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Social health insurance consolidation and urban-rural inequality in utilization and financial risk protection in China

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ABSTRACT

Universal health care is a long-term policy goal for health care reform in China. In 2016, China consolidated its urban and rural resident social health insurance programs into one program with a goal to reduce disparities between rural and urban populations. Using a nationally-representative sample of 14,967 individuals from the China Family Panel Studies surveys (2012–2018), we investigate whether the consolidation reduced gaps in total and out-of-pocket medical expenditure, and reimbursement between rural and urban residents. Our identification approach relies on an augmented difference-in-differences analysis whereby we compare the two programs that were consolidated to a different program that was not consolidated, before and after the consolidation. We find no evidence that the urban-rural gaps in these measures have narrowed as a result of the consolidation, at least in the near term. This surprising result may be partly explained by urban-rural inequality in access to care and provincial fiscal spending on health care. While these findings need to be confirmed with additional data and research, we call for continued efforts on addressing supply-side challenges, particularly in under-served areas.

1. Introduction

Rising inequality—in all spheres of life, including income, education, and health—is one of the most pressing development challenges China faces today. The Gini coefficient, a measure of income inequality, has risen by 15 points since 1990 and currently stands at 50, eclipsing the rapid progress the country has made in overall poverty alleviation (Jain-Chandra et al., 2018). Inequality in health care—the topic of this paper—dates back to the 1980s when China liberalized its market and dissolved its existing social health care system. Those reforms saw the emergence of private hospitals and pharmacies, followed by a rise in medical costs and a reduction in access to care for the poor and the rural, which led to the inequality we see today.

Prior to 2016, China's social health insurance system consisted of three main programs: The New Cooperative Medical Scheme (NCMS), the Urban Resident Basic Medical Insurance (URBMI), and Urban Employee Basic Medical Insurance (UEBMI). NCMS covered the rural population (hereafter, rural resident), UEBMI covered the employed urban population (hereafter, urban employee), and URBMI covered the rest of urban population (hereafter, urban resident). In an effort to reduce the persistent inequality in health care, in 2016, China consolidated NCMS and URBMI, the two programs that catered separately to rural and urban populations. Using data from the China Family Panel Studies (CFPS), we investigate if the consolidation had the intended effect of reducing urban-rural inequalities in medical expenditure, reimbursement, and out-of-pocket costs. In order to obtain the causal effects of the consolidation, we use an augmented difference-in-differences model whereby we compare the two programs that were consolidated to the program that was not consolidated, before and after the consolidation.

To preview the results, we find no evidence that the urban-rural gaps in total medical expenditure, reimbursement, or out-of-pocket costs narrowed as a result of the consolidation, at least in the near term. We rule out a number of methodological concerns, including selection due to migration, as potential reasons for this finding and present descriptive data which suggest that the failure to reduce the gap may be due to differences in access to care for urban and rural populations and differences in provincial fiscal spending on health care. This, in turn, suggests that, for China to meets its universal health care aspirations, continued efforts on addressing supply-side challenges, primarily the availability of clinics, hospitals and medical care professionals in rural areas, are needed.

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Our study contributes primarily to the emerging literature on health care reforms in low- and middle-income countries (LMICs), in particular the consolidation of multiple social protection programs. In China, a number of studies have documented inequality in health care utilization and health outcomes among enrollees in various insurance programs, both before and after the 2016 consolidation (Ma et al., 2017; Wang et al., 2019; Yang et al., 2018). However, these studies have a number of limitations, which we address. The primary limitation of prior studies is that, given their cross-sectional nature, the estimates they provide are not causal. For example, Yang et al. (2018) compared the extent of inequality in reimbursement within NCMS, URBMI, and the consolidated program, and found that inequality in reimbursement was the lowest within the consolidated program. However, the study compared inequality within the population of each scheme and did not examine inequality *between* the programs. Likewise, Wang et al. (2019) compared the inequality indexes of populations under NCMS and the pilot consolidated program in 2015. They found that, among individuals with similar medical needs, the rich used more outpatient care than the poor in both programs, but the inequality in outpatient care utilization between the rich and the poor was greater in the consolidated program. In contrast, in both programs, the poor utilized more inpatient care than the rich (Wang et al., 2019).

A number of studies have documented the *causal* effect of the consolidation on outcomes other than inequality (Huang and Wu, 2020; Q. Zhou et al., 2022). For example, Huang and Wu (2020) examined the impact on rural residents' health care utilization and health outcomes. They found that the use of inpatient care increased for mid-age and older rural residents after the consolidation. Similarly, Q. Zhou et al. (2022) found a significant improvement in health care utilization, financial protection, and health status among rural residents after the consolidation.

Among the studies that have examined inequality, G. Zhou et al. (2022) examined inequality in health care financing between UEBMI and the consolidated program after the consolidation. They found that financing in the consolidated program was regressive and regressivity was more serious in rural areas than urban areas, while financing in UEBMI was not regressive (G. Zhou et al., 2022). Another study focused on rural elderly population and concluded that inequality in health outcomes worsened among them after the consolidation (Fan et al., 2021).

A small but emerging number of studies have estimated the causal effects of the consolidation on measures of urban-rural inequality, as we do in this study. Notably, Li et al. (2019) compared the number of visits to the provider made by individuals in NCMS and URBMI schemes before and after consolidation in provinces where the consolidation was piloted by December 2015. They found that, compared to pre-consolidation, rural residents had a larger increase in the number of health care visits after the consolidation than urban residents, suggesting a narrowing of the urban-rural gap. However, the study did not evaluate outcomes on financial protection, and the use of select pilot provinces limits the findings' generalizability. The authors have also acknowledged that their estimate of the extent of the narrowing may be biased upward.

We address the limitations of the previous studies by generating causal estimates of the effect of the consolidation using nationally representative, longitudinal data. Our measures include those pertaining to utilization (medical expenditure) as well as financial risk protection (reimbursement and out-of-pocket payments). In subsidiary analysis, we also examine additional measures of utilization, namely visits to the doctor and the use of high-cost facilities for care. Finally, we examine heterogenous effects by the level of provincial financing to shed light on potential mechanisms underlying our findings.

