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ABSTRACT

Long-Term Care Insurance Policy and Development of Elderly Care Enterprises in China*

This paper examines the impact of Long-Term Care Insurance (LTCI) policy on the development of elderly care enterprises in China. Employing a policy shock and a difference-in-differences design, we find that the implementation of LTCI significantly promotes the the number of new entries and survival rate of elderly care enterprises, particularly for individual businesses, enterprises in the health and social work industry, and those located in eastern regions. Notably, service-only LTCI policy exhibits stronger effect on the development of elderly care enterprises compared to policy combining service and cash benefits. Mechanism analysis suggests that LTCI stimulates market demand for formal elderly care services and increases government expenditures on social security and healthcare, both of which drive the development of elderly care enterprises. We also find that LTCI policy boosts labor demand in the elderly care industry. Overall, our empirical findings suggest that LTCI can help address the shortage of long-term care services and enhance family welfare.

JEL Classification: H55, I28, J14, J26

Keywords: long-term care insurance, elderly care enterprises, China

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1. Introduction

Population aging has become a global challenge, driven by declining fertility rates and increasing life expectancy. This demographic shift has resulted in a growing demand for long-term care (LTC) services. However, many countries, including China, face a critical shortage of professional formal care providers. This shortage is largely attributed to a shrinking working-age population and insufficient compensation for formal caregivers. According to *the China Elderly Health Report*, the number of disabled individuals aged 60 and above reached 46.54 million between 2021 and 2023. By contrast, as of 2020, fewer than 3 million disabled elderly individuals had access to formal care, and medical and elderly care institutions provided only 1.585 million beds (National Health Commission of China, 2021). Although health insurance-funded medical services have been employed to alleviate the LTC shortage, several issues persist. The limited quality of primary healthcare, coupled with an over-reliance on costly tertiary hospitals, has exacerbated the financial burdens on families with elderly members (Yip et al., 2019).

In response to this growing challenge, the Chinese Ministry of Human Resources and Social Security initiated the pilot of Long-Term Care Insurance (LTCI) policy in July 2016. Initially rolled out in 15 cities, with Jilin and Shandong Provinces serving as key contact regions, the pilot policy was expanded in 2020 to include 49 cities. The LTCI policy primarily targets insured individuals with disabilities, providing access to formal long-term care services. Its impacts on family welfare, beