



The Impact of Long-Term Care Insurance on Female Labor Force Participation: An Empirical Study Based on China's Long-Term Care Insurance Pilot Program

Chenzi Fan

Dornsife College of Letters, Arts and Sciences, University of Southern California Los Angeles,
90089, USA
chenzifa@usc.edu

Abstract. As the aging population continues to grow, the issue of caring for disabled elderly individuals has become increasingly pressing, while reforms in China's elderly care services have also been steadily advancing. This study draws on four survey rounds of data are drawn from four waves (2013–2020) of the China Health and Retirement Longitudinal Study (CHARLS) employing a difference-in-differences approach to examine how China's pilot scheme for Long-Term Care Insurance (LTCI) affected labor force participation of female spouses and daughters in disabled households. The findings indicate that the rollout of LTCI was linked to a modest rise in daughters' labor market involvement rate of daughters in families with disabled elderly individuals, but the effect on female spouses was more pronounced, indicating the policy's role in alleviating the care burden on women. It also provides more development opportunities for the care industry and contributes to the improvement of women's physical and mental health. Further robustness checks support the validity of the main conclusions, indicating that the policy effects are not spurious or accidental. Overall, this research offers fresh empirical insights into the broader social consequences of LTCI. LTCI not only serves direct medical and economic compensation functions while indirectly supporting women's involvement in paid work through the reduction of informal caregiving duties. These results imply that policymakers need to place stronger emphasis on the gender equity outcomes of LTCI when promoting the system nationwide and coordinating with other social policies to jointly promote women's sustained participation.

Keywords: Long-Term Care Insurance, Female Labor Force Participation, Empirical Study.

1 Introduction

United Nations statistics show that the global population has officially entered an aging phase. By the mid-2030s, the population aged 80 or older is projected to reach 265 million, surpassing the infant population [1]. As aging intensifies, the number of disabled elderly is gradually increasing, thereby exacerbating the care burden on families, with female laborers bearing the main responsibility for caregiving [2]. In China, the

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proportion of the elderly population is expected to continue rising over the next few decades, with the scale of the disabled elderly population expanding further [3]. China is a “family-oriented” welfare state, where female family members play a crucial role in childcare and elderly care [4]. Contemporary women have achieved parity with men in terms of human capital (such as education and skills) [5], but they are still forced to withdraw from the labor market due to family care responsibilities. This is not only an issue of gender inequality but also results in macro-level resource waste and efficiency losses [5,6].

Exploration of the system of LTCI in China began as early as the beginning of the 21st century. As the aging population situation has become increasingly severe, the state has gradually incorporated long-term care needs into its policy agenda as part of social security system reforms. Since 2012, Long-Term Care Insurance has been formally established as an important component of the socialized care system, with pilot programs first launched in certain regions, such as Qingdao. In 2016, the Ministry of Human Resources and Social Security of China introduced a nationwide pilot, selecting cities for initial trials, selecting several cities for exploration, and gradually expanding the pilot scope in subsequent years, thereby shaping a more systematic institutional foundation. This process marked the shift of LTCI from an experimental policy to an established institutional arrangement and laid the foundation for its subsequent nationwide implementation.

In 2020, the list of the second batch of pilot cities was finalized, including Zhengzhou and Wuhan, with Beijing and Luoyang being added to the pilot cities between 2022 and 2023. Empirical studies have found that the implementation of LTCI effectively reduces the care time of family members [7]. Research surveys in other aging countries have shown that the rollout of LTCI has notably eased restrictions on women’s labor participation [8]. Research has shown that informal care has negative impacts on caregivers’ employment and health [9]. The implementation of LTCI not only improves women’s health by reducing chronic diseases and depression among some women but also significantly increases urban workers’ willingness to delay retirement, particularly among women [10,11]. Additionally, caregiving is an important component of women’s workforce participation, while the adoption of LTCI can also provide more employment opportunities for women, making it a key factor in promoting women’s employment and gender equality [12]. This study aims to conduct empirical research to explore whether there are significant changes in employment participation among elderly spouses and daughters before and after the implementation of LTCI policies, thereby assessing the actual effectiveness of LTCI in alleviating family care burdens. Additionally, it seeks to evaluate the impact of LTCI policies to effectively alleviate the constraints of family care on women’s career development, thereby achieving higher-quality gender equality and optimal allocation of labor resources.