While our primary goal is to draw policy lessons for China, the study also offers insights to other countries considering the consolidation of their fragmented insurance or social protection programs as a move toward achieving universal health care. In fact, inequality in health outcomes is a pressing challenge in many LMICs (Gwatkin, 2000; World Health Organization, 1996). One of the reasons for this inequality is fragmented health care financing—even among the public insurance programs—resulting in differential financial protection for the poor and the rich (Atun et al., 2015). In a number of LMICs, citizens are covered by different public health care programs based on their geographies (urban/rural) or employment status. For example, Colombia has two main health insurance regimes: one intended for salaried worker and a less generous subsidized scheme for population outside of the formal sector (Montenegro Torres and Bernal Acevedo, 2013). Before 2001, Dominican Republic had a similar system three-tiered system based on income (Rathe, 2010). In efforts to reduce health inequality and ensure universal health care, many LMICs have formulated reforms to consolidate different public health care programs into fewer unified programs or to harmonize them with the same standards of benefits (Cotlear et al., 2015). However, there is limited empirical evidence on the possible effects of these reforms.

The rest of the paper is organized in the following manner. In section 2, we provide a brief overview of the insurance programs in China, followed by a discussion of the data and the empirical strategy in section 3. We discuss the key findings in section 4. We conclude in section 5 with a discussion of the study's limitations and policy implications, and areas for further research.

2. A brief overview of the social Insurance programs and the 2016 consolidation

Several previous studies provide succinct summaries of the Chinese health care system and its insurance programs (Fang, 2020; Hougaard et al., 2011; Yip and Hsiao, 2008). In this section, we highlight aspects of the system and programs that help contextualize our empirical strategy and the findings.

Before the consolidation of NCMS and URBMI in 2016, there were significant differences between the three programs in terms of the coverage (both medical services and drugs), reimbursement rates, and deductibles, even within the same province (Hougaard et al., 2011). Because social health insurance is organized at municipal or even county level, we are not able to exhaustively list benefit changes for all jurisdictions in China. However, Shanghai provides a good illustration. Coinsurance for inpatient expenditure in a tier 3 hospital was 50% for NCMS enrollees before the consolidation, in contrast to 45% for URBMI enrollees under the age of 60, and 35% for URBMI enrollees aged 60 or older (Shanghai Municipal Government, 2014; 2012). While the social health insurance programs were intended to cover all citizens, the inequality by policy design—particularly between the rural and the urban programs—made it hardly a system with true universal health coverage.

Reducing urban-rural health care inequality has been a long-term policy goal in China. Government documents from the State Council, such as the *Twelfth Five-Year Plan for Health Sector Development* (State Council, 2012), explicitly state reducing urban-rural health care gap as its policy goal. Toward this goal, another report, *State Council Advisory on Consolidating Urban, Rural Resident Basic Medical Insurance* (2016), provides detailed information on the merging of NCMS and URBMI into Urban-Rural Resident Basic Medical Insurance (URRBMI). The goal of the consolidation was to "gradually reducing urban-rural gap, geographic difference, ensuring equitable benefits for urban and rural residents" (State Council, 2016). Indeed, URRBMI, created by the consolidation, provides the same benefits for urban and rural residents. For instance, in Shanghai, URRBMI enrollees under 60 years of age are expected to pay 40% coinsurance for inpatient expenditure in a tier 3 hospital after the consolidation, compared to 45% for urban resident and 50% for rural resident before the consolidation (Shanghai Municipal Government, 2015). After the consolidation, all local governments are required to follow the policy advisory from the State Council to ensure that the benefit package of URRBMI is no worse than that of URBMI and

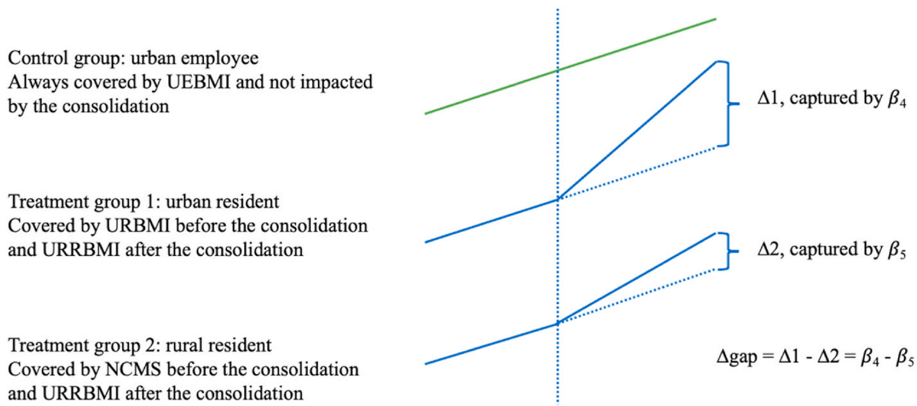

Fig. 1. Empirical Approach. This figure explains our identification strategy. The first DD estimator, **Δ1**, captures the change in the gap between urban employee (control group) and urban resident (treatment group 1), which reflects the impact of the 2016 consolidation on urban resident population. The second DD estimator, **Δ2**, captures the change in the gap between urban employee and rural resident (treatment group 2), which reflects the impact on rural resident population. Therefore, **Δ1-Δ2** captures the differential impact of the consolidation on urban resident and rural resident relative to the urban employee, which can also be interpreted as the change in the urban-rural gap.

NCMS so that no one is worse off due to the consolidation (National Health Commission, 2016). The consolidation policy only affected the social insurance programs and was not intended to address supply-side issues, including financing of medical institutions.

If the policy goal of the consolidation was met, we expect to see a reduction in the difference between urban and rural residents (which we refer to as the urban-rural gap in the rest of the paper) in terms of their expenditure, reimbursement, and out-of-pocket costs after the consolidation of the two programs. For our empirical strategy, it is important to understand that the consolidation only affected individuals who were previously covered by either NCMS or URBMI, while those covered by UEBMI were not affected, at least in terms of coverage and benefits and except potentially through the general equilibrium effects.

3. Data and empirical strategy

We use publicly available data from the China Family Panel Studies (CFPS) (Institute of Social Science Survey, 2019). CFPS is a nationally representative and longitudinal survey that collects information on health, socio-economic factors, and demographic characteristics of the Chinese population (Xie and Hu, 2014). CFPS has surveyed the same set of households and their derivatives biannually since 2010, and collected information on health care expenditures, insurance status, income, and many other potential determinants of health every two years. The dataset is publicly available and can be downloaded free of charge from the Peking University's website (https://opendata.pku.edu.cn/). The survey was approved by Biomedical Ethics Committee at Peking University (approval number: IRB00001052-14010). A separate approval not required for this study because we used publicly-available, de-identified data.

For our main analysis, we utilize a sample of 14,967 individuals for whom data on insurance type was available in both 2014 (pre-consolidation) and 2018 (post-consolidation). We do not use the 2016 data in the main analysis for the following reason. China has 34 provincial administrative units, 333 prefecture-level administrative units, and 2847 county-level administrative units. Like any major reform in China, the implementation of the consolidation varied across provinces and even across the smaller geographic units (i.e., prefectures and counties) within these provinces (Beijing Municipal Government, 2017; Shanghai Municipal Government, 2015; Wuxuan County Government, 2017; Xincheng County Government, 2016). The State Council, China's central authority, announced the consolidation in January 2016 (State Council, 2016). However, the consolidation had already been piloted in some provinces by December 2015 (Li et al., 2019), while it was not completed by the date of the 2016 CFPS (July to November 2016) nationwide. The precise timing of when consolidation became effective in China's 2847 counties is not centrally available. Moreover, the CFPS data only provide randomly-generated unique identifiers for counties and not their names; therefore, mapping CFPS data to the date of implementation is not possible even if the date of implementation for each county was known. This limitation also precludes the use of a staggered difference-in-differences as a source of identification.[1] However, we do know that the consolidation took place between 2014 and 2018. Therefore, a comparison between 2014 and 2018 captures the overall effect of the consolidation. We utilize a subset of the 2012 data in our robustness check but are unable to include them in the main analysis as most of the outcome variables were not available in the 2012 survey.

Appendix Table 1 shows how we derived the analytic sample. Briefly, we limit our main analysis to individuals ages 18 and above who were enrolled in one of the three insurance programs in 2014 but were also surveyed in 2018. Note that attrition between 2014 and 2018 differed across insurance types. Specifically, information on individuals with URBMI in 2014 was more likely to be missing in subsequent years than individuals with other insurance types, likely because of the higher mobility of the urban population. About 63% of NCMS individuals in 2014 continued to participate in the 2018 survey, compared to 58% of URBMI individuals. In the discussion, we revisit the issue of potential bias of our estimates from this differential attrition.

The descriptive statistics for the full sample of individuals (unbalanced panel), broken down by year, are in Appendix Table 2. Between 2014 and 2018, total medical expenditure increased by 983 yuan (=3509–2526), on average, for all public health insurance enrollees. During the same period, out-of-pocket payments also increased by 636 yuan (=2224–1588), on average, for all enrollees. Individuals seem to have higher medical utilization in 2018 than in 2014, leading to both higher reimbursements and higher out-of-pocket payment.

In 2018, individuals in the analytic sample have a median income of Chinese Yuan (CNY) 60,900 (approximately, 8700 in United States dollars) (Table 1). Forty eight percent are women, and the average age is 51.60 years. Note that, as UEBMI only covers employed individuals, we have limited our sample to individuals ages 18 and above. Eighty eight percent are currently married and have about seven years of schooling on average. On a scale of one to five with five being the best health condition, about 41% of individuals rate their health at three and another 25% of individuals rate their health above three. Approximately 15% of individuals have been hospitalized in the 12 months preceding the survey and about one fifth have a doctor-diagnosed chronic disease during the 6 months preceding the survey. Thirty one percent of individuals have a history of smoking, and the smokers consume an average of five sticks of cigarettes per day. Approximately 16 percent drank more than three times a week in the month preceding the survey. In terms of the outcomes, the average annual out-of-pocket medical

[1] We would like to thank one of the reviewers for suggesting this as a possibility. Note that using staggered difference-in-differences at the province level is problematic because there could be substantial variation in implementation date between prefectures and counties within a province.

expenditure is 2334 yuan and the average annual total medical expenditure is 3740 yuan. The average reimbursement on health care expenses is 1379 yuan.

Fig. 1 illustrates the intuition behind our empirical approach. As mentioned previously, our identification strategy relies on the fact that the consolidation only affected individuals who were previously covered by either NCMS or URBMI. Those previously (and currently) covered by UEBMI are considered to be the untreated group. In order to estimate the effect of the consolidation on urban-rural gaps, we estimate coefficients in a regression of the following form:

$$Y_{it} = \beta_0+\beta_1 Urbanresident_i+\beta_2 Ruralresident_i+\beta_3 Post_t+\beta_4 (Urbanresident*Post)_{it}+\beta_5 (Ruralresident*Post)_{it}+ \delta X_{it} + \sigma + \mu_{it}. \quad (1)$$

In equation (1), Y_{it} is the outcome (discussed below) for individual i measured in year t. The variables Urbanresident and Ruralresident are binary such that Urbanresident = 1 if the individual was covered through URBMI in 2014 and through the consolidated program in 2018 (and 0 otherwise) and Ruralresident = 1 if the individual was covered through NCMS in 2014 and through the consolidated program in 2018 (and 0 otherwise). Individuals covered through UEBMI—the unaffected insurance category—in 2014 and 2018 are the excluded group. Post = 1 for 2018 and 0 for 2014. β_1 captures the difference in the outcome between URBMI and UEBMI, while and β_2 captures the difference in the outcome between NCMS and UEBMI. β_3 captures the simple pre-post change in the outcome. β_4 and β_5 are the two difference-in-differences estimators. β_4 captures the impact of 2016 consolidation on those with URBMI and β_5 captures the impact on those with NCMS, both relative to those with UEBMI. The difference between β_4 and β_5 reflects the effect of the consolidation on the difference between NCMS and URBMI. If the consolidation reduced the urban-rural gap, we expect $\beta_4 - \beta_5$ to be negative.

Following the World Bank's guidelines on health equity analysis, we examine the effect of the consolidation on three outcomes: total annual medical cost, total annual medical reimbursement, and total annual out-of-pocket costs (O'Donnell et al., 2007). These outcomes are commonly used in the health inequity literature (X. Liu et al., 2016; Yip and Hsiao, 2009). The total annual medical cost measures the medical expenditure gap, which in turn reflects the gap in health care utilization. Total annual medical reimbursement and total annual out-of-pocket costs are measures of financial protection.

To obtain estimates of total medical expenditure and out-of-pocket costs, the survey asks the following two questions:

- "How much was the total cost of disease/injury in the past year, include total cost that was reimbursed or will be reimbursed?", and
- "Excluding the amount that was reimbursed or will be reimbursed, how much of the total medical expenditure did your family pay for the cost of medical treatment in the past year?"

We obtain the amount of reimbursement by subtracting out-of-pocket payments from the total medical expenditure.

In equation (1), X_{it} includes demographic and health covariates. We include demographic and health-related variables to account for differences in health care utilization and reimbursement due to these factors (X. Liu et al., 2016; Xie, 2011). The demographic variables include gender, age, marital status, years of education, and household income. Health-related variables include whether the individual was hospitalized in the past 6 months, self-rated health status, whether the individual smokes, whether the individual has a history of smoking, whether the individual drinks alcohol, and whether the individual has a chronic condition. We also include county fixed effects (σ) to account for time-invariant factors specific to a county that may lead to differences in outcomes. For example, county/municipal governments have the latitude to customize each public health care insurance scheme, which might affect some of the outcomes we evaluate. We cluster the standard errors at the county level, thus allowing observations within a county to be correlated with each other. μ_{it} is the usual error term.

About 30% of observations in the full sample have zero total medical expenditure which may bias the estimates if ordinary least squares (OLS) is used. Therefore, when evaluating total medical expenditure, we use a two-part model to account for clustering of values at zero (Belotti et al., 2015; Deb et al., 2017). Both parts of the two-part model take the general form shown in equation (1). In the first part, we use logit regression to differentiate between individuals who incurred a medical expenditure and those who did not. In the second part, conditional on incurring a medical expenditure, we use OLS to estimate the relation between the logarithm of total medical expenditure and consolidation. We choose logarithm because of the extreme values in total medical expenditure.

Similarly, we use the two-part model for total reimbursement, as this variable also has clustering at zero (approximately 50% of the individuals with positive medical expenditure received zero reimbursement). When estimating equation (1) with out-of-pocket costs as the outcome, however, we exclude individuals with no medical expenditure, and use OLS. Conditional on incurring a medical expenditure, the out-of-pocket costs are not clustered at zero; in fact, there is no individual in the data for whom out-of-pocket costs conditional on incurring a medical expenditure are zero. Moreover, the issue of financial risk protection is not relevant for individuals who incur no medical expenditures.

One of the key assumptions we need to interpret the difference between β_4 and β_5 as the causal effect of the consolidation on the urban-rural inequality is that the difference in the outcomes between NCMS and URBMI would have stayed the same in absence of the consolidation. In order to check this assumption, we compare the trend before the consolidation (i.e., between 2012 and 2014). Given differences in the definition of the outcome variables over time, we are able to conduct this analysis only for total medical expenditure. Our inability to check the assumption for all outcomes and using a longer period of data is a major limitation of the study to which we return in the conclusion section.

One key feature of our augmented difference-in-differences model is that we compare two treatment groups and use a third control group as reference. Hence, an advantage of our model over traditional Difference-in-Differences model is that both β_4 and β_5 can be statistically different from zero before the treatment as long as β_4 - β_5 is not statistically different from zero (Muralidharan and Prakash, 2017). In other words, we only need a parallel trend between the two treatment groups before the treatment (two blue lines in Fig. 1). The parallel trend between treatment group and control group is not necessary for the validity of our augmented difference-in-differences model (i.e., before the treatment, the blue lines in Fig. 1 do not have to be parallel with the green line as long as two blue lines are parallel with each other). Nonetheless, we also provide results of a parallel trend test between NCMS and UEBMI and between URBMI and UEBMI.

Table 1
Descriptive statistics by insurance Type (2018)

Characteristics	Rural Resident	Urban Resident	Urban Employee	All
Household income, 1000 CNY	72.35 (50.00)	150.02 (97.20)	151.02 (110.00)	91.46 (60.9)
Gender (male)	47.5%	43.9%	54.3%	48.2%
Age, years	51.71 (14.11)	53.49 (14.46)	49.95 (15.19)	51.60 (14.34)
Marital status				
Unmarried	4.6%	5.1%	8.8%	5.3%
Married	88.4%	85.7%	84.8%	87.6%
Cohabit	0.3%	0.4%	0.3%	0.3%
Divorced	1.1%	2.9%	2.3%	1.4%
Widowed	5.6%	5.9%	3.8%	5.4%
Years of education	6.16 (4.40)	9.00 (4.55)	11.70 (3.78)	7.27 (4.79)
Self-rated health				
1 (Worst)	20.9%	17.8%	11.3%	19.1%
2	14.3%	18.4%	14.7%	14.7%
3	38.5%	44.5%	52.4%	41.2%
4	13.2%	13.4%	13.2%	13.2%
5 (Best)	13.2%	5.9%	8.4%	11.8%
Hospitalized in past 12 months	15.4%	14.5%	12.7%	14.9%
Alcohol (drank more than 3 times a week in the past month)	16.7%	14.4%	14.9%	16.2%
Number of cigarettes smoked per day	4.77 (9.10)	3.99 (8.44)	4.10 (8.16)	4.60 (8.91)
Had a history of smoking	31.5%	27.4%	30.1%	30.9%
Diagnosed with a chronic condition in the past 6 months	19.3%	23.0%	20.3%	19.8%
Total medical expenditure (CNY)	3368.21 (12641.45)	5783.99 (23199.72)	4362.08 (14245.16)	3740.47 (14191.82)
Reimbursement for medical expenses (CNY)	1031.35 (5333.87)	2974.29 (18357.74)	2215.07 (9844.47)	1378.90 (8148.82)
Out-of-pocket medical expenses (CNY)	2289.99 (8641.10)	2759.59 (9074.09)	2304.92 (6635.08)	2333.98 (8416.55)
N	11,314	1365	2288	14,967

Notes: 1 USD = 7 CNY. This table shows the characteristics in 2018 for individuals in the balanced panel, by the type of insurance the individual had before the consolidation of the urban resident and rural resident insurance programs in 2016. Standard deviation is reported in brackets except for household income. For household income, median is reported in brackets. For an individual, the sum of reimbursement and out-of-pocket costs is equal to the total medical expenditure.

4. Results

(a) Main findings

In Table 2, we report results from estimating the coefficients in equation (1) for the three outcomes. For regressions using a two-part model, Table 2 reports the overall marginal effects—i.e., predicted from both parts. Full set of results from the two-part model, broken down by part, are in Appendix Table 3. Table 2 shows that the 2016 consolidation did not reduce the urban-rural gap in any of the indicators we evaluate (see row corresponding to β_4 - β_5 and the associated p-values). In fact, β_4 - β_5 is positive for all outcomes—suggesting that, at least in the immediate term, urban-rural gap might have *widened* because of the consolidation. However, the difference is not statistically significant at conventional levels for us to ascertain the widening of the gap.

