The Impact of Public-Private Partnership Health Plans on Private Insurance*

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Abstract

Public-private partnership (PPP) health insurance plans have been viewed as a promising tool to expand coverage while maintaining fiscal sustainability. However, little is known about their impact, particularly whether they increase overall coverage or displace existing private insurance. To examine this, we leverage the staggered introduction of China's City-Customized Supplemental Medical Insurance (CCSMI) across cities and a novel transaction-level dataset of private health insurance. Results reveal significant spillover effects on both the extensive and intensive margins: CCSMI substantially crowds out private insurance purchases and reduces average coverage amounts. Average premiums paid also decline, with two-thirds of the reduction driven by consumers opting for narrower coverage and the remainder likely due to insurers' pricing adjustments. A back-of-the-envelope calculation suggests that the decline in private insurance purchases offsets at least 25% of CCSMI enrollment gains. These findings provide important insights for comprehensively evaluating PPP insurance programs. (*JEL* I13, H42, G22, G41)

Keywords: Health insurance, Public-Private Partnership (PPP), Crowd-out.

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I. Introduction

Many countries grapple with the issue of insufficient public health insurance, often due to strained government budgets or unsustainable insurance funds. At the same time, private health insurance with voluntary enrollment often suffers from limited risk pooling and potential adverse selection. As a result, many of these plans remain unaffordable, particularly to vulnerable populations with high health risks but low incomes, raising concerns about equity. Combining the strengths of both systems while mitigating their respective limitation, public-private partnership (PPP) health insurance plans could offer a fiscally sustainable solution in expanding adequate and affordable coverage. For instance, the Partnership Long-Term Care Insurance Program (PLTC) in the United States connects Medicaid with private insurance through partnership-qualified private insurance products that allow enrollees to protect a portion of their assets from Medicaid eligibility requirements. This encourages greater financial protection without adding to the burden of public insurance. Many low- and middle-income countries (LMICs), such as Viet Nam,[1] Malaysia,[2] Indonesia,[3] etc., which face more pressing need to expand coverage with fiscal constraints, are also considering or piloting PPP insurance programs.

In China, while it has established the world's largest public health insurance system, covering approximately 1.4 billion people (Yip *et al.*, 2019), the out-of-pocket (OOP) expenditures remain relatively high. According to the World Health Organization, OOP expenditure accounts for 34.4% of health spending in China in 2021, significantly higher than the average in OECD countries (WHO, 2023). To address this, China's central government released the "Opinions on Deepening the Reform of the Medical Security System" in March 2020, emphasizing the importance of supplementary health insurance and encouraging collaboration between public and private sectors in providing such

[1] Vietnam's Ministry of Health has proposed a voluntary supplementary health insurance package, named "BHYT bổ sung" for those already covered by the basic plan (BHYT, Vietnam's mandatory public health insurance program) in the revised draft of the *Health Insurance Law*, aiming to include co-payments, regular check-ups and other benefits beyond the current scope. The scheme would operate under contracts between insurers and participants, with premiums and benefit levels set according to state-specified principles issued by the government. See, Viet Nam News. 2024. "Health ministry proposes supplementary health insurance package", https://vietnamnews.vn/society/1651835/health-ministry-proposes-supplementary-health-insurance-package.html. Viewed April 27, 2025.

[2] Malaysia launched an insurance program named "mySalam" in 2019, which is funded by the mySalam trust of the Ministry of Finance of Malaysia and underwritten by Great Eastern Takaful Bhd. (a private insurer), aiming to provide reimbursement upon diagnosis of specific critical illnesses for Malaysia's bottom 40% (B40) households and parts of the middle 40% (M40) households. See, https://www.mysalam.com.my/mys/info/. Viewed April 27, 2025.

[3] Indonesia's West Java province's Jaminan Kesehatan Daerah (JAMKESDA) is a provincially funded health insurance program—financed from the West Java APBD (West Java Provincial Revenue and Expenditure Budget)—that provides interim and supplementary coverage (including cancer treatment and inpatient care) for low-income residents who are not yet registered in the national JKN system (national mandatory public health insurance program) and routinely partners with private health providers and insurers to streamline claims processing. Unfortunately, JAMKESDA has been deactivated since January 2021. See, https://medium.com/@gracellam96/analysis-of-health-facilities-and-national-health-insurance-in-west-java-f4f2003abc7b., and https://www.undp.org/sites/g/files/zskgke326/files/2023-11/ina_summary_country_diagnostic_indonesia.pdf. Viewed April 27, 2025.

insurance products.[4] Following this guideline, a number of cities introduced government-endorsed private health insurance plans known as City-Customized Supplemental Medical Insurance (CCSMI). As a collaboration between local governments and private insurers, CCSMI aims to provide supplementary health insurance on top of public insurance, at a relatively low cost and tailored to the needs of local residents. By the end of 2023, over 280 CCSMI products had been launched nationwide, with around 300 million people enrolled (Xu, 2023).

This is a great achievement at first glance. However, the actual impact on expanding coverage also depends on the spillover effect on other insurance schemes. In particular, if those enrolling in CCSMI are entirely switching from those who would have enrolled in private insurance, then there is no net effect on overall insurance coverage, or even a reduction if private insurance provides more comprehensive coverage.

To better understand the overall effect of PPP insurance, we leverage the staggered rollout of CCSMI across cities and to examine its impact on private health insurance market. Using a novel transaction-level dataset from a private health insurer from 2017 to 2022, we observe not only the number of private insurance policy purchased in different periods and cities, but also the characteristics of each individual insurance policy. We focus on private critical illness (CI) insurance, which has a nearly single-dimensional measure for the level of financial protection it provides when a risk event occurs—the "coverage amount", i.e., the lumpsum payout when diagnosed with certain critical illness. This enables us to examine the impact of CCSMI on private insurance purchasing decisions at not only the extensive, but also the intensive margin. We also observe the annual premium of each insurance policy sold, which reflect demand side choices across insurance products and coverage amounts, as well as potential supply-side responses in pricing.

Our findings reveal significant crowd-out between PPP insurance and private insurance. Specifically, we observe an average 13.7% decrease in the number of private health insurance purchased following the introduction of CCSMI. Furthermore, the average coverage amounts and annual premiums decline by 13.6% and 4.6%, respectively. These changes are not driven by compositional shifts in certain types of people switching into CCSMI, as controlling for policyholder characteristics does not affect the estimated results. Instead, it suggests that the introduction of CCSMI not only attracts some individuals forgo purchasing private insurance altogether, but also leads those who still choose to purchase private insurance to opt for lower levels of coverage. Conditional on the chosen insurance

[4] See https://www.gov.cn/zhengce/2020-03/05/content_5487407.htm (in Chinese). Viewed August 19, 2024.

product and coverage amount (as well as policyholder characteristics that may affect pricing), there is still an average 1.6% reduction in annual premiums. This suggests that private insurers adjust their pricing strategies in response to the new competition from CCSMI. Even so, they continue to face a shrinking market size, as indicated by the declining total number of insurance purchases and coverage amounts per insurance policy.

Heterogeneity analysis reveals similar declines in private insurance purchases across age groups. However, children under age 18 shows smaller reduction in average coverage amounts and no reduction in annual premiums. Additionally, cities with CCSMI plans that include special medications (typically expensive cancer treatment) experience stronger crowd-out effects at the extensive margin and greater reduction in private insurers' pricing. These plans appear to provide more comparable risk protection to private CI insurance, therefore leading to greater substitution. Meanwhile, individuals who remain choosing private insurance tend to select higher average coverage amounts, suggesting that CCSMI mainly draws lower-demand individuals out of the private market.

Finally, a back-of-envelop calculation suggests that the reduction in private health insurance purchases accounts for 25% of the increase in CCSMI enrollment. The crowd-out effect is even more substantial in terms of premiums, as private insurance typically offers more comprehensive coverage than CCSMI. To assess the external validity of our results and their applicability to the broader private health insurance market, we also conduct a rough estimation using aggregated data from the *Yearbook of China's Insurance*. This approach suggests a crowd-out effect of approximately 30% in terms of premiums. These findings highlight the importance of accounting for the displacement of private insurance when evaluating the overall impact of CCSMI on expanding coverage. A more careful discussion is needed regarding the resulting changes in the risk pools of both CCSMI and private insurance to ensure the program can achieve its intended goals.

Our work contributes to the following three strands of literature. First, it adds to the research on crowd-out between insurance programs. Since the seminal work by Cutler and Gruber (1996) on Medicaid expansion, many studies have examined public–private crowd-out (Blumberg *et al.*, 2000; Shore-Sheppard *et al.*, 2000; Card and Shore-Sheppard, 2004; Lo Sasso and Buchmueller, 2004; Ham and Shore-Sheppard, 2005; Brown and Finkelstein, 2008; Gruber and Simon, 2008; Antwi *et al.*, 2013; Hamersma and Kim, 2013; Koch, 2013; Ham *et al.*, 2014; Koch, 2015; Wagner, 2015; Dillender, 2017; Frean *et al.*, 2017; Lennon, 2025). Results vary widely, from no effect to complete

displacement, depending on the policy context, data, and empirical approach. In China, Hou and Zhang (2017) find no effect of public insurance expansion on private enrollment,[5] while Li and Tian (2020) document a reduction in employer-provided health insurance. We extend this literature by studying the impact of PPP insurance on private insurance. Unlike public programs, PPP insurance is operated by private insurers, which consumers may perceive as more similar to private insurance. Moreover, we go beyond prior work by examining not only crowd-out in enrollment but also in coverage levels. This sheds light on the possibility of partial substitution at the intensive margin. We are also able to explore insurer-side responses in pricing, offering new insights into how the private market adjusts to emerging competition from PPP insurance.

Second, our paper contributes to the literature evaluating the performance of PPPs. These arrangements have become increasingly common in delivering public services—including transportation, energy, IT, education, and health (see a review by Fabre and Straub, 2023). In the health insurance sector, PPPs often take the form of government contracting with private insurers to provide coverage, such as Medicare Advantage (e.g., Brown *et al.*, 2014; Curto *et al*., 2019), Medicare Part D (e.g., Einav *et al.*, 2018; Decarolis *et al.*, 2020), and Medicaid HMO (e.g., Duggan, 2004; Kuziemko *et al.*, 2018). Shifting from public insurance scheme, policy discussion around these models typically focuses on the trade-off between allocative efficiency via greater consumer choice and productive efficiency concerns due to adverse selection and inadequate competition (Gruber, 2017). By contrast, the PPP model we study involves no direct government payment to private insurers. Instead, it is a government-endorsed but privately operated supplemental insurance product that complements, rather than replaces, existing public coverage. Therefore, it does not affect public insurance enrollment directly,[6] and its welfare implications hinge on the extent to which it expands total coverage versus crowds out private insurance. A similar design is the PLTC program in the U.S., which links approved private insurance plans with Medicaid. While earlier studies found limited impacts (Lin and Prince, 2013), more recent research suggests that it significantly increased private LTC insurance (including partnership plans) uptake (Liu and Zai, 2023; Costa-Font and Naut, 2025).

Finally, this paper contributes the literature on China's health insurance system. Many studies have examined the establishment of China's universal health insurance and its impact on health care utilization, spending, health outcomes (Lei and Lin, 2009; Wagstaff *et al.*, 2009; Liu and Zhao, 2014;

[5] A few other studies further discuss the mechanism using aggregated data, which may suffer from measurement issues (Zhang *et al.*, 2018; Chen *et al.*, 2023).

[6] As a form of supplemental insurance, the introduction of CCSMI may influence public insurance indirectly by altering enrollees' health care utilization behavior (Chandra *et al.*, 2010). While this is an important and interesting question, it lies beyond the scope of this paper.