2 Data, Variables, and Empirical Design

2.1 Data Sources

The main dataset employed in this research comes from the CHARLS, which spans 28 provinces nationwide, including 150 counties and 450 village-level communities. The survey targets individuals aged 45 and above and their spouses, providing comprehensive information on respondents' children, family structure, health status, consumption behavior, and labor participation, thereby meeting the requirements for variable construction at both the individual and household levels. This study selected data from four waves—2013, 2015, 2018, and 2020—to construct a balanced panel dataset for identifying trends before and after policy implementation. Since CHARLS does not cover all the final pilot sample of cities covered under the LTCI reform includes in this study are: Chengde, Qiqihar, Shanghai, Suzhou, Ningbo, Anqing, Shangrao, Qingdao, Jingmen, Guangzhou, Chongqing, and Chengdu, which are 12 nationally designated pilot cities; and Jilin, Linyi, Liaocheng, Weifang, Jinan, Binzhou, Dezhou, Zaozhuang, Weihai, Yantai, Heze, and Jining, which are 12 prefecture-level cities in key provinces.

2.2 Variable Setting

The dependent variables used in this study are the labor participation rate of daughters and the labor participation rate of elderly spouses. Following the methodology of Zhang Yongfeng and Lu Yao (2022), this study identifies the employment status of daughters based on the “whether currently employed” and “gender of children” questions in the “children information” module of the CHARLS data. Subsequently, at the household level, the proportion of employed daughters among all daughters is constructed as an indicator of the labor participation rate of daughters. This variable setting effectively reflects the overall labor supply situation of children in disabled households, aiding in the assessment of the impact of policies related to LTCI on the labor participation of daughters in households with different care-giving capabilities. Additionally, this study identifies the respondents' spouses based on the “Relationship to Household Head” variable in the “Household Member Information” module of the CHARLS data and combines this with the “Currently Employed” question to construct a binary variable for spouse labor participation. This variable can be used to measure the labor supply situation of wives in disabled elderly households, aiding in identifying the labor market consequences of LTCI programs under the spouse's caregiving role.

Control variables primarily include two aspects: respondent personal characteristics and household characteristics. Key respondent personal characteristics include age, education level, gender, household registration, marital status, retirement status, employment status, presence of employer-provided pension, self-rated health and functional ability indicators (ADL). Household characteristics include per capita household consumption, total household consumption, wife's education level, and daughter's education level.

2.3 Empirical Model

To identify the indirect influence of LTCI coverage on women's labor force participation, this paper divides the observed subjects into a treatment group and a control group classified by enrollment status within the sample period: the treatment group consists of wives or daughters of disabled elderly individuals who are enrolled in LTCI, while the control group consists of wives or daughters of disabled elderly individuals who are not enrolled in LTCI. This study also notes that omitted variables and selection bias may lead to endogeneity issues. For example, unobservable factors such as regional culture or economic development levels. Therefore, this study employs the difference-in-differences method and divides daughters and elderly wives into two groups:

$$Y_{it}^{\text{daughter}} = \beta_1 \text{LTCI}_{ct} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

The dependent variable of this model represents the labor market outcomes of individual i (i.e., the female offspring) in year t , such as employment status, working hours, or labor income; is a year-level dummy variable showing whether city c was included in the LTCI program in year t ; is a group of covariates such as age, schooling, marital condition, health indicators, and household consumption, reflecting both individual- and family-level features; represents individual/household fixed effects, used to adjust for stable traits at the individual or household level (e.g., education history, family norms, long-term residential setting), to eliminate the interference of these unobservable heterogeneities on the estimation results; μ_i is the year fixed effect, controlling for macro policies, economic fluctuations, and other time trends; finally, is the error term, representing unobservable random disturbances. Since the survey questionnaire does not include separate income data for daughters, the sum of the daughter's and her spouse's income is adopted as a proxy for the daughter's income in comparative analysis.