The main results reported in Table 2 do not change significantly when we conduct the analysis on the sample without individuals who switched insurance type, or changed hukou status or hukou location (Appendix Table 4).[2] We revisit these results in the discussion section.

Table 2
Coefficients from the regression of urban-rural medical gap measures on insurance types.

	Total medical expenditure (TPM)	Reimbursement (TPM)	Out-of-pocket (OLS)
Urban resident insurance (β_1)	−423.388* (207.581)	−503.136** (194.491)	59.759 (421.665)
Rural resident insurance (β_2)	−647.297*** (158.522)	−1133.261*** (149.324)	186.870 (318.595)
Post (β_3)	1528.118*** (176.120)	533.247*** (154.105)	1035.408** (354.779)
Urban resident insurance × post (β_4)	−130.252 (280.387)	331.714 (260.354)	292.502 (574.363)
Rural resident insurance × post (β_5)	−529.770** (187.514)	−65.509 (168.454)	−384.102 (381.223)
N	14,967	7903	8002
Derived from the estimates above:			
$\beta_4 - \beta_5$	399.518	397.223	676.604
p-value	0.088	0.077	0.154

Notes: $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. TPM stands for two-part model. Total medical expenditure, reimbursement, and out-of-pocket are all measured in CNY. 1 USD = 7 CNY. This table shows the coefficients and standard errors from estimating equation (1), separately for each outcome. Columns 1 and 2 report margins from the two-part model and column 3 reports OLS results. Column 1 is for the entire analytic sample, while columns 2 and 3 are for the subsample with a positive total medical expenditure. All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. The p-values in the final row are from a student-t test of $\beta 4 - \beta 5 = 0$. Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018. Sample size in column 1 is higher than in other columns because the two-part model utilizes observations with no medical expenditure. Sample size in column 2 is slightly smaller than in column 3 because some counties are dropped in the first part of the two-part model.

(b) Mechanisms

The finding that the urban-rural gap did not narrow may be surprising and calls for additional exploration. While it is difficult to ascertain the factors behind this effect, in this sub-section, we rule out a few methodological possibilities and present suggestive evidence on other possible mechanisms. The parallel trend test suggests that this surprising result is unlikely to be due to the differences in the trend before the consolidation. Results from estimating equation (1) on the 2012 and 2014 sample for total medical expenditure—the only outcome for which we have the 2012 data—are in Appendix Table 5. The results show that the gap in total medical expenditure between urban residents and rural residents (both relative to the urban employees) *narrowed* by approximately 78 yuan between 2012 and 2014, although the change is statistically insignificant. Admittedly, passing the parallel trend test does not necessarily guarantee that the future trends would be similar in absence of consolidation (Kahn-Lang and Lang, 2020). However, these tests raise our confidence in the validity and robustness of our conclusion; in this case, our estimates are likely to be conservative if the parallel trend assumption fails. Results from testing the parallel trend in the total medical expenditure before the consolidation separately between NCMS and UEBMI and between URBMI and UEBMI are in Appendix Tables 6A and 6B. Here, too, we see no evidence of the violation of the

[2] Hukou is similar to household registration but difficult and expensive to change. Hukou is associated with the type of social insurance program one is entitled to. However, one is unlikely to change hukou for better social insurance because of the difficulty and cost involved in changing hukou.

Table 3
Coefficients from the regression of medical utilization pattern on insurance types.

	See Doctor when Feeling Discomfort	Usually Visit High-cost Facility
Urban resident insurance (β_1)	−0.031 (0.037)	−0.137** (0.044)
Rural resident insurance (β_2)	0.021 (0.028)	−0.292*** (0.033)
Post (β_3)	0.077** (0.030)	0.029 (0.036)
Urban resident insurance × post (β_4)	−0.001 (0.049)	0.028 (0.058)
Rural resident insurance × post (β_5)	−0.064* (0.032)	0.021 (0.038)
N	2518	2507
Derived from the estimates above:		
$\beta_4 - \beta_5$	0.063	0.007
p-value	0.117	0.877

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. This table shows the coefficients and standard errors from estimating equation (1), separately for each outcome. All regressions control for demographic and health-related variables (see text). Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018. The p-values in the final row are from a student-t test of β4 – β5 = 0. The outcome in column (1) is based on a follow-up question for those who answer "yes" to "During the past two weeks, have you felt any physical discomfort". The outcome in column (2) is based on the question "Where would you usually go to see a doctor." We categorize general hospital and specialty hospital as high-cost facilities, and community health care center/township hospital, community health care post/village clinic, and clinic as low-cost facilities.

parallel trend assumption.

A second potential explanation—and a threat to identification—is that individuals may have changed their insurance type between 2014 and 2018. Descriptively, less than 1% of the sample changed insurance type or hukou. To ascertain our findings, we estimate equation (1) on the sub-sample of individuals who did not switch insurance type or change hukou status/location. The results are similar to our main analysis (Appendix Table 4). The only exception is reimbursement which becomes statistically significant. The positive result for reimbursement shows the urban-rural gap in reimbursement *widened* after the consolidation, which again suggests that our main results are conservative.

Moving beyond methodological issues, one hypothesis behind the surprising result is that health care utilization changed differentially as a result of the consolidation. Specifically, since the benefits for both rural and urban residents are now better than before consolidation, individuals previously in both of the consolidated programs may have utilized more care but the increase was higher for those previously in the urban program. To test this formally, we use 'whether an individual visited a doctor in the past two weeks' as the outcome and estimate a regression similar to equation (1). We conduct this analysis on the sample of individuals who reported that they were sick in the past two weeks.[3] The results from this analysis are in Table 3 (column 1). For the same level of illness, all social health insurance enrollees are more likely to visit a doctor after the consolidation of the insurance programs (by 7.7 percentage points) than before. However, consolidation did not differentially affect the probability of visiting a doctor. Based on this result, it seems unlikely that the failure to reduce the urban-rural gap is due to urban residents' increased propensity to visit a doctor in response to the consolidation.

Another possible explanation is the difference in *access* to care for urban and rural residents. Medical resources, such as public hospitals, are unevenly distributed in China (Ding et al., 2018; Yan et al., 2017). Rural areas generally have fewer medical institutions than urban areas.

[3] The survey asks: "During the past two weeks, have you felt any physical discomfort?"