Gruber *et al.*, 2023), household savings and consumption (Bai and Wu, 2014), education and entrepreneurship (Chen and Jin, 2012; Huang and Liu, 2023; Wang *et al.*, 2024), as well as health care providers and pharmaceutical industry (Wagstaff *et al.*, 2009; Zhang and Nie, 2021). However, little is known about its private insurance market. A handful of studies explore factors associated with private health insurance purchase, such as perceived health risks due to pollution (Chang *et al.*, 2018) or pandemic (Chen *et al.*, 2023), and purchasing channels (Murphy *et al.*, 2024). By examining the effect of PPP on private insurance uptake, our study fills a gap in understanding this newly introduced insurance model and its interaction with other insurance schemes. We highlight the need for policymakers and insurers to account for the interplay between different tiers of coverage and to design plans that better meet consumer needs. These findings may also offer policy insights for other countries facing similar challenges of inadequate public insurance and looking to PPPs to expand coverage.

The remainder of the paper is organized as follows. The next section outlines the relevant institutional background on China's health insurance system and the institutional details of CCSMI. We then present the data and empirical strategy in Section III and IV. Section V reports the empirical results, followed by back-of-the-envelope calculations in section VI. The final section concludes the paper.

II. Institutional Background

A. *Health Insurance System in China*

China aims to develop a multi-level health insurance system, with public health insurance (basic medical insurance) as its main body, supplemented by other forms of insurance, including private health insurance (see Appendix Figure A1). China's public health insurance has reached universal coverage. The two major schemes of public health insurance, Urban Employee Basic Medical Insurance (UEBMI) and Urban-Rural Resident Basic Medical Insurance (URRBMI), jointly covered 1.35 billion people, more than 95 percent of the total population (National Healthcare Security Administration of China, 2023). While public health insurance plays a significant role in easing catastrophic health expenditure risks, improving health outcomes, and enhancing social welfare (e.g., Bai and Wu, 2014; Gruber *et al.*, 2023; Huang and Liu, 2023), the constraints of public insurance fund limit the expansion of health coverage, resulting in a significantly higher share of OOP expenditures compared to most OECD countries (WHO, 2023).

Private health insurance serves a complementary role in China's health insurance landscape. accounting for only 4.2% of total health expenditures in 2022.[7] Although it currently covers a relatively small percentage of the population, it has experienced rapid growth in recent years. As shown in Figure 1, the aggregate annual premiums for private health insurance doubled between 2017 and 2022, reaching 865 billion CNY (around 120 billion USD).

The private health insurance market offers various products, including medical insurance and critical illness (CI) insurance. Private medical insurance in China operates on a reimbursement basis, providing coverage for medical services or prescription drugs outside the coverage list of public health insurance or offering supplemental reimbursement for deductibles and coinsurance under public insurance. Meanwhile, CI insurance provides a lump-sum payout—typically over 100,000 CNY (over 13,500 USD)—upon the first diagnosis of a severe condition. The payout can be used to cover medical expenses, but it is not limited to those and may also support other financial needs. Based on total annual premiums, medical insurance and CI insurance each accounted for half of the private health insurance market in 2017. Since then, the share of CI insurance gradually rose to 60% by 2020 but started to decline thereafter, returning to 48% in 2022.

[Insert Figure 1 here]

B. *City-Customized Supplemental Medical Insurance* (*CCSMI*)

Due to the limited benefits of public health insurance and the growing yet still constrained private insurance market, there remains a substantial gap in health coverage. To address this issue, the government has decided to promote the uptake of supplemental health insurance through a public-private partnership model, where private insurance companies offer supplemental medical insurance endorsed by the government. These partnerships are established at the local level, typically between city governments and local private insurance companies (or local branches of national companies). The insurance products are tailored to the needs of local residents and aligned with the benefit design of the local public insurance scheme. Hence, they are referred to as City-Customized Supplemental Medical Insurance (CCSMI).

[7] The data is from National Health Commission of China and National Financial Regulatory Administration of China. See National Health Commission of China, 2023. "Statistical Bulletin on the Development of Health Care in 2022" (in Chinese), http://www.nhc.gov.cn/guihuaxxs/s3585u/202309/6707c48f2a2b420fbfb739c393fcca92/files/9b3fddc4703d4c9d9ad399bcca089f03.pdf. Viewed April 27, 2025; National Financial Regulatory Administration, 2023. "Business Performance of the Insurance Industry in 2022" (in Chinese), https://www.nfra.gov.cn/cn/view/pages/ItemDetail.html?docId=1093175&itemId=954&generaltype=0. Viewed April 27, 2025.

Before 2020, only a few cities took a pilot step in offering CCSMI.[8] In March 2020, State Council of China released the "Opinions on Deepening the Reform of the Medical Security System", highlighting the significance of supplementary health insurance. Encouraged by this positive directive from the central government, the development of CCSMI products has surged. Figure 2 shows the number of new and existing CCSMI products in each year. By the end of 2023, 286 CCSMI products had been launched, with an estimated 300 million individuals insured nationwide.

[Insert Figure 2 here]

As a public-private partnership health insurance plan, CCSMI combines the strengths of government involvement and private sector operation. Although the government neither mandates the purchase of CCSMI products nor provides direct subsidies for their operation, its involvement is crucial in influencing the purchasing decisions of the general population. Local governments actively promote these products through mass marketing efforts and by offering tax-deductible incentives to encourage uptake. The public sector's support increases penetration rates and creates a large pool of enrollees, mitigating potential adverse selection issues. This also reduces per capita marketing and administrative costs that would be faced by single private insurer. Consequently, CCSMI products can offer supplementary insurance at affordable prices, typically ranging from 60 to 150 CNY (10 to 25 USD), without pricing and enrollment discrimination on age and health status. Private insurers, on the other hand, are responsible for selling CCSMI products and reimbursing medical expenses under the program. However, it is important to note that these insurers do not have complete discretion in pricing and benefit design due to the involvement of local governments. Most of the insurers chosen to administer CCSMI are either the largest national insurers or well-established local insurers.

The benefit design of CCSMI aims to bridge the gap between public insurance and private health coverage. Coverage includes inpatient and outpatient expenditure not covered by public insurance (some cities also cover the deductible and coinsurance for items covered by public insurance). Annual deductible for CCSMI usually falls between 10,000 CNY and 40,000 CNY (around 1,200 to 6,000 USD). For inpatient expenses, the reimbursement ratio generally ranges from 70% to 80% for people without pre-existing health conditions and 30%-50% for those with pre-existing conditions. Most of those CCSMI products do not cover outpatient expenses. Additionally, some CCSMIs cover the costs of certain special medications (expensive and not covered by public insurance), particularly those

[8] There were four cities offering CCSMI before 2020: Shenzhen (2015), Nanjing (2018), Zhuhai (2019), Foshan (2019).

used to treat critical illnesses like cancer. Annual reimbursement cap(s) is set by reimbursement category (e.g., inpatient expenses not covered by public insurance, out-of-pocket expenses after public insurance reimbursement, special medication, etc.), with the total amount typically ranging between 2 million to 4 million CNY (around 250,000 to 600,000 USD).

III. Data

The primary dataset used for the analysis is insurance purchase data from a leading life and health insurance company in China. The company is ranked among the top 10 life insurers in the country by market share. It is not the provider of any CCSMI products in the regions where it operates. As a result, none of the policies included in the analysis are part of the PPP plans. Furthermore, the company did not need to reorganize its operating framework—such as reallocating agents to support PPP operations—which would typically be needed by PPP operators. Therefore, any observed changes in enrollment can be attributed to the spillover effects of the PPP establishment on purely private plans.

The dataset includes all private health insurance plans sold by the insurer in 18 first-tier and second-tier cities across China from 2017 to 2022. Only 0.53% of the purchases are medical insurance, which we dropped from the analysis for simplicity consideration. This leads to us a total of 302,750 CI insurance purchases. For each purchase, the dataset provides detailed information on the purchase date, coverage amount (i.e., the lump-sum payout upon diagnosis), annual premiums, premium payment term and personal characteristics of the policyholder, including gender, age, city of residence, and income status.

Focusing the analysis on CI insurance offers both advantages and limitations. The main advantage is that CI insurance has a nearly single-dimensional measure of coverage.[9] This gives us a clear metric to examine intensive margin responses, i.e., the coverage amount of private insurance, and therefore allows us to access the potential crowd-out effect of CCSMI beyond the extensive margin of whether to purchase private insurance at all. The limitation, however, is that consumers may perceive CI insurance as providing different types of protection against health expenditure risks compared to CCSMI. If that is the case, any observed crowd-out effect should be interpreted as a lower-bound estimate for the CCSMI's impact on overall private insurance.

[9] Plans also differ by the types of critical illness they cover, which we control for using plan fixed effects in the following analysis. Conditional on the plan chosen, the intensive margin—how much coverage individual choose—is reflected solely in the lump-sum payout upon diagnosis.

To capture the rollout of CCSMI, we manually collect CCSMI information for each sample city, including the introduction date, annual purchasing window, benefit package, list of special medications covered, and annual premium rates. Table 1 lists the introduction dates of CCSMI plans across the 18 cities covered in the private insurance enrollment data. Most of these cities (except Nanjing and Foshan) launched their CCSMI plans after March 2020, following the release of the central government's "Opinions on Deepening the Reform of the Medical Security System."

[Insert Table 1 here]

Finally, a vector of time-varying city characteristics is collected from the *China City Statistical Yearbook*. These include population, GDP, healthcare expenditure, number of hospitals and number of hospital beds. Since our sampled period and introduction of the CCSMI overlaps with the COVID-19 pandemic, we also collect monthly number of newly confirmed COVID-19 cases in each city from *Sina News*.[10]

Table 2 presents the summary statistics for the main and control variables used in the analysis. At the city-by-month level, the average number of insurance purchases drops from 265 to 175 after the implementation of CCSMI, suggesting a potentially substantial crowd-out effect at the extensive margin. Among all newly purchased insurance, the average coverage amount decreases slightly from approximately 1.12 million CNY (155,000 USD) to 1.08 million CNY (150,000 USD).

[Insert Table 2 here]

Changes in the average coverage amounts can occur through different channels. For instance, there might be crowd-out at the intensive margin, where consumers choose lower coverage if they perceived that CCSMI provides some level, but not full, protection against health expenditure risk. Meanwhile, there might also be composition changes as certain types of consumers switch to CCSMI, altering the demographic profile and the selected coverage amounts of those purchasing private insurance. The direction of this composition effect on the average coverage amounts is, however, ambiguous. In panel B of Table 2, we show some slight changes in the age composition of the new enrollees. The average age decreased from 24.9 to 24.0 after the implementation of CCSMI. The

[10] See https://news.sina.cn/zt_d/yiqing0121?vt=4 (in Chinese), Viewed March 3, 2025.

share of those aged 40 and above decreased from 10.75% to 9.24%, while the share of children and young adults increased slightly.[11]

The average annual premium also decreases from 7,582 CNY (1,050 USD) to 7,234 CNY (1,000 USD) after the introduction of CCSMI. Given that the premium rate is determined based on the plan and coverage selected, as well as the policyholder's age and gender, the decrease in premium can be driven by the changes in coverage levels and the demographic composition noted above. However, there may be an additional channel—private insurers adjusting their pricing strategy in response to the introduction of CCSMI. This competitive pricing response could further reduce premiums, even for consumers with similar characteristics and coverage choices.

For city time-varying characteristics presented in Panel C, there are some moderate increases over the years in terms of population and GDP per capita. Medical resources also expand alongside economic growth, and possibly also in response to the COVID-19 outbreak. Since months before 2020 are mostly before the introduction of CCSMI, the monthly number of newly confirmed COVID-19 cases is significantly lower in the pre-period compared to the post-period. All of these variables will be included as controls in the subsequent analysis.

IV. Empirical Strategy

To examine the impact of CCSMI on private insurance, we leverage the gradual introduction of CCSMI across cities. We begin by examining the impact on the extensive margin, specifically the number of private insurance purchases. To conduct this analysis, we aggregate the number of insurance purchases by city and month and run the following DiD specification:

$$\ln(Purchases)_{c,t} = \alpha + \beta Introduce_{c,t} + \rho \mathbf{X}_{c,t} + \gamma_c + \tau_t + \epsilon_{c,t} \quad (1)$$

where $\ln(Purchases)_{c,t}$ represents the natural logarithm of number of private insurance policies purchased in city c and month t. The DiD variable is denoted by $Introduce_{c,t}$, which takes value 1 only when CCSMI has been introduced in city c by month t. City fixed effects (γ_c) and year-month fixed effects (τ_t) are included in the regression model. Additionally, $\mathbf{X}_{c,t}$ is a vector of city-time-

[11] As shown in Appendix Figure A2, the age distribution reveals a substantial proportion of policyholders below 1 year old and during 25-40 years old, with only 10% of policyholders being over 40. This is likely because children and younger individuals, including parents with infants, are more proactive in purchasing insurance for themselves and for their newborn child to address potential health risks. In contrast, middle-aged and older population may face higher premium rates due to increased health risks associated with aging, which can discourage them from enrolling.

level control variables as listed in Panel C of Table 2 and city-by-calendar-month fixed effects. To account for the difference market size across cities, the regression is weighted by the number of private health insurance purchases in city *c* and pre-period (in year 2017).[12] Standard errors are clustered at the city level. Considering that there are only 18 cities in our sample, we also report wild bootstrap p-values for the key coefficients to correct for potential few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Our coefficient of interest, β, represents the change in private insurance purchases in cities after the introduction of the CCSMI. The identification assumption is that no other factors systematically vary across cities around the time of CCSMI's launch that could simultaneously affect changes in private insurance purchases. This assumption may be violated if cities experiencing market shocks, which subsequently alter the demand for private insurance, decide to implement CCSMI endogenously. In such cases, changes in private insurance purchases driven by the market shock could be mistakenly attributed to CCSMI's implementation, leading to a biased estimation of its actual impact.

Although such possibilities cannot be ruled out completely, we provide supporting evidence below that this should not be a major concern. First, as shown in Figure 1, most cities began designing and introducing CCSMI after 2020, following the central government's guidance to promote the development of PPP insurance plans. Such policy from the central government can be considered quasi-exogenous to the local governments, as it was implemented without regard to local market shocks. However, questions remain about why some cities adopted the policy early while others took longer to introduce their own CCSMI product. Specifically, was there increasing or decreasing demand for private insurance prior to CCSMI's introduction? To test this, we analyze data from the *Yearbook of China's Insurance* to determine if the decision to implement CCSMI is correlated with the size of the private insurance market and other macroeconomic indices in the city. The results show no significant correlation between the introduction of CCSMI and insurance market or macroeconomic conditions in the previous one, two, or three years (see Appendix Table A1). The severity of the Covid-19 pandemic—measured by either the number of newly confirmed cases, deaths, or cured cases in the preceding 1 to 12 months—also does not predict the timing of CCSMI's launch.

To further test if there are different trends in private insurance market prior to the implementation of the CCSMI, we also estimate the following event-study model:

[12] Alternative weights such as the population in city *c* and year 2017 will be used for robustness checks (see Appendix Table A2).

$$\ln(Purchases)_{c,t} = \sum_{k=-8,k\neq-1}^{k=8} \beta_k \mathbb{I}(t - t_c = k) + \rho \mathbf{X}_{c,t} + \gamma_c + \tau_t + \epsilon_{c,t} \quad (2)$$

where the key coefficients of interest are β_ks, which represent the dynamic effect of CCSMI in the *k*th month relative to its introduction. Indicator variables $\mathbb{I}(t - t_c = k)$ measure the time relative to the implementation month of CCSMI (t_c) in city *c*. The month immediately prior to the event is dropped as the reference month. $\mathbf{X}_{c,t}$, γ_c and τ_t are the same as in equation (1). If the identification assumption holds, we would expect to see no pre-existing trend in β_ks. As will be demonstrated in the next section, this provides additional support to our empirical design.

The DiD estimate above relies on two-way fixed effect (TWFE) regression, which could be problematic with staggered treatment status and heterogenous treatment effect (Callaway and Sant'Anna, 2021; de Chaisemartin and D'Haultfoeuille, 2020).[13] Therefore, we also implement new TWFE estimates to test the robustious of the findings.

After examining the change in private insurance purchases at the extensive margin, we return to the transaction-level data to test the impact at the intensive margin. This is estimated using equation (3),

$$Y_{i,c,t} = \alpha + \beta Introduce_{c,t} + \rho \mathbf{X}_{c,t} + \theta \mathbf{Z}_{i,c,t} + \gamma_c + \tau_t + \epsilon_{i,c,t} \quad (3)$$

where $Y_{i,c,t}$ represents the natural logarithm of coverage amount or the annual premium paid for each purchased insurance policy *i* in city *c* and month *t*. The main variable of interest $Introduce_{c,t}$ is the same as in equation (1), indicating the implementation of CCSMI. City fixed effects (γ_c), year-month fixed effects (τ_t), and the set of city-by-time-level control ($\mathbf{X}_{c,t}$) are also same as in model (1). Standard errors are again clustered at the city level.

As discussed above, the coverage amount may be affected through two channels. Firstly, if consumers perceive CCSMI as offering some level of protection against health risk, they might continue purchasing private insurance but opt for a lower coverage amount, reflecting a crowd-out or substitution effect at the intensive margin. Second, CCSMI may cause some individuals to exit the private insurance market, resulting in a composition effect on coverage amount. Therefore, we include policyholder characteristics ($\mathbf{Z}_{i,c,t}$) such as gender, age and income status. It also includes

[13] As all of the sample cities are treated, the approaches mentioned by Sun and Abraham (2021) and Borusyak *et al.* (2024) are not applicable in our context.

premium paid duration, which may affect the coverage amount and premium. To further explore the potential mechanisms, we test for heterogeneous responses among individual with different risk levels, proxied by age groups. Specifically, we examine whether there is greater crowd-out among children, young adults and middle-aged consumers, and whether there are different responses in the average coverage amounts within each age group.

In terms of the change in annual premiums in response to the introduction of CCSMI, we examine premium changes both with and without controlling for the plan and coverage choices. This would enable us to distinguish whether and to how much extent the premium adjustments are driven by consumer choices or insurer's pricing strategies.

V. Empirical Results

A. *Extensive margin*

In this section, we present results on how the introduction of CCSMI across cities affects the purchases of private insurance.

Table 3 reports the result from DiD regression (1). Baseline result, shown in column (1), indicates that there is a 14.1% (exp(-0.152)-1) reduction in private insurance purchases following the introduction of CCSMI. In column (2), we add controls for *PurchasingWindow*, a dummy variable equal to one if the month falls within the annual purchasing window of the CCSMI product, and zero otherwise.[14] This variable allows us to explore whether there are additional shifts in consumers' decisions during the purchasing window, a period when CCSMI is immediately available for enrollment and there are typically increased marketing efforts from both the public and private entities. However, the coefficient for *PurchasingWindow* is close to zero and insignificant, and adding this variable does not change the regression results of our main variable of interest much. Finally, in our preferred specification reported in column (3), we further incorporate city-by-calendar-month fixed effects to control for potential seasonality. The DiD coefficient suggests an average 13.7% (exp(-0.147)-1) decline in the number of private insurance policies following the introduction of CCSMI. These results reveal a strong crowding-out effect, suggesting that CCSMI significantly affects the purchasing decisions of potential private insurance consumers.

[Insert Table 3 here]

[14] Usually, the purchasing window for CCSMI products lasts for 2-3 months in a year.

Figure 3 presents the event-study result for the effect of CCSMI on the number of private insurance policies purchased. Prior to the event, coefficients are insignificant and close to zero. This suggest that cities that introduced the CCSMI earlier do not differ from those that introduced it later in the previous trend of private insurance purchases and therefore support the parallel trends in the DiD analysis. Even in the month prior to the introduction, there is no anticipation effect. This is consistent with the fact that consumers were not aware of the CCSMI until it is publicly announced and open for enrollment.

To further validate these findings, we employ the approach outlined by Callaway and Sant'Anna (2021) and de Chaisemartin and D'Haultfoeuille (2020) to study the dynamics of treatment effects. Appendix Figure A3 presents results generated by a set of estimators that account for treatment effect heterogeneity. The results reveal similar patterns across all specifications, reinforcing the conclusions drawn from Table 3.

[Insert Figure 3 here]

B. *Intensive margin*

In this section, we present results on the effect of the introduction of CCSMI across cities on the coverage amount and annual premium of private insurance.

In Panel A of Table 4, we focus on the effects of CCSMI on the coverage amount of private insurance. In column (1), the coefficient for the variable *Introduce* is negative and statistically significant, indicating a reduction in the coverage amount following the introduction of CCSMI. In column (2), we control for product fixed effects to examine the coverage amount change within the same insurance product (i.e., those with the same set of critical illnesses included), as well as the premium payment term. In column (3), we further control for policyholder characteristics, including age, gender, and income status. These controls do not change the coefficient much from column (2), suggesting little composition effect on average. In other words, the reduction in average coverage amounts is not driven by sicker population or individuals with high insurance demand switching to CCSMI. In the heterogeneity analysis, we will further split the sample by age group to test whether there are different responses across subpopulations. As baseline benchmark, the coefficient of *Introduce* in column (3) reveals an average of 13.6% (exp(-0.146)-1) decrease in the coverage amount

of private insurance following the introduction of CCSMI. Given a pre-CCSMI monthly average of 1.12 million CNY for coverage amount in the sample cities, this implies a reduction of approximately 152,000 CNY in coverage amount.

In Panel B, we examine how the introduction of CCSMI affects the annual premium paid for private insurance. Columns (4)-(6) replicates the specification in columns (1)-(3), showing negative and statistically significant coefficients for the variable *Introduce*. Again, controlling for policyholder characteristics does not explain much of the premium change. In Column (6), the estimated coefficient implies that there is an average of 4.6% (exp(-0.047)-1) decrease in the annual premium paid of private insurance following the introduction of CCSMI. Further accounting for differences in coverage amounts in column (7), the size of premium reduction decreases to an average of 1.6% (exp(-0.016)-1).[15] The difference between these two estimates (4.6% - 1.6%) suggests that two-thirds of the reduction in premium can be attributed to consumers choosing smaller coverage amount. The rest is due to premium reduction for given product and coverage. This suggest that insurers lower its pricing in response to the challenge of the new CCSMI. However, even with lower prices, we still see crowd-out in both the extensive and intensive margin.

[Insert Table 4 here]

C. *Robustness Checks*

As noted above, the rapid expansion of CCSMI was largely driven by the central government's guideline issued in March 2020. Only two cities—Nanjing and Foshan—launched CCSMI prior to the release of the guideline. To avoid any unique factors in these two cities that may have contributed to their pilot attempt and could bias the results, we exclude them from the analysis sample and focus on cities that introduced CCSMI only after the central policy. The regression results remain robust for both extensive and intensive outcomes (see Appendix Table A4 and A5).

To further address concerns about unobserved trends across cities, we include city-specific year trends in the regression in addition to the baseline controls. Results also remain robust for the main findings (see Appendix Table A6 and A7).

D. *Heterogeneity*

[15] Controlling coverage amount in non-linear coverage groups format and accounting for product-by-coverage group fixed effect produce slightly larger estimations for the premium reduction (see Appendix Table A3).

As shown in the previous section, the introduction of CCSMI leads to reductions in both the coverage amount and annual premium of private insurance. These changes could be driven by the crowding-out effect of CCSMI at the intensive margin or the compositional shifts in those who purchase private insurance resulting from the extensive margin responses. Although the analysis on intensive margins controls for policyholder characteristics, one may still question whether a set of linear controls can adequately capture the composition changes private insured population. Therefore, in the first set of heterogeneity analysis, we split the sample into three age groups: children ($0 \leq age < 18$), young adults ($18 \leq age < 40$), and middle-aged population ($40 \leq age \leq 65$). As shown in Appendix Figure A2, these three groups represent about 30%, 60%, and 10% of the sample, respectively. There are no enrollees above age 65 as it is the upper limit for purchasing private CI insurance. Compared to children and young adults, middle-aged population can be seen as facing higher levels of health risk.[16]

Heterogeneity results by age group are presented in Figure 4. In each panel, we first plot the estimates from our preferred specification for the overall sample—Column (3) in Table 3 for the number of private insurance purchases at the city-month level; Columns (3) in Table 4 for coverage amount; and Column (7) in Table 4 for annual premium. We then replicate the same regression separately for each of the three age groups and plot the coefficients respectively.

At the extensive margin, Panel (a) reveals similar responses at the extensive margin. In terms of coverage amount reported in Panel (b), children show significantly smaller decreases (8.0%) than young adults (15.1%) and middle-aged adults (18.0%). There is also no reduction in annual premium paid for children, whereas the other two subgroups show similar level of reduction. These suggest that, within each risk group roughly proxied by age, there is a substitution effect at the intensive margin. However, among children, a more pronounced composition effect may be present, as those continuing to purchase private insurance after the introduction of CCSMI likely have a higher demand for private insurance, partially offsetting the substitution effect.

[Insert Figure 4 here]

Another set of heterogeneity analysis is related to the design of CCSMI plans. More specifically, we discuss the role of special medications included in the benefit items of certain CCSMI plans in the

[16] According to the insurer providing our data, adults over age 40 account for 62% of settled claims, while those under 40 comprise the remaining 38%.

crowd-out of private insurance. Many of these special medications are FDA-approved immunotherapies for cancer treatment. Reimbursement payment from CCSMI for these medications is can be as much as 1 million CNY or even higher conditional on specific conditions outlined in the CCSMI product's special medications list (see Appendix Figure A4 for an example). Since cancers are mostly covered by private CI insurance, it is possible that CCSMI plans with lists of special medications, could further impact the private insurance market.

To test this, we construct three variables based on the CCSMI design in each specific city: 1) a dummy indicating whether the CCSMI includes any special medication; 2) the number of special medications included; and 3) the share of special medications (and its covered indication) overlapping with the list of basic critical illnesses required to be covered by private insurance.[17] All these variables take value zero before the introduction of CCSMI. As reported in Table 5 Panel A, CCSMI plans that include a special medications list exhibit a significantly stronger crowd-out effect at the extensive margin, whereas plans without such lists show virtually no effect. Moreover, the crowd-out effect becomes more pronounced as the number of special medications increases and as the overlap in covered indications between CCSMI and private insurance grows. Regarding the coverage amounts of private insurance, the estimates for all three variables on special medications are positive. This suggests that CCSMIs with special medications lists (covering more special medications or having more overlapping indications with private CI insurance) tend to filter out individuals with lower health risks and insurance demand, leaving those still choosing private insurance having an average higher coverage amount. Finally, conditional on the chosen coverage amount, annual premiums show a larger reduction in cities where CCSMIs offer better coverage for special medications. This suggests a stronger response in insurers' pricing strategies when facing greater competition from CCSMI.

[Insert Table 5 here]

VI. Back-of-the-Envelope Calculations

Results so far indicate that there is substantial crowd-out of the private insurance following the introduction of CCSMI. To better understand how the size of the crowd-out compares to the increase in insurance uptake in CCSMI plans, we perform the following back-of-the-envelope calculations.

[17] Insurance Association of China (IAC) and Chinese Medical Doctor Association (CMDA) established the definition of basic diseases for private CI insurance in 2007, initially covering 25 diseases. This definition was expanded to include 28 diseases in 2020. See Insurance Association of China, 2020. "Guidelines for the Use of Disease Definitions in Critical Illness Insurance" (in Chinese), https://www.iachina.cn/module/download/downfile.jsp?filename=dfbe46c8f7aa414694e7043603c6fb0b.pdf. Viewed August 20, 2024.

In our preferred specification (Table 3, column (3)), the introduction of CCSMI led to a 13.7% decrease in the purchases of private insurance. Assuming this decrease applies nationwide and across all private insurers, it translates into a reduction of 39.5 million newly-issued insurance policies from the private insurance market size in 2019, prior to the introduction of CCSMI.[18] Compared to the total number of CCSMI enrollees—168 million across China in 2023—the reduction in private health insurance purchases accounts for 25% of the increase in insurance coverage from CCSMI.

In terms of premiums, the introduction of CCSMI resulted in a 14.9% (exp(-0.161)-1) decrease in the total premiums of private health insurance (see Appendix Table A8, column (3)). Following the same calculation, this amounts to approximately 105 billion CNY reduction in total private insurance premiums nationwide, which is nearly six times the annual premium of CCSMI in 2023. This is because CCSMI has much lower premiums—generally ranges from 60 to 150 CNY—compared to private insurance. Consumers, however, may perceive significant, perhaps mistakenly high, levels of risk protection and therefore opt out private insurance, resulting in a larger overall reduction in total premiums.

It should be noted that the calculations above rely on several strong assumptions, particularly that the estimated crowd-out effects can be extrapolated to the entire private insurance market. As discussed in the very beginning, the focused type of private insurance in the analysis is CI insurance, which differs from CCSMI and other private medical insurance. Therefore, one might expect a smaller substitution effect from CCSMI on CI insurance compared to its impact on other types of medical insurance. In this case, the calculations above may represent a lower bound of the total crowd-out effect on private health insurance. Furthermore, since the focal insurer in the sample is not a CCSMI operator, it may be affected differently than insurers affiliated with CCSMI, who could benefit from increased media attention and reputational gains through their partnership with the government.

To account for these external validity concern, we supplement the analysis by conducting another analysis for the effect of CCSMI on the insurance market using data on the total premiums of health

[18] According to the Insurance Association of China (IAC), in 2019, the total annual premiums for private CI insurance and private medical insurance amounted to 411 and 296 billion CNY, respectively. About 75% of private CI insurance are paid periodically and the other 25% are policies with single payment. The average annual premiums of private CI insurance (based on the pre-CCSMI mean of our sample, same below) are 7698.55 CNY and the average premiums of private CI insurance with single payment are 100,000 CNY. The average annual premiums of private medical insurance are 1,200 CNY. The total premiums therefore correspond to approximately 41 million private CI insurance and 247 million private medical insurance purchased that year. Therefore, the decrease in potential demand for private health insurance can be estimated as $(41+247) \times 0.137 \approx 39.5$ million policies.

insurance at the insurer-city-year level from the *Yearbook of China's Insurance.* The total premium includes both private health insurance and CCSMI, as latter is also recorded in premium revenue for private insurers selected as CCSMI operators.[19] A caveat of the data, however, is that the total premiums reported in the yearbook include not only premiums paid for newly purchased insurance in a given year but also portions of premiums for long-term plans, either paid in full upfront and distributed annually over the duration of the plan or recurring annual premium for plans with yearly payment schedule set up. Since these previously purchased plans are hardly affected by introduction of CCSMI,[20] such measure of total premiums attenuates the effect of CCSMI on private insurance purchasing decisions. To address this issue, we use the year-over-year differences in annual premiums as a measure of the change in total premiums of newly-issued health insurance policies.

The results are presented in Table 6. The variable $Introduce_{c,t}$ takes the value 1 only if CCSMI has been introduced in city c by year t. Its coefficient reflects that change in premiums for newly-issued health insurance policies among insurers not operating CCSMI plans. For insurers selected as the CCSMI operator, the additional impact is captured by the interaction term $Introduce_{c,t} \times Operator_j$, which takes the value 1 if CCSMI has been introduced in city c by year t, and insurer j is one of the CCSMI operators in that city. The increase in premiums for private insurers operating CCSMI (including both CCSMI and their own private insurance plans) is offset by about one-third by the decrease in premiums for insurers not involved in CCSMI. This finding supports the earlier results that there is substantial crowd-out effect of CCSMI on private insurance, and highlights a redistribution of market across different private insurers.

[Insert Table 6 here]

VII. Conclusion

PPP health insurance programs have been considered as a key strategy for expanding insurance coverage. However, the impact of such programs remains unclear, particularly regarding potential spillover effects on other insurance schemes. In this paper, we examine the effects of China's CCSMI on private health insurance. Using administrative data from a representative private insurer, we find that the introduction of CCSMI leads to declines in private insurance purchases, average coverage

[19] The data used here contains 157 private insurers in total, 31 of which are operators of CCSMI in at least one of the 18 sample cities.

[20] According to IAC, only 3.47% of the long-term plans are cancelled in an average year. See Insurance Ass ociation of China, "2023 Insurance Company Business Evaluation Results" (in Chinese), https://www.iachina.cn/art/2024/12/31/art_24_108138.html, Viewed Jan 20, 2025.

amounts, and average annual premiums. These findings indicate substantial crowd-out effects on both the extensive and intensive margins. In response, private insurers adjust their pricing strategies to accommodate the increased competition posed by CCSMI.

Our results highlight that CCSMI may fall short of its goal in increasing insurance coverage, as a significant portion of the new CCSMI enrollees appears to be drawn from consumers who would have chosen private insurance. While such a public-private partnership program gains advantage from both public and private participants, attracting over 300 million enrollees within a few years, our back-of-envelope calculation indicates that at least 24% of the increase in CCSMI enrollment is offset by the reduction in private insurance purchases.

This crowd-out effect could become more worrisome if CCSMI attracts a specific subset of consumers—particularly individuals with higher health risks and lower purchasing power—leaving others either in the private market or uninsured. Such adverse selection poses a long-run sustainability challenge for both CCSMI and the broader insurance system. While CCSMI's inclusive enrollment policy (e.g., non-discriminatory pricing and no restrictions based on pre-existing conditions) reflects a strong equity motivation from the government, it also raises questions about financial suitability over time. On the private sector side, crowd-out may lead to a shrinking market, particularly for insurers not involved in CCSMI partnerships. While large insurers cooperating with local governments may benefit from CCSMI-related revenues, the overall market concentration could harm competition and reduce incentives for innovation. These dynamics deserve further attention in future research and policy discussions.

It is also critical to further assess the subsequent effects of the crowd-out on people's health and financial outcomes. Theoretically, it is ambiguous whether CCSMI or private CI insurance provides better protection for health and health-related financial risk. The presence of moral hazard in supplemental medical insurance further complicates this comparison. Revealed preference from our heterogeneity analysis suggests that when CCSMI offers more comparable risk protection through including more special medications for cancer as covered in CI insurance, there are larger crowd-out effects. However, prior studies show that individuals often struggle to make optimal insurance choices due to financial illiteracy or limited information and tend to focus on salient features such as premiums (Abaluck and Gruber, 2011; Loewenstein *et al.*, 2013; Handel and Kolstad, 2015). We also observe that the reduction in total premiums is disproportionately larger than the decline in enrollment, suggesting that individuals substituting into CCSMI may end up with substantially less risk protection.

Therefore, policy maker should carefully evaluate the overall welfare effects of the CCSMI, and consider better information provision to help individuals better aligning their insurance choices with their actual needs.

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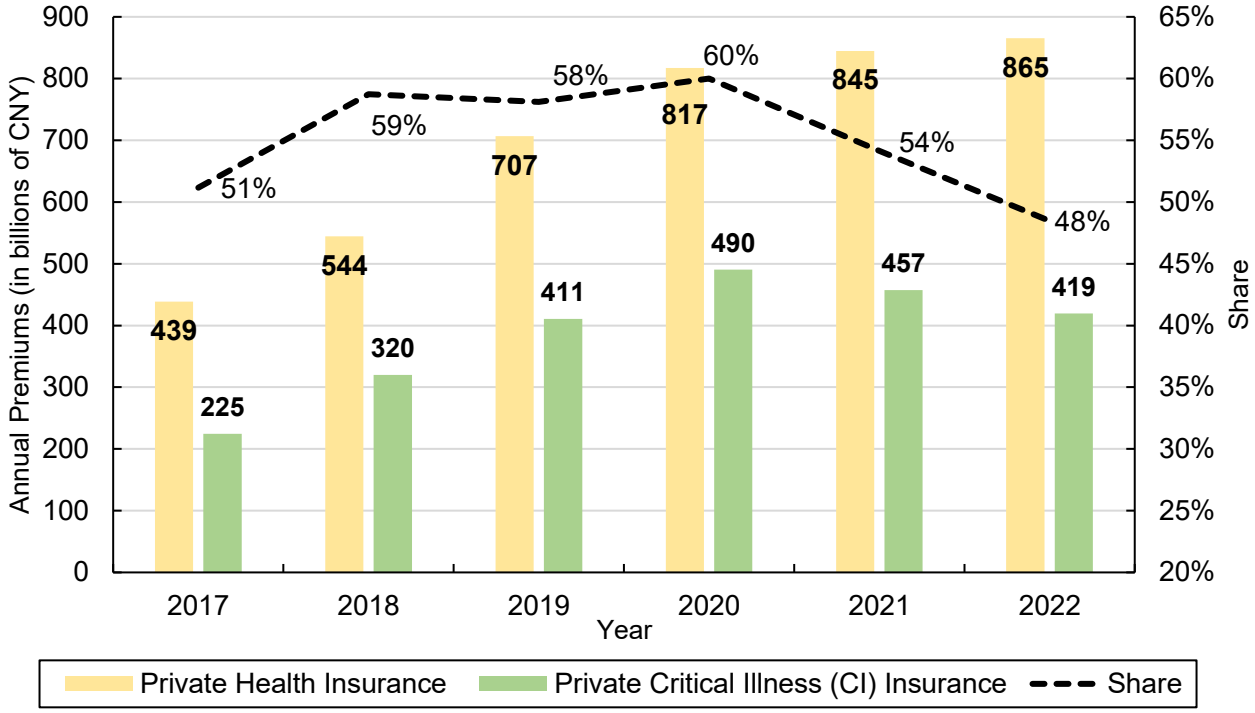
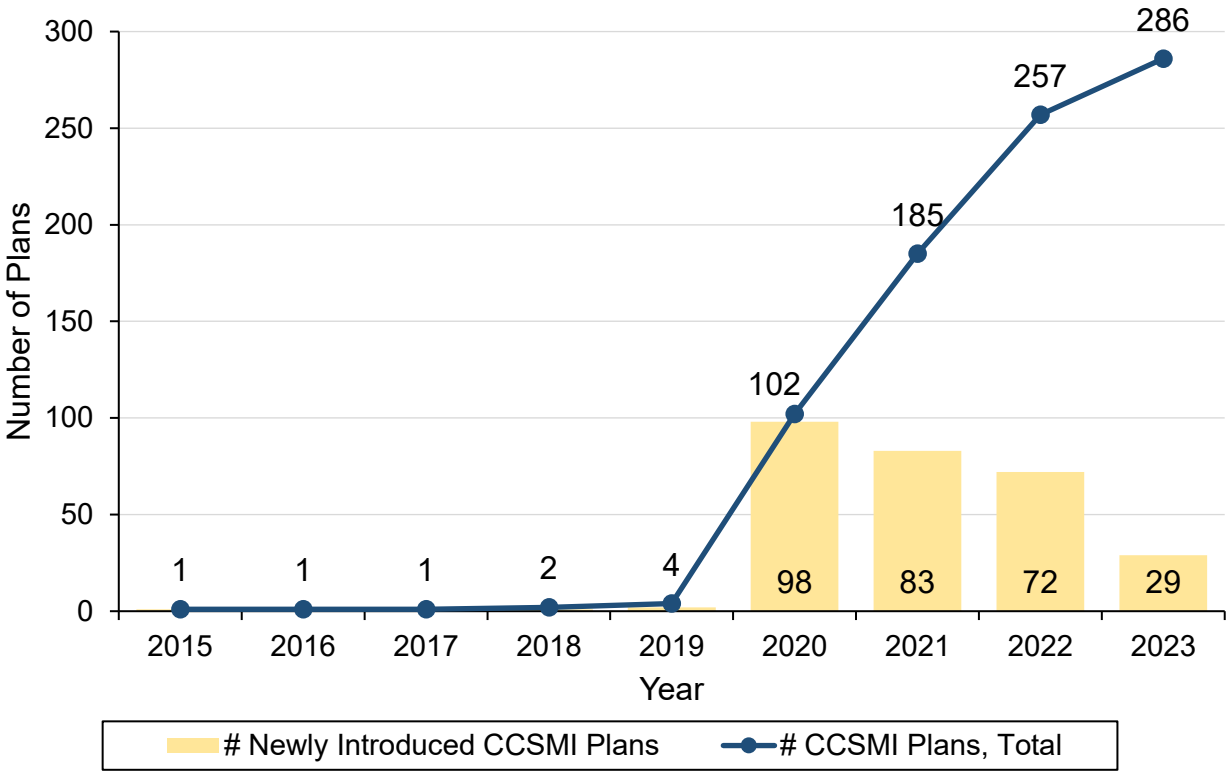
Figures and Tables

Figure 1: The Development of Private Health Insurance in China



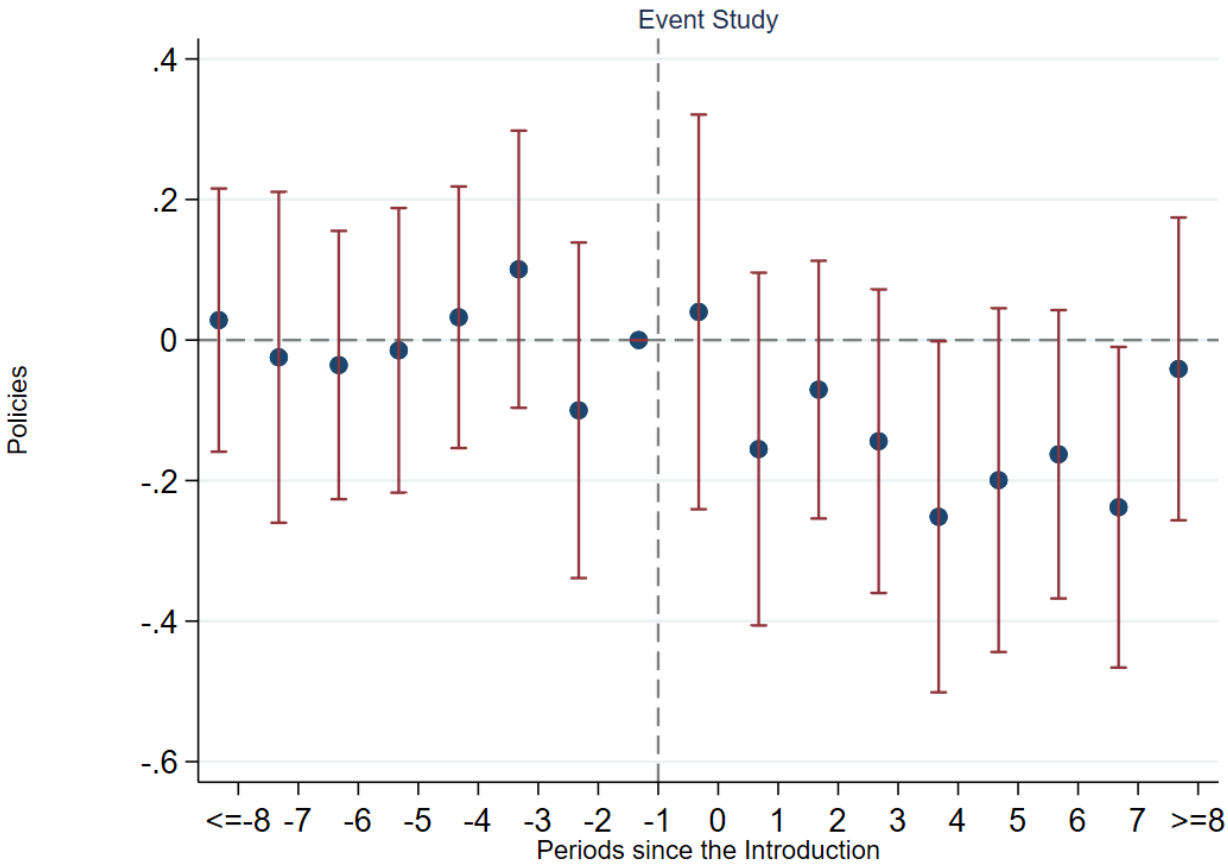
Note: This figure compares the aggregate annual premiums (in billions of CNY) of private health insurance and private critical illness (CI) insurance, and shows the share of private CI insurance relative to total private health insurance from 2017 to 2022. Private health insurance includes both private medical health insurance (including CCSMIs after their introduction) and private CI insurance. The data is sourced from the Insurance Association of China.

Figure 2: The Introduction of CCSMI Plans in China



Note: This figure shows the trend in the number of newly introduced CCSMI plans and the total CCSMI plans in China from 2015 to 2023. The data was manually collected by the authors.

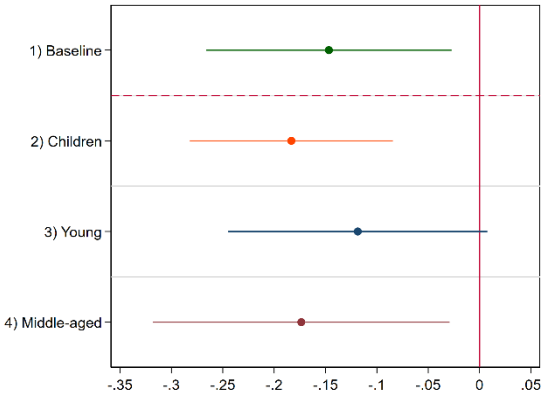
Figure 3: Effects of CCSMI on Private Insurance Purchases



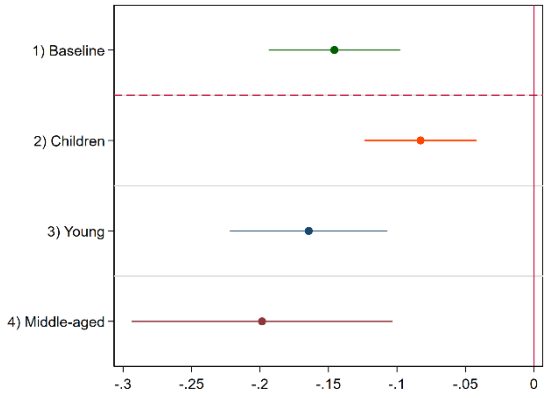
Note: This figure reports the regression results from the estimation of equation (2). The plots represent point estimates of β_ks and the segments represent 95% confidence intervals, of which β_{-1} is normalized to zero. Years beyond eight months before and after the introduction are grouped together as $t \leq -8$ and $t \geq 8$ respectively. The regression uses the size weight, i.e., the number of private health insurance policies purchased in city c and year 2017 (pre-period) from our sample. Standard errors are clustered at the city level.

Figure 4: Heterogenous Responses to the Introduction of CCSMI

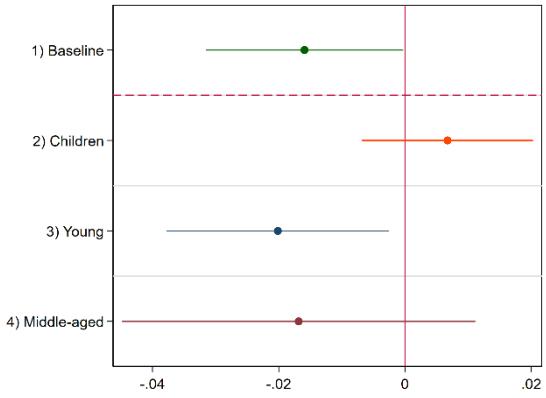
(a) # Insurance purchases



(b) Coverage Amount



(c) Annual Premium



Note: These figures show the heterogenous responses to the introduction of CCSMI in the number of private insurance purchases, coverage amount, and annual premium, using the city-month-level panel dataset (number of purchases) and the transaction-level dataset (coverage amount and premium). The horizontal lines represent the upper and lower bounds of the 95% confidence interval, based on standard errors clustered at the city level.