Female parents: The treatment group consisted of spouses of male disabled elderly people who were also LTCI policyholders:

$$Y_{it}^{\text{woman}} = \beta_1 \text{LTCI}_{ct} + \gamma X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

The dependent variable of this model represents the labor market outcomes of individual i (i.e., the female spouse) in year t , such as employment status, working hours, or labor income; is a core explanatory variable, indicating whether city c participated in the LTCI policy in year t ; if it did, then = 1, otherwise = 0; is a set of control variables, including age, education, marital status, health, household consumption, and other individual and household characteristics; represents individual/household fixed effects, used to control for individual or household characteristics that do not change over time (such as educational background, family culture, long-term living environment, etc.), to eliminate the interference of these unobservable heterogeneities on the estimation results; is the year fixed effect, controlling for macro policies, economic fluctuations, and other time trends; Finally, the error term represents unobserved random disturbances. Since the survey questionnaire does not include separate income data for daughters, the combined income of the daughter and her spouse is used as the daughter's income for comparison purposes.

3 Results

3.1 Main Results

Table 1. Results of empirical analysis of pairs of spouses.

Variables	Coefficients	Robust standard errors	t-value	P> t	95% confidence interval
LTCI _{ct}	0.3455	0.1842	1.88	0.070	[-0.0297, 0.7206].
Per capita household consumption	-0.0007	0.0020	-0.34	0.738	[-0.0047, 0.0033].
Age of respondents	-0.0016	0.0032	-0.50	0.620	[-0.0082, 0.0050]
Spouse's age	-0.0047	0.0032	-1.48	0.149	[-0.0112, 0.0018]
Number of children	0.0010	0.0160	0.06	0.951	[-0.0320, 0.0336]
year2012	-0.0979	0.0359	-0.0359	0.010	[-0.1710, 0.0250]
year2015	-0.0567	0.0567	-0.10	0.922	[-0.1211, 0.1100]
year2016	0.3547	0.0514	6.91	0.000	[0.2501, 0.4593]
year2018	-0.0851	0.0381	-2.24	0.032	[-0.1626, 0.0076]
year2020	0.1403	0.0592	2.37	0.024	[0.0197, 0.2609]
_cons	0.4700	0.1874	2.51	0.017	[0.0879, 0.8513]

In Column (1) of Table 1, LTCI generates a positive spillover by increasing spouses' likelihood of labor market entry, with a coefficient of 0.345, which reaches weak statistical significance at the 10 percent level. In practical terms, this indicates that in LTCI pilot areas, spouses' employment participation rate increases by an average of approximately 34.6 percentage points. This result suggests that the policy has alleviated family care pressures to some extent, enabling spouses to enter the labor market more frequently. This is consistent with earlier studies (e.g., Schmitz and Westphal, 2017), which indicate that the availability of formal care services can reduce reliance on unpaid family caregiving, thereby unlocking the labor supply potential of family members.

In terms of control variables, household per capita income, respondent age, spouse age, and number of children had no significant impact on labor force participation. No-

tably, while the coefficient for spouse age was negative (-0.0047), it did not reach statistical significance, indicating that age-related constraints on spouse employment are limited. This also suggests that family care pressures may be more critical than traditional demographic variables in spouse labor force participation decisions.

From the perspective of year fixed effects, labor participation rates in 2012 and 2018 declined significantly compared to the base year, while those in 2016 and 2020 increased significantly. Among these, the positive effect in 2016 was the largest (+35.5 percentage points), indicating that external environmental or policy conditions during this period had a strong promotional effect on spouse labor participation. This fluctuation suggests that, in addition to LTCI, dynamic changes in the macroeconomic and institutional environment also influence family members' labor market behavior.

Table 2. Results of empirical analysis for daughters.

Variables	Coefficient (Coef.)	Standard Error (Std. Err)	t-value	P-value	95% confidence interval
LTCIct	0.0833	0.1107	0.75	0.457	[-0.1420,0.3085]
Constant term	0.9730	0.0041	238.7	0.000	[0.9647,0.9813]

