060	300.467	-3057.016*
	(689.830)	(741.914)	(279.700)	(1627.122)
Group 2015				
t 2011-2013	-369.241	-303.368	-198.488	982.071*
	(459.621)	(375.891)	(167.912)	(548.750)
t 2013-2015	479.146	135.255	153.532	-449.068
	(455.707)	(395.453)	(150.553)	(378.423)
t 2013-2018	3925.459***	3126.892***	1236.386***	-5351.850***
	(1129.295)	(711.587)	(261.796)	(1163.905)
Group 2018				
t 2011-2013	135.421	223.002	93.122	-666.332
	(524.841)	(425.317)	(177.985)	(590.778)
t 2013-2015	-432.493	-818.564	-503.213	926.601
	(3401.961)	(787.146)	(474.613)	(1790.346)
t 2015-2018	2517.183**	1482.024	438.021	-388.159
	(1267.257)	(1015.291)	(490.918)	(2812.819)

The table presents the full set of group-time average treatment effects and standard errors in parenthesis. ***, ** and * denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.