Table 4A
Heterogenous Effects on Total Medical Expenditure, by Provincial Fiscal Spending

	Q1 (lowest fiscal spending)	Q2	Q3	Q4 (highest fiscal spending)
Urban resident insurance (β_1)	−542.757 (314.928)	−316.524 (416.985)	−449.399 (555.265)	−290.143 (511.117)
Rural resident insurance (β_2)	−681.943** (234.318)	−376.517 (316.513)	−581.307 (411.933)	−1042.706* (431.135)
Post (β_3)	1453.604*** (249.982)	1617.689*** (388.308)	775.072 (486.382)	1865.520*** (440.645)
Urban resident insurance × post (β_4)	99.013 (426.716)	−661.070 (573.137)	546.186 (767.941)	−283.106 (670.765)
Rural resident insurance × post (β_5)	−418.458 (267.521)	−774.135 (400.110)	−71.075 (509.079)	−661.618 (483.357)
N	6261	3423	2142	3009
Derived from the estimates above:				
$\beta_4 - \beta_5$	517.471	113.065	617.261	378.512
p-value	0.160	0.804	0.322	0.499

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. Total medical expenditure is measured in CNY. 1 USD = 7 CNY. This table shows the coefficients and standard errors from estimating equation (1) by province group. We group provinces into 4 quartiles based on per capita fiscal spending on health care. Column 1 is for the lowest quartile and column 4 is for the highest. All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. The p-values in the final row are from a student-t test of β4 – β5 = 0. Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018.

Moreover, advanced medical facilities are more likely to be located in metropolises, such as province capitals. Therefore, urban residents may have a higher increase in high-cost facility utilization than rural residents as a result of the consolidation. To test this hypothesis, we again estimate a regression similar to equation (1) with the type of health facility usually visited as the dependent variable (binary; = 1 if high-cost facility, 0 otherwise). The results are reported in Table 3 (column 2). Both urban and rural residents are less likely to visit high-cost medical facilities compared to urban employees (by 13.7 and 29.2 percentage points, respectively). However, consolidation did not differentially affect the probability of visiting a high-cost facility.

Our last hypothesis relates to heterogenous effects across provinces. Urban-rural gap might have widened in some provinces, offsetting the reduction in other provinces. To assess the heterogeneity in the effects across provinces, we stratify the analytic sample into four quartiles based on the provinces' fiscal spending on health care and estimate equation (1) separately for each quartile. For total medical expenditure (Table 4A), we do not see any pattern in the change in the urban-rural gap across the quartiles. However, in the highest spending quartile, the urban-rural gap in reimbursement significantly *increased* by 936 yuan, more than twice the amount in the full national sample (Table 4B). In the second lowest quartile, the urban-rural gap in reimbursement decreased, as expected, although not by a statistically significant amount. These results suggest heterogeneity in effects across provinces as a potential reason for the lack of reduction in urban-rural gap, but the findings are far from conclusive.

5. Discussion and conclusion

We find no evidence of a reduction in urban-rural disparities in health care utilization or financial protection as a result of social

Table 4B
Heterogenous Effects on Reimbursement, by Provincial Fiscal Spending

	Q1 (lowest fiscal spending)	Q2	Q3	Q4 (highest fiscal spending)
Urban resident insurance (β_1)	−1089.745** (376.239)	75.828 (376.961)	−757.502 (554.881)	−421.789 (386.757)
Rural resident insurance (β_2)	−1089.262*** (247.589)	−1005.437*** (273.013)	−1605.750*** (424.812)	−1054.139** (348.563)
Post (β_3)	580.570* (236.844)	317.351 (333.342)	−224.505 (463.530)	1016.686** (332.328)
Urban resident insurance × post (β_4)	255.053 (509.045)	19.315 (525.008)	1341.668 (775.535)	256.921 (503.879)
Rural resident insurance × post (β_5)	−86.401 (258.281)	177.075 (351.399)	668.450 (484.544)	−679.496 (386.503)
N	2959	1801	1245	1859
Derived from the estimates above:				
$\beta_4 - \beta_5$	341.454	−157.760	673.218	936.417
p-value	0.468	0.709	0.296	0.035

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. Reimbursement is measured in CNY. 1 USD = 7 CNY. This table shows the coefficients and standard errors from estimating equation (1) by province group. We group provinces into 4 quartiles based on per capita fiscal spending on health care. Columns 1 is for the lowest quartile and column 4 is for the highest. All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. The p-values in the final row are from a student-t test of β4 – β5 = 0. Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018.

insurance program consolidation in China in 2016, at least in the first two years of consolidation. We do not see the urban-rural gap narrowing in any of the three outcomes we evaluate. The results do not seem to be due to differential trends in the gaps before the consolidation of the two programs, at least for one of the outcomes for which we were able to assess the trends, or because of individuals switching programs or hukou status.

Given the lack of prior empirical evidence on consolidation in other countries, it is not possible to compare our findings with other studies without significant caveats. However, the limited evidence suggests that it is possible for policy efforts such as the consolidation to not reduce inequality. For example, evidence from British National Health Service (NHS), such as the famous “Black Report”, suggests that health inequality can deteriorate under a unified health care system (Macintyre, 1997). In China, Li et al. (2019) have found that the urban-rural gap in the number of health care visits narrowed after the 2016 consolidation, which seems contradictory to our results. The contradictory results may be due to different samples and methods used. This is an area for further research. Except for these studies, we are not aware of other evaluations to which our findings can be compared directly, although Turkey and a few Latin American countries, such as Brazil and Peru, have a similar history of consolidating disparate public health programs into a more unified system (Atun et al., 2013; Cotlear et al., 2015).

Our findings should be understood in light of a number of caveats. First, other policy changes between 2014 and 2018 might have impacted the two insurance programs differently. Given the inclusion of county fixed effects in our analysis, the overall findings are not affected as long as the policy changes did not impact individuals within a county differentially based on their pre-consolidation insurance type. Our analysis also accounts for any differences in outcomes resulting from differential effect of other policy changes on different population segments, as we control for a range of individual- and household-level factors. Second, given the limitations of the data, we are able to check the pre-consolidation parallel trends for total medical expenditure, but not for reimbursement and out-of-pocket. While parallel pre-consolidation trend is neither necessary nor sufficient for the parallel counterfactual trend post-consolidation (Kahn-Lang and Lang, 2020), our ability to check for pre-consolidation trends for all outcomes would have raised confidence in our results. Third, urban employees are not a perfect control group for rural residents and urban residents, as urban employees are inherently different from the other two populations in terms of employment, which may lead to or originate in differences in other employment-related characteristics. In our analysis, we have controlled for a range of characteristics that can differ between these populations, including income and education. However, some differences in outcomes could be due to differences in unobservable factors between the populations, such as motivation and exposure to health risks.