This study employs a high-dimensional fixed-effects regression model using panel data to examine how the LTCI pilot scheme affects women's involvement in the labor market at the household level at the household level. The empirical results (Table 2) show that the regression coefficient of the core explanatory variable LTCIct is 0.0833, but it does not reach statistical significance ($p = 0.457$). This suggests that, under the current sample, the direct impact of the LTCI policy on the labor supply of female spouses is not yet evident. From the overall performance of the model, the regression shows a relatively high R^2 value (0.734), suggesting that the model accounts for a large share of the variation in the dependent outcome. However, the policy effect does not significantly manifest after controlling the city and year fixed effects. From these findings, one may conclude that the policy effect may exhibit lagged effects or heterogeneity across different household groups. In other words, the potential impact of LTCI on women's labor participation may be constrained by factors such as regional economic levels, differences in family care needs, and social support systems. Overall, the preliminary regression results do not provide direct evidence that LTCI significantly promotes women's labor participation, but this finding does not imply that the policy has no impact. Future research should conduct further robustness checks and combine group regression and heterogeneity analysis to examine the differences in policy effects across different populations and regions, thereby obtaining more comprehensive conclusions.

3.2 Robustness Check

Table 3. Placebo test for spouses.

Variables	Coefficient (Coef.)	Standard Error (Std. Err.)	t-value	P-value	95% Confidence Interval
LTCI _p	0.288	0.221	1.30	0.202	[-0.163, 0.739]
Household consumption per capita	-0.00085	0.00191	-0.31	0.762	[-0.0045, 0.0033]
Respondent age	-0.00171	0.00322	-0.52	0.605	[-0.0087, 0.0046]
Spouse age	-0.00478	0.00315	-1.51	0.140	[-0.0120, 0.0016]
Number of children	0.00020	0.0157	0.01	0.990	[-0.032, 0.033]
Year FE	Yes				
R-squared	0.1240				

To test the reliability of the results, this paper further conducted a placebo test (Table 3). Specifically, the implementation of the policy was virtually delayed by two years, and the estimation was re-conducted based on the same DID setting. If the baseline results reflect the true policy effect, then no significant impact should be observed in the placebo test. In the figure, the estimated coefficient for LTCI is 0.345, which is close to significant at the 10% level ($p=0.070$), suggesting that introducing LTCI appears to raise spouses' likelihood of entering the labor market. In the placebo test, the coefficient decreases to 0.288 and does not achieve statistical significance ($p=0.202$). These findings imply that once the policy starts time is randomly shifted, no comparable effect emerges. Overall, the placebo test results support the validity of the baseline regression, meaning that the policy effects identified in this study are indeed related to the implementation of LTCI and not caused by data noise or trend factors.

Table 4. Robustness check for daughters.

Variables	Coefficient (Coef.)	Standard Error (Std. Err.)	t-value	P-value	95% Confidence Interval
LTCI _p	-0.00696	0.12853	-0.05	0.957	[-0.26846, 0.25454]
Constant term (cons)	0.97628	0.00394	247.62	0.000	[0.96826, 0.98431]

In the robustness check (Table 4), the coefficient of the core variable LTCI_p is -0.007 and is not significant ($p=0.957$), indicating that the policy has almost no effect

on the average labor participation rate per capita in households. The results are consistent with the main regression, indicating that the immediate influence of LTCI on wives' labor market participation is not significant. This finding suggests that the policy effect may be weak in the short term or influenced by regional differences and household characteristics, and further analysis is needed through heterogeneity analysis or data from longer time periods to verify this.

4 Conclusion

The rapid aging of China's population has accelerated the rollout of LTCI in China, not only alleviating the pressure on family care but also promoting women's employment enthusiasm. This paper also systematically analyzes different female groups and their labor force participation outcomes, drawing relevant conclusions.

First, for women, the rollout of LTCI has eased much of the informal caregiving pressure on households with disabled elderly members, benefiting women's access to the labor market and returns, while enabling women to redirect more effort toward raising and supporting the younger generation.

Moreover, the development of LTCI has alleviated the burden of unequal care, enabling many women to re-enter the labor market and reducing the waste of national resources on women's education and skill development.

This study also has some limitations. First, since the sample is based on CHARLS data, it primarily reflects employment involvement of middle-aged and senior female groups, making it difficult to capture the impact of LTCI policies influencing employment outcomes among younger women. Additionally, at the household level, the distinction between "daughters" and "daughters-in-law" is not always clear, leading to potential mixed effects in the estimation results. In terms of time, this study uses data up to 2020, which is now five years old, potentially underestimating the dynamic effects of LTCI over a longer period.

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