Table 1: The Introduction Date of CCSMI across 18 Sample Cities

City	Introducing Date	City	Introducing Date
Nanjing	2018.12.17	Wuxi	2021.01.15
Foshan	2019.12.24	Wuhan	2021.01.15
Suzhou	2020.04.10	Hangzhou	2021.01.20
Chengdu	2020.05.07	Shanghai	2021.05.01
Xiamen	2020.09.10	Changsha	2021.07.22
Jinan	2020.10.24	Beijing	2021.07.26
Chongqing	2020.11.06	Dongguan	2022.04.13
Shijiazhuang	2020.11.10	Shenyang	2022.05.16
Guangzhou	2020.12.01	Tianjin	2022.07.19

Note: The data was manually collected by the authors.

Table 2: Summary Statistics

	All	Before CCSMI	After CCSMI
Panel A: *Key Variables*			
# Purchases	302,750	226,966	75,784
# Purchases (city-month level)	233.87	264.95	174.84
	(505.44)	(568.43)	(349.43)
Coverage Amount (10 thousand)	111.00	111.99	108.01
	(141.27)	(147.87)	(119.30)
Annual Premium	7582.35	7698.55	7234.36
	(4212.89)	(4310.25)	(3886.13)
Panel B: *Policy Characteristics*			
Age	24.64	24.86	23.97
	(14.16)	(14.20)	(14.03)
% 0-18	30.23%	29.70%	31.83%
% 18-40	59.40%	59.55%	58.93%
% 40+	10.37%	10.75%	9.24%
Female	0.565	0.567	0.559
	(0.496)	(0.495)	(0.497)
High Income	0.0198	0.0207	0.0169
	(0.139)	(0.142)	(0.129)
Premium payment term (# years)	23.63	23.73	23.35
	(5.11)	(5.17)	(4.95)
Panel C: *City Characteristics*			
Population (10 thousand)	1378.01	1360.70	1402.25
	(682.48)	(666.11)	(711.63)
GDP per capita	120,621	111,316	133,648
	(35,907)	(31,510)	(37,930)
Gov. public health exp. (100 million)	198.98	173.08	235.24
	(188.88)	(149.04)	(230.54)
# Hospitals	338.11	330.90	348.18
	(204.78)	(195.60)	(218.82)
# Hospital beds	75,401	72,539	79,408
	(39,897)	(36,899)	(43,865)
Monthly number of newly confirmed COVID-19 cases	136.62	67.30	268.32
	(2040.56)	(1579.77)	(2705.27)

Note: This table presents summary statistics on key variables, policy characteristics, and characteristics for the full sample, and for the samples before and after the implementation of CCSMI, between 2017 and 2022. The average numbers in Panel A and B are calculated at transaction level (excluding # Purchases (city-month level), which is calculated at city-month level), and those in Panel C are calculated at city-year level. Standard deviations are given in parentheses beneath each average.

Table 3: Effects of CCSMI on Private Insurance Purchases

	Dependent Variable: ln(Number of **Policies**)		
	(1)	(2)	(3)
Introduce	**-0.152*** **	**-0.134** **	**-0.147** **
	(0.057)	**(0.060)**	**(0.058)**
Wild Bootstrap p-value	*0.011*	*0.027*	*0.016*
PurchasingWindow		-0.056	-0.027
		(0.066)	(0.078)
FEs: city	Y	Y	Y
FEs: year-month	Y	Y	Y
FEs: city × calendar month	N	N	Y
Mean of Dependent Variable	233.87 (4.32)	233.87 (4.32)	233.87 (4.32)
Observations	1,293	1,293	1,293
R^2	0.952	0.952	0.956

Note: This table reports the DiD results of the variation in purchases of private insurance following the introduction of CCSMI, using the city-month-level panel dataset. All regressions use the size weight, i.e., the number of private health insurance policies purchased in city *c* and year 2017 (pre-period) from our sample. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table 4: Effects of CCSMI on the Coverage Amount and Annual Premium of Private Insurance

	Panel A: ln(Coverage)			Panel B: ln(Premiums)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Introduce	**-0.108*** **	**-0.144*** **	**-0.146*** **	**-0.024** **	**-0.050*** **	**-0.047*** **	**-0.016** **
	(0.026)	**(0.024)**	**(0.024)**	**(0.009)**	**(0.009)**	**(0.009)**	**(0.008)**
Wild Bootstrap p-value	*0.001*	*0.001*	*0.001*	*0.043*	*0.001*	*0.001*	*0.077*
PurchasingWindow	0.004	0.046	0.048	-0.008	0.010	0.008	-0.002
	(0.037)	(0.037)	(0.037)	(0.015)	(0.016)	(0.016)	(0.013)
Coverage							**0.214*** **
							(0.009)
Payment Term		0.018***	0.016***		-0.019***	-0.016***	-0.019***
		(0.001)	(0.001)		(0.0004)	(0.0003)	(0.0002)
Age			-0.008***			0.009***	0.011***
			(0.0005)			(0.0003)	(0.0004)
Gender			0.067***			-0.060***	-0.074***
			(0.005)			(0.002)	(0.002)
HighIncome			0.208***			0.192***	0.147***
			(0.018)			(0.010)	(0.008)
FEs: city	Y	Y	Y	Y	Y	Y	Y
FEs: year-month	Y	Y	Y	Y	Y	Y	Y
FEs: city × calendar month	Y	Y	Y	Y	Y	Y	Y
FEs: Product	N	Y	Y	N	Y	Y	Y
Mean of Dependent	1,109,968	1,109,968	1,109,968	7582.35	7582.35	7582.35	7582.35
Variable	(13.27)	(13.27)	(13.27)	(8.82)	(8.82)	(8.82)	(8.82)
Observations	302,750	302,750	302,750	302,750	302,750	302,750	302,750
R^2	0.171	0.274	0.281	0.058	0.224	0.275	0.459

Note: This table reports the results of the variation in coverage amount and annual premium paid of private insurance following the introduction of CCSMI, using the transaction-level dataset. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table 5: Effects of Special Medications in CCSMI

	Panel A: ln(Number of **Policies**)				Panel B: ln(Coverage)				Panel C: ln(Premiums)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Introduce	**-0.147****	**0.021**	**-0.098***	**-0.115***	**-0.146*****	**-0.357*****	**-0.235*****	**-0.292*****	**-0.016****	**0.028****	**0.002**	**0.002**
	(0.058)	**(0.063)**	**(0.056)**	**(0.064)**	**(0.024)**	**(0.038)**	**(0.027)**	**(0.032)**	**(0.008)**	**(0.012)**	**(0.009)**	**(0.011)**
Wild Bootstrap p-value	*0.016*	*0.712*	*0.074*	*0.077*	*0.001*	*0.001*	*0.001*	*0.001*	*0.077*	*0.046*	*0.829*	*0.835*
Special Medications		**-0.265*****				**0.318*****				**-0.065*****		
		(0.060)				**(0.035)**				**(0.012)**		
Wild Bootstrap p-value		*0.001*				*0.001*				*0.001*		
# Special Medications			**-0.004****				**0.008*****				**-0.002*****	
			(0.002)				**(0.001)**				**(0.0003)**	
Wild Bootstrap p-value			*0.028*				*0.001*				*0.001*	
Overlap				**-0.009**				**0.041*****				**-0.005*****
				(0.008)				**(0.005)**				**(0.001)**
Wild Bootstrap p-value				*0.268*				*0.001*				*0.001*
PurchasingWindow	-0.027	0.004	-0.0001	-0.024	0.048	0.024	0.006	0.033	-0.002	0.002	0.006	-0.001
	(0.078)	(0.081)	(0.081)	(0.080)	(0.037)	(0.034)	(0.034)	(0.030)	(0.013)	(0.012)	(0.013)	(0.014)
Coverage									0.214***	0.215***	0.214***	0.214***
									(0.009)	(0.009)	(0.009)	(0.009)
Policy Characteristics	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
FEs: city	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FEs: year-month	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FEs: city × calendar month	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FEs: Product	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,293	1,293	1,293	1,293	302,750	302,750	302,750	302,750	302,750	302,750	302,750	302,750
R^2	0.956	0.957	0.957	0.956	0.281	0.283	0.282	0.282	0.459	0.459	0.460	0.460

Note: This table presents the estimated effects of CCSMI's special medications on private insurance purchases, coverage amounts, and annual premium paid. Panel A utilizes the city-month-level panel dataset, while Panels B and C employ the transaction-level dataset. Policy characteristics (*Age*, *Gender*, *HighIncome*, *PaymentPeriod*) are controlled for in Panels B and C, consistent with the approach in Table 4. Column (5) and (9) present the

same results as Table 4 column (3) and (7), respectively. Standard errors, clustered at the city level, are reported in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variables which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al*., 2019).

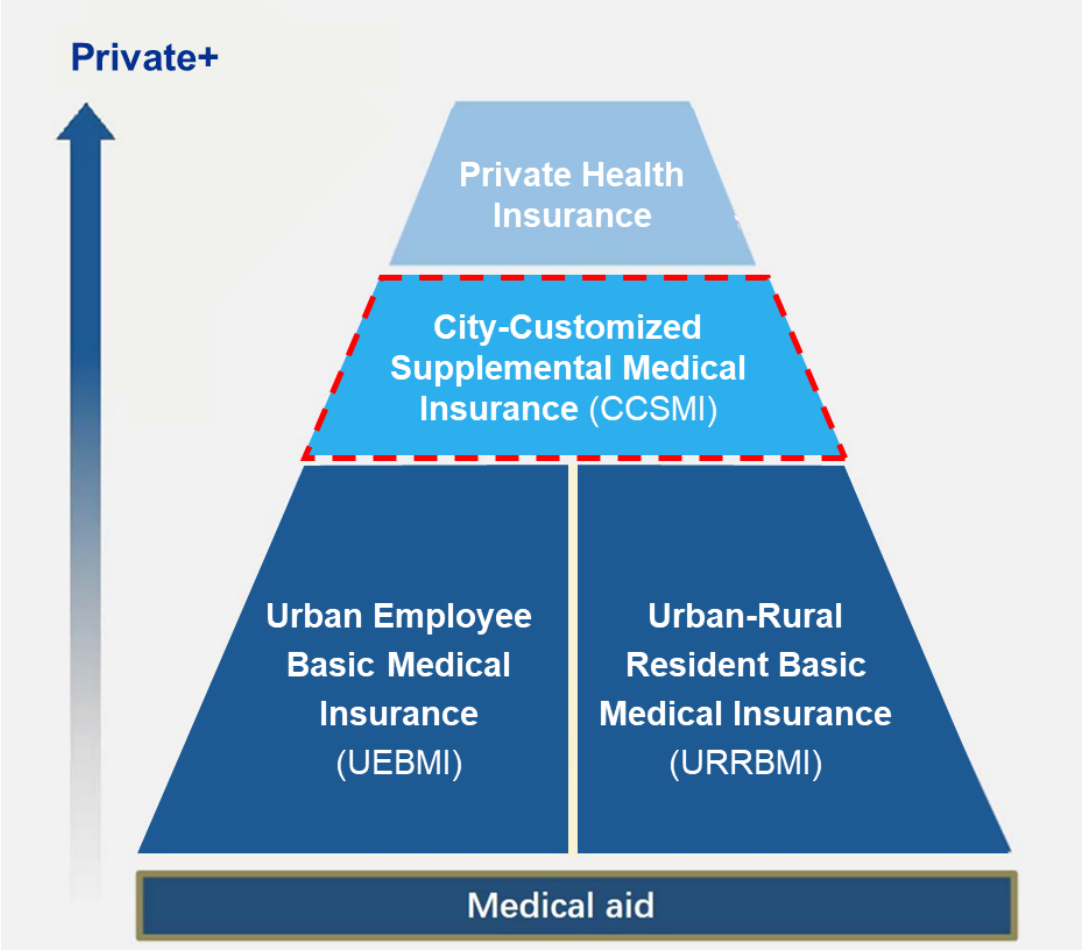
Table 6: Effects of CCSMI on Year-over-Year Differences of Annual Premiums of Private Health Insurance