Finally, attrition is high. Specifically, approximately 40% of observations in 2014 dropped out in 2018. To test how attrition differs across insurance type, gender, age, marital status, education, household income, medical expenditure in 2014, we conducted the regression of whether the observation dropped out in 2018 (binary measure; = 1 if the observation dropped out, 0 otherwise) on the interaction of insurance types and total medical expenditure in 2014, accounting for other demographic variables. We find that rural residents are less likely to drop out of the survey compared to urban residents (Appendix Table 7), suggesting that attrition is likely caused by migration—rural population has a lower mobility. Furthermore, total medical expenditure is positively associated with the probability of attrition. Specifically, one standard deviation increase in total medical expenditure (10,312 yuan) raises the probability of attrition by 2 percentage points. However, the coefficient on the interaction of total medical expenditure and insurance type is not statistically significant, indicating no differential medical-related attrition by insurance type. Based on these analyses, it appears that although attrition may affect the external validity of our findings, it likely does not compromise the internal validity substantially.

Future research, with additional data, can attempt to assess whether our findings reflect only short-term effects or if complementary policies are needed before the intended narrowing of the urban-rural gap in health care utilization and financial protection becomes visible. Additional research is also needed on whether the consolidation has improved other outcomes, particularly health status, as well as the operating mechanisms behind any such effects. In the meantime, stricter gatekeeping in urban areas and continued supply-side investment in under-served areas will remain critical to reducing urban-rural disparities. As previous studies have suggested, the government should promote primary health care-based integrated delivery system so that urban patients may reduce unnecessary and costly visit to tertiary hospitals (Yip et al., 2019). Cost containment measures, such as Global Budget and Diagnosis Related Groups, are already being experimented (Gu and Page-Jarrett, 2018). The government can also continue to address supply-side constraints in rural areas, such as the limited number of facilities and medical professionals. Currently, such resources, including pharmacies and public hospitals, are concentrated in urban areas (W. Liu et al., 2016). Finally, a more organized effort on educating the population on the changes in insurance programs may encourage individuals in rural areas to take advantage of the additional benefits available through the consolidated insurance program. While this recommendation can be made in many other settings, the need for educational initiatives targeted to rural population is more critical in China, where stark differences between urban and rural residents in terms of income and education has been documented (Sicular et al., 2007).

Credit author statement

Di Yang: Conceptualization, Methodology, Formal analysis, Writing – original draft.; **Yubraj Acharya**: Methodology, Writing – review & editing, Supervision.; **Xiaoting Liu**: Conceptualization, Writing – review & editing.

Data availability

CFPS dataset is publicly available and we include the website link in the manuscript.

Appendix

Appendix Table 1
Derivation of the Analytic Sample

	2014	2018
Full sample	37,147	37,354
Adults only (age≥18)	36,209	33,973
Enrolled in one of the three social health insurances	30,549	25,960
Non-erroneous observations	28,247	25,960
Matched with household dataset	28,083	25,737
Data available in both years	17,757	17,757
No missing data for regression	14,967	14,967

Notes: We dropped erroneous observations whose reimbursement or out-of-pocket were more than total medical expenditure, or total medical expenditure was missing but out-of-pocket existed.

Appendix Table 2
Descriptive Statistics by the Year of Survey

Characteristics	2014	2016	2018
Household income, 1000 CNY (median in brackets)	58.87 (121.69)	82.18 (241.58)	95.81 (174.02)
Gender (male)	49.3%	50.0%	49.4%
Age, years	46.56 (16.20)	46.84 (16.36)	47.98 (16.04)
Marital status			
Unmarried	13.0%	13.4%	12.2%
Married	80.2%	79.9%	80.9%
Cohabit	0.4%	0.3%	0.4%
Divorced	1.3%	1.4%	1.6%
Widowed	5.1%	5.0%	4.9%
Years of education	7.22 (4.79)	7.55 (4.89)	7.80 (4.93)
Self-rated health			
1 (Worst)	15.9%	15.5%	17.1%
2	14.6%	18.0%	13.5%
3	34.5%	35.4%	41.3%
4	20.7%	18.0%	15.1%
5 (Best)	14.4%	13.1%	13.0%
Hospitalized in past 12 months	11.2%	11.8%	13.7%
Alcohol (drank more than 3 times a week in the past month)	15.5%	14.7%	15.4%
Number of cigarettes smoked per day	4.61 (8.99)	4.36 (8.63)	4.51 (8.73)
Had a history of smoking	27.8%	27.7%	31.7%
Diagnosed with a chronic condition in the past 6 months	17.3%	17.1%	17.4%
Total medical expenditure (CNY)	2526.28 (10312.46)	2848.05 (11386.80)	3509.33 (14185.17)
Reimbursement for medical expenses (CNY)	873.54 (5687.49)	966.29 (5940.12)	1269.81 (8195.76)
Out-of-pocket medical expenses (CNY)	1586.87 (6605.55)	1870.86 (7182.89)	2224.50 (8465.54)
N	28,083	28,996	25,737

Notes: 1 USD = 7 CNY. This table shows the characteristics of individuals in the overall (unbalanced) sample by year. Some observations have data on total medical expenditure but not on out-of-pocket. For an individual, the sum of reimbursement and out-of-pocket costs is equal to the total medical expenditure.

Appendix Table 3
Coefficients from the Regression of Urban-Rural Medical Gap Measures on Insurance Types – Both Parts of the Two-Part Model

	Total medical expenditure	Reimbursement
First step: logit		
Urban resident insurance (β_1)	−0.129 (0.087)	−0.737*** (0.138)
Rural resident insurance (β_2)	−0.178** (0.068)	−0.539*** (0.101)
Post (β_3)	−0.027 (0.074)	−0.369*** (0.112)
Urban resident insurance × post (β_4)	−0.165 (0.120)	0.225 (0.187)
Rural resident insurance × post (β_5)	0.017 (0.081)	0.205 (0.121)
Derived from the estimates above:		
$\beta_4 - \beta_5$	−0.182	0.02
p-value	0.069	0.899
Second step: OLS		
Urban resident insurance (β_1)	−0.106 (0.055)	−0.118 (0.102)

(continued on next page)

Appendix Table 3 (*continued*)

Rural resident insurance (β_2)	−0.162*** (0.042)	−0.502*** (0.077)
Post (β_3)	0.409*** (0.046)	0.368*** (0.079)
Urban resident insurance × post (β_4)	−0.025 (0.074)	0.133 (0.136)
Rural resident insurance × post (β_5)	−0.142** (0.050)	−0.079 (0.088)
Derived from the estimates above:		
$\beta_4 - \beta_5$	0.117	0.212
p-value	0.060	0.070
N	14,967	7903

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. Total medical expenditure, reimbursement, and out-of-pocket are all measured in CNY. 1 USD = 7 CNY. This table shows the coefficients and standard errors from estimating equation (1) using two-part model, separately for each outcome. All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018. Sample size of column 1 is larger than the column 2 because the two-part model uses observations with no medical expenditure. For the second part of the two-part model (OLS), both dependent variables are in logarithms.