	Dependent Variable: year-over-year differences of annual premiums of health insurance of insurer *j* in city *c*		
	(1)	(2)	(3)
Introduce	**-11.87*** **	**-12.60*** **	**-11.89** **
	(4.00)	(4.34)	(4.85)
Wild Bootstrap p-value	*0.006*	*0.013*	*0.025*
Introduce × Operator	**30.04*** **	**29.98*** **	**26.27** **
	(8.65)	(8.80)	(11.75)
Wild Bootstrap p-value	*0.003*	*0.003*	*0.020*
FEs: year	Y	Y	Y
FEs: city × Insurer	Y	Y	Y
city-specific year trend	N	Y	Y
insurer-specific year trend	N	N	Y
Mean of Dependent Variable	20.70	20.70	20.70
Observations	6,570	6,570	6,570
R^2	0.293	0.295	0.392

Note: This table presents the results of the effect of CCSMI on year-over-year differences of the annual premiums (in millions) of health insurance offered by private insurers. The insurance data are from the *Yearbook of China's Insurance*. The regression uses the size weight, i.e., the population in city *c* and the year 2017. Standard errors, clustered at the city level, are reported in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variables which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

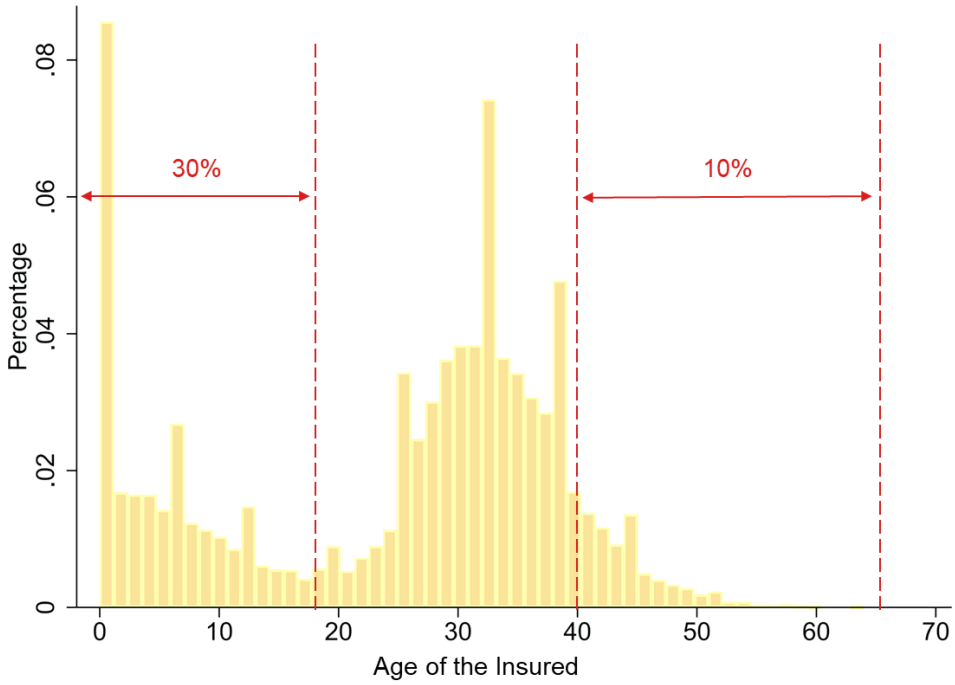
Appendix

Figure A1: Health Insurance System in China



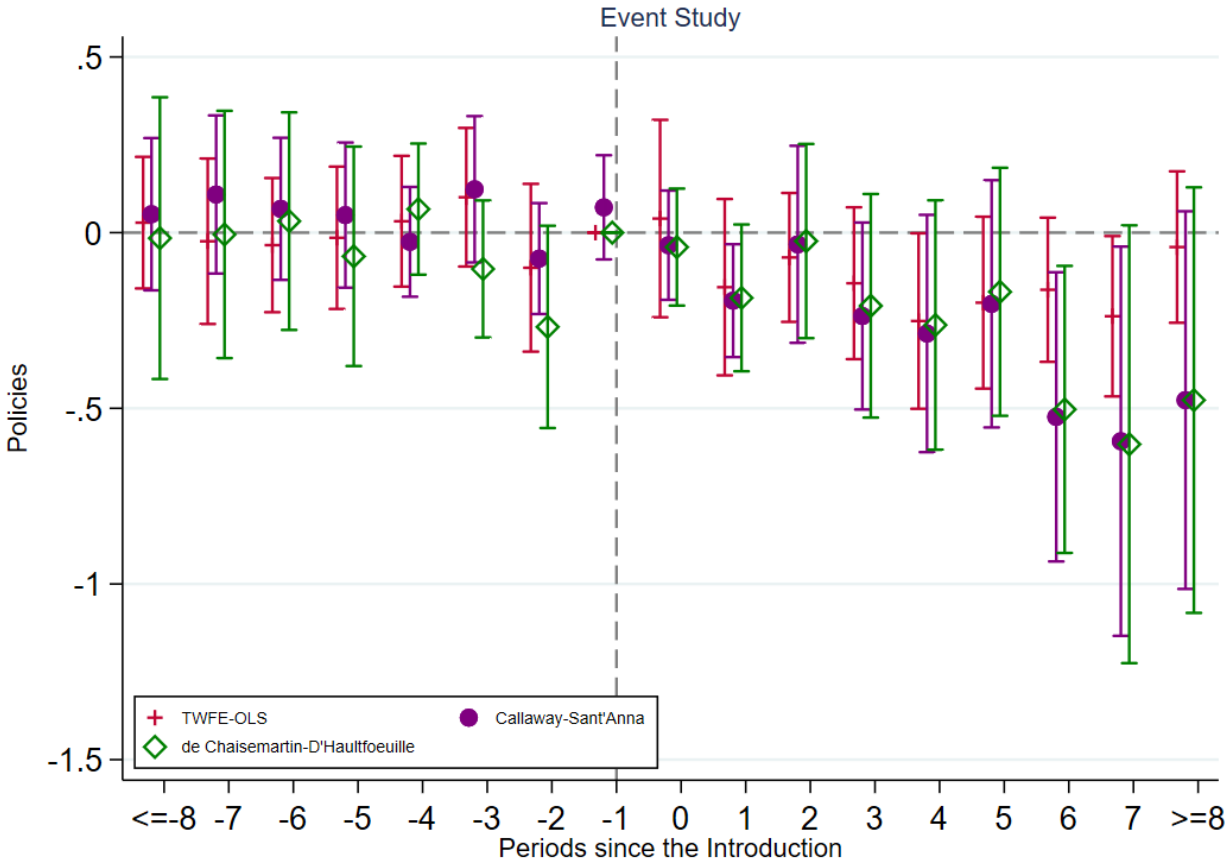
Note: This figure illustrates the multi-tiered health insurance system in China, structured from the bottom upward to reflect increasing private-sector involvement and personalized coverage. At the foundation lies Medical Aid, a publicly funded safety net providing subsidized or free healthcare to low-income and vulnerable populations. Above this, the middle tier consists of two mandatory public schemes: Urban Employee Basic Medical Insurance (UEBMI), covering formal-sector workers through shared contributions from individuals, employers, and the state, and Urban-Rural Resident Basic Medical Insurance (URRBMI), providing basic coverage to non-working urban and rural residents. The uppermost tier, combines City-Customized Supplemental Medical Insurance (CCSMI) and private health insurance, which is exclusively managed by private entities.

Figure A2: Age Distribution



Note: This figure illustrates the age distribution of the full sample. The three age groups, children (0≤age<18), young adults (18≤age<40), and middle-aged population (40≤age≤65) represent about 30%, 60%, and 10% of the sample, respectively.

Figure A3: Robustness Check of the Dynamic Effects of Staggered Treatment



Note: This figure reports the results of a robustness check of staggered difference-in-differences (DiD) estimates of equation (2). It overlays the event-study plots constructed using three different estimators: (1) TWFE-OLS (in red with cross markers), (2) Callaway and Sant'Anna (2021) (in purple with circle markers), and (3) De Chaisemartin and d'Haultfoeuille (2020) (in green with diamond markers). All regressions use the size weight, i.e., the number of private health insurance purchased in city *c* and year 2017 (pre-period) from our sample. Standard errors are clustered at the city level. The vertical dashed line indicates the introduction of CCSMI.

Figure A4: An Example of the List of Special Medications of one CCSMI Product

Brand name | Manufacturer | Indications | Descriptions for the intended use and indications

序号	商品名	分子名 (Generic name)	厂商	疾病种类	适应症限制
1	欧狄沃 / OPDIVO®	纳武利尤单抗 / nivolumab	百时美施贵宝 / Bristol-Myers Squibb Company	肺癌，头颈癌，胃癌	限用于： 1) Non-small cell lung cancer (NSCLC) 2) Head and neck squamous cell cancer 3) Gastroesophageal cancer 1.[illegible]（ALK）阴性、既往接受过含铂方案化疗后疾病进展[illegible] 2.[illegible]性（表达PD-L1肿瘤细胞≥1%）的复发性或转移性头[illegible] 3.[illegible]接部腺癌。
2	可瑞达	帕博利珠单抗	默沙东	黑色素瘤，食管癌，肺癌	限用于： 1.经一线治疗失败的不可切除或转移性黑色素瘤的治疗。 2.治疗PD-L1阳性（综合阳性评分CPS≥10）、既往一线全身治疗失败的局部晚期或转移性食管鳞状细胞癌（ESCC）。 3.联合培美曲塞和铂类化疗适用于表皮生长因子受体（EGFR）基因突变阴性和间变性淋巴瘤激酶（ALK）阴性的转移性非鳞状非小细胞肺癌（NSCLC）的一线治疗。 4.单药用于表皮生长因子受体（EGFR）基因突变阴性和间变性淋巴瘤激酶（ALK）阴性、PD-L1表达≥1%的局部晚期或转移性非小细胞肺癌（NSCLC）一线治疗。 5.联合化疗（卡铂+紫杉醇或白蛋白紫杉醇）一线治疗转移性鳞状非小细胞肺癌（NSCLC）。
3	多泽润	达可替尼	辉瑞	肺癌	限用于表皮生长因子受体（EGFR）19号外显子缺失突变或 21号外显子L858R置换突变的局部晚期或转移性非小细胞肺癌（NSCLC）患者的一线治疗。
4	英飞凡	度伐利尤单抗	阿斯利康	肺癌	限用于在接受铂类药物为基础的化疗同步放疗后未出现疾病进展的不可切除、Ⅲ期非小细胞肺癌(NSCLC)患者的治疗。
5	百泽安	替雷利珠单抗	百济神州	肺癌	限用于联合化疗一线治疗晚期鳞状非小细胞肺癌（NSCLC）。
6	泰圣奇	阿替利珠单抗	罗氏	肝癌	限用于联合贝伐珠单抗治疗既往未接受过全身系统性治疗的不可切除肝细胞癌患者。
7	爱博新	哌柏西利	辉瑞	乳腺癌	限用于激素受体（HR）阳性、人表皮生长因子受体2（HER2）阴性的局部晚期或转移性乳腺癌，应与芳香化酶抑制剂联合使用作为绝经后女性患者的初始内分泌治疗。
8	赫赛莱	恩美曲妥珠单抗	罗氏	乳腺癌	限用于接受了紫杉烷类联合曲妥珠单抗为基础的新辅助治疗后仍残存侵袭性病灶的HER2阳性早期乳腺癌患者的辅助治疗。
9	费蒙格	地加瑞克	辉凌制药	前列腺癌	限用于需要雄激素去势治疗的前列腺癌患者。
10	则乐	尼拉帕利	再鼎医药	卵巢癌	限用于晚期上皮性卵巢癌、输卵管癌或原发性腹膜癌成人患者对一线含铂化疗达到完全缓解或部分缓解后的维持治疗。

Note: This figure provides an example of the list of special medications included in a CCSMI product. The list contains detailed information, including: 1) the number of special medications covered by the CCSMI product; 2) brand name and generic name of each medication; 3) the manufacturer of the medication; and 4) the medication's indications and descriptions of its intended use.

Table A1: p-Values for Correlations of the Introduction of CCSMI with Macro Indices

	Dependent Variable: ***Introduce*** p-values		
	(1)	(2)	(3)
City-level macroeconomic indices	**Prev. 1 year**	**Prev. 2 years**	**Prev. 3 years**
Total premiums of Private Ins.	0.44	0.12	0.29
Population	0.35	0.56	0.69
Birth rate	0.34	0.76	0.97
Death rate	0.66	0.69	0.27
GDP per capita	0.86	0.65	0.76
# Social medical ins. participants	0.58	0.34	0.15
Gov. exp.	0.54	0.61	0.49
Gov. public health exp.	0.59	0.57	0.66
Gov. social security exp.	0.27	0.26	0.66
# Hospitals	0.55	0.83	0.69
# Hospital beds	0.40	0.29	0.26
# Doctors in hospitals	0.84	0.96	0.96
COVID-19-related indices	**Prev. 1 month**	**Prev. 6 months**	**Prev. 12 months**
Newly confirmed cases	0.80	0.95	0.41
New deaths	0.93	0.90	0.37
Newly cured cases	0.98	0.95	0.42

Note: This table reports p-values for correlations of the decision to implement CCSMI with the average levels of macroeconomic indices in the previous one, two, or three years, as well as COVID-19-related indices over the past one, six, or twelve months. The city-level macroeconomic and COVID-19-related indices data are sourced from the *Yearbook of China's Insurance*, *China City Statistical Yearbook* and collected by the authors from *Sina News*, respectively.

Table A2: Effects of CCSMI on Private Insurance Purchases (Population Weight)

	Dependent Variable: ln(Number of **Purchases**)		
	(1)	(2)	(3)
Introduce	**-0.265*** **	**-0.267*** **	**-0.283*** **
	(0.071)	**(0.071)**	**(0.078)**
Wild Bootstrap p-value	*0.001*	*0.001*	*0.001*
PurchasingWindow		0.005	0.028
		(0.047)	(0.057)
FEs: city	Y	Y	Y
FEs: year-month	Y	Y	Y
FEs: city × calendar month	N	N	Y
Mean of Dependent Variable	233.87 (4.32)	233.87 (4.32)	233.87 (4.32)
Observations	1,293	1,293	1,293
R^2	0.925	0.925	0.930

Note: This table reports the DiD results of the variation in purchases of private insurance following the introduction of CCSMI, using the city-month-level panel dataset. All regressions use another size weight, i.e., the population in city *c* and year 2017 (pre-period). Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A3: Effects of CCSMI on Annual Premium of Private Insurance (Different Approaches of Controlling for Coverage Amount)

	Dependent Variable: ln(Premiums)		
	(1)	(2)	(3)
Introduce	**-0.016****	**-0.025*****	**-0.022*****
	(0.008)	**(0.007)**	**(0.007)**
Wild Bootstrap p-value	*0.077*	*0.005*	*0.004*
PurchasingWindow	-0.002	-0.003	-0.005
	(0.013)	(0.013)	(0.011)
Coverage	0.214***		
	(0.009)		
Low Coverage		-0.552***	
		(0.008)	
Median Coverage		-0.113***	
		(0.008)	
Policy Characteristics	Y	Y	Y
FEs: city	Y	Y	Y
FEs: month of year	Y	Y	Y
FEs: city × calendar month	Y	Y	Y
FEs: product	Y	Y	Y
FEs: product × coverage group	N	N	Y
Mean of Dependent Variable	7582.35 (8.82)	7582.35 (8.82)	7582.35 (8.82)
Observations	302,750	302,750	302,750
R^2	0.459	0.484	0.493

Note: This table reports the results of the change in annual premium paid of private insurance following the introduction of CCSMI, using the transaction-level dataset. Column (1) presents the same results as Table 4 column (7). We control for non-linear coverage groups instead of the coverage amount, and account for product-by-coverage group fixed effect in column (2) and (3), respectively. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A4: Effects of CCSMI on Private Insurance Purchases (Nanjing & Foshan Excluded)

	Dependent Variable: ln(Number of **Purchases**)		
	(1)	(2)	(3)
Introduce	**-0.151****	**-0.131****	**-0.142****
	(0.061)	**(0.064)**	**(0.062)**
Wild Bootstrap p-value	*0.018*	*0.046*	*0.024*
PurchasingWindow		-0.064	-0.037
		(0.073)	(0.086)
FEs: city	Y	Y	Y
FEs: year-month	Y	Y	Y
FEs: city × calendar month	N	N	Y
Mean of Dependent Variable	230.49 (4.27)	230.49 (4.27)	230.49 (4.27)
Observations	1,149	1,149	1,149
R^2	0.954	0.954	0.958

Note: This table reports the DiD results of the change in purchases of private insurance following the introduction of CCSMI, using the city-month-level panel dataset. All regressions use the size weight, i.e., the number of private health insurance policies purchased in city *c* and year 2017 (pre-period) from our sample. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A5: Effects of CCSMI on the Coverage Amounts and Annual Premium of Private Insurance (Nanjing & Foshan Excluded)

	Panel A: ln(Coverage)			Panel B: ln(Premiums)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Introduce	**-0.097*** **	**-0.131*** **	**-0.133*** **	**-0.023** **	**-0.049*** **	**-0.046*** **	**-0.018** **
	(0.027)	**(0.024)**	**(0.024)**	**(0.009)**	**(0.009)**	**(0.009)**	**(0.007)**
Wild Bootstrap p-value	*0.005*	*0.001*	*0.001*	*0.046*	*0.001*	*0.001*	*0.050*
PurchasingWindow	-0.006	0.034	0.035	-0.010	0.008	0.006	-0.002
	(0.040)	(0.039)	(0.039)	(0.015)	(0.017)	(0.016)	(0.014)
Coverage							**0.215*** **
							(0.008)
Payment Term		0.018***	0.016***		-0.019***	-0.016***	-0.019***
		(0.001)	(0.001)		(0.0004)	(0.0003)	(0.0002)
Age			-0.008***			0.009***	0.011***
			(0.0005)			(0.0003)	(0.0004)
Gender			0.066***			-0.060***	-0.074***
			(0.005)			(0.002)	(0.002)
HighIncome			0.207***			0.192***	0.148***
			(0.019)			(0.010)	(0.008)
FEs: city	Y	Y	Y	Y	Y	Y	Y
FEs: year-month	Y	Y	Y	Y	Y	Y	Y
FEs: city × calendar month	Y	Y	Y	Y	Y	Y	Y
FEs: Product	N	Y	Y	N	Y	Y	Y
Mean of Dependent	1,114,691	1,114,691	1,114,691	7596.57	7596.57	7596.57	7596.57
Variable	(13.27)	(13.27)	(13.27)	(8.82)	(8.82)	(8.82)	(8.82)
Observations	265,200	265,200	265,200	265,200	265,200	265,200	265,200
R^2	0.171	0.273	0.281	0.058	0.224	0.275	0.460

Note: This table reports the DiD results of the change in coverage amounts and annual premium paid of private insurance following the introduction of CCSMI, using the transaction-level dataset. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A6: Effects of CCSMI on Private Insurance Purchases (Controlling for City-Specific Year Trend)

	Dependent Variable: ln(Number of **Policies**)		
	(1)	(2)	(3)
Introduce	**-0.150*** **	**-0.146*** **	**-0.162*** **
	(0.052)	**(0.054)**	**(0.054)**
Wild Bootstrap p-value	*0.007*	*0.009*	*0.004*
PurchasingWindow		-0.013	0.030
		(0.046)	(0.058)
FEs: city	Y	Y	Y
FEs: year-month	Y	Y	Y
FEs: city × calendar month	N	N	Y
city-specific year trend	Y	Y	Y
Mean of Dependent Variable	233.87 (4.32)	233.87 (4.32)	233.87 (4.32)
Observations	1,293	1,293	1,293
R^2	0.965	0.965	0.970

Note: This table reports the DiD results of the change in purchases of private insurance following the introduction of CCSMI, using the city-month-level panel dataset. All regressions use the size weight, i.e., the number of private health insurance purchased in city *c* and year 2017 (pre-period) from our sample. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A7: Effects of CCSMI on the Coverage Amount and Annual Premium of Private Insurance (Controlling for City-Specific Year Trend)

	Panel A: ln(Coverage)			Panel B: ln(Premiums)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Introduce	**-0.082*** **	**-0.123*** **	**-0.125*** **	**-0.035*** **	**-0.056*** **	**-0.054*** **	**-0.027*** **
	(0.023)	**(0.021)**	**(0.021)**	**(0.009)**	**(0.009)**	**(0.009)**	**(0.006)**
Wild Bootstrap p-value	*0.007*	*0.001*	*0.001*	*0.002*	*0.001*	*0.001*	*0.001*
PurchasingWindow	-0.008	0.034	0.036	-0.004	0.011	0.009	0.001
	(0.038)	(0.039)	(0.039)	(0.013)	(0.015)	(0.014)	(0.008)
Coverage							**0.216*** **
							(0.009)
Payment Term		0.018***	0.016***		-0.019***	-0.016***	-0.020***
		(0.001)	(0.001)		(0.0004)	(0.0003)	(0.0002)
Age			-0.008***			0.009***	0.011***
			(0.0005)			(0.0003)	(0.0004)
Gender			0.065***			-0.060***	-0.074***
			(0.006)			(0.002)	(0.002)
HighIncome			0.210***			0.192***	0.146***
			(0.018)			(0.010)	(0.008)
FEs: city	Y	Y	Y	Y	Y	Y	Y
FEs: year-month	Y	Y	Y	Y	Y	Y	Y
FEs: city × calendar month	Y	Y	Y	Y	Y	Y	Y
FEs: Product	N	Y	Y	N	Y	Y	Y
city-specific year trend	Y	Y	Y	Y	Y	Y	Y
Mean of Dependent	1,109,968	1,109,968	1,109,968	7582.35	7582.35	7582.35	7582.35
Variable	(13.27)	(13.27)	(13.27)	(8.82)	(8.82)	(8.82)	(8.82)
Observations	302,750	302,750	302,750	302,750	302,750	302,750	302,750
R^2	0.176	0.279	0.286	0.059	0.225	0.276	0.462

Note: This table reports the results of the change in coverage amount and annual premium paid of private insurance following the introduction of CCSMI, using the transaction-level dataset. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).

Table A8: Effects of CCSMI on Total Premiums of Private Insurance at City-by-Month Level

	Dependent Variable: ln(Premiums)		
	(1)	(2)	(3)
Introduce	**-0.171*** **	**-0.150** **	**-0.161*** **
	(0.058)	**(0.060)**	**(0.060)**
Wild Bootstrap p-value	*0.003*	*0.015*	*0.008*
PurchasingWindow		-0.068	-0.044
		(0.064)	(0.079)
FEs: city	Y	Y	Y
FEs: year-month	Y	Y	Y
FEs: city × calendar month	N	N	Y
Mean of Dependent Variable	1,772,009 (13.16)	1,772,009 (13.16)	1,772,009 (13.16)
Observations	1,293	1,293	1,293
R^2	0.955	0.955	0.959

Note: This table reports the DiD results of the variation in total premiums of private insurance following the introduction of CCSMI, using the city-month-level panel dataset. All regressions use the size weight, i.e., the number of private health insurance purchased in city *c* and year 2017 (pre-period) from our sample. Standard errors, clustered at the city level, are given in parentheses beneath each estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level. Since there are few cluster groups in the data, we also report wild bootstrap p-values for the key variable which correct for the few-clusters problem (Cameron and Miller, 2015; Roodman *et al.*, 2019).