Appendix Table 4

Coefficients from the Regression of Urban-Rural Medical Gap Measures on Insurance Types – for Individuals Who Did Not Switch Insurance Types or Change Hukou Status

	Total medical expenditure (TPM)	Reimbursement (TPM)	Out-of-pocket (OLS)
Urban resident insurance (β_1)	−364.729 (267.857)	−760.247** (261.192)	385.201 (557.333)
Rural resident insurance (β_2)	−833.786*** (183.698)	−1347.599*** (176.205)	236.517 (378.052)
Post (β_3)	1417.427*** (204.290)	425.197* (175.438)	1182.676** (421.243)
Urban resident insurance × post (β_4)	−190.489 (356.375)	683.542* (335.166)	502.868 (747.499)
Rural resident insurance × post (β_5)	−424.388* (214.494)	45.947 (188.647)	−490.104 (445.654)
N	13,052	6991	7066
Derived from the estimates above:			
$\beta_4 - \beta_5$	233.899	637.595*	992.972
p-value	0.443	0.033	0.120

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. TPM stands for two-part model. Total medical expenditure, reimbursement, and out-of-pocket are all measured in CNY. 1 USD = 7 CNY. This table shows the coefficients and standard errors from estimating equation (1), separately for each outcome. Columns 1 and 2 report margins from the two-part model and column 3 reports OLS results. All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. The p-values in the final row are from a student-t test of $\beta4 - \beta5 = 0$. Sample size (N) is the number of individuals for whom data are available for both 2014 and 2018. Sample size in column 1 is higher than in other columns because the two-part model utilizes observations with no medical expenditure. Sample size of column 2 is slightly smaller than column 3 because some counties are dropped in the first part of the two-part model. The regressions in this table use the analytic sample minus the individuals who switched insurance type, or changed hukou status or hukou location.

Appendix Table 5

Parallel Trend Test for the Main Analysis

	Logit (first part)	OLS (second part)	Joint Margins
Urban resident insurance (β_1)	−0.162 (0.113)	0.055 (0.060)	83.265 (117.302)
Rural resident insurance (β_2)	−0.225** (0.084)	−0.163*** (0.046)	−345.942*** (88.992)
Post (β_3)	−0.665*** (0.090)	0.209*** (0.052)	311.477** (101.397)
Urban resident insurance × post (β_4)	−0.106 (0.149)	−0.083 (0.085)	−175.586 (165.109)
Rural resident insurance × post (β_5)	−0.047 (0.098)	−0.047 (0.056)	−97.168 (108.482)
N	11,448	8562	11,448
Derived from regression results:			
$\beta_4 - \beta_5$	−0.059	−0.036	−78.418
p-value	0.636	0.608	0.570

Notes: *p < 0.05, **p < 0.01, ***p < 0.001 This table shows the coefficients and standard errors from estimating equation (1) using 2012 and 2014 data and reports margins from the two-part model. The dependent variable for the second part is the logarithm of total medical expenditure (OLS). All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. The p-values in the final row are from a student-t test of $\beta4 - \beta5 = 0$. Sample size (N) is the number of individuals for whom data are available for both 2012 and 2014.

Appendix Table 6A

Parallel Trend Test for Rural Residents and Urban Employees

	Logit (first part)	OLS (second part)	Joint Margins
Rural resident	0.015 (0.080)	−0.337*** (0.044)	−614.078*** (83.348)
Post	−0.686*** (0.094)	0.248*** (0.057)	360.088*** (105.676)
Rural resident × post	0.046 (0.102)	−0.086 (0.061)	−151.191 (112.023)
N			10,091

Notes: *p < 0.05, **p < 0.01, ***p < 0.001 This table shows the coefficients and standard errors from estimating equation (1) using 2012 and 2014 data and reports margins from the two-part model. The dependent variable for the second part is the logarithm of total medical expenditure (OLS). All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. Sample size (N) is the number of individuals for whom data are available for both 2012 and 2014.

Appendix Table 6B
Parallel Trend Test for Urban Residents and Urban Employees

	Logit (first part)	OLS (second part)	Joint Margins
Urban resident	−0.114 (0.120)	−0.027 (0.070)	−56.546 (87.184)
Post	−0.578*** (0.091)	0.236*** (0.058)	163.595* (72.707)
Urban resident × post	−0.159 (0.156)	−0.041 (0.101)	−81.919 (125.061)
N			2052

Notes: *p < 0.05, **p < 0.01, ***p < 0.001 This table shows the coefficients and standard errors from estimating equation (1) using 2012 and 2014 data and reports margins from the two-part model. The dependent variable for the second part is the logarithm of total medical expenditure (OLS). All regressions control for demographic and health-related variables (see text). Standard errors are clustered at the county level. Sample size (N) is the number of individuals for whom data are available for both 2012 and 2014.

Appendix Table 7
Results from the Regression of Attrition on Individual Characteristics

	Attrition
Insurance type (UEBMI as reference)	
NCMS	−0.092***
	(0.010)
URBMI	0.018
	(0.013)
Total medical expenditure (1000 CNY)	0.002**
	(0.001)
Total medical expenditure × Insurance Type (UEBMI as reference)	
Total medical expenditure × NCMS	0.000
	(0.001)
Total medical expenditure × URBMI	−0.001
	(0.001)
Gender (female as reference	0.013*
	(0.006)
Age (years)	0.001***
	(0.000)
Marital status (unmarried as reference)	
Married	−0.247***
	(0.011)
Cohabit	−0.157**
	(0.050)
Divorced	−0.169***
	(0.028)
Widowed	−0.067***
	(0.019)
Years of education	−0.004***
	(0.001)
Household income (1000 CNY)	0.055*
	(0.024)
N	23,829

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. Sample size is the total number of individuals data are available for 2014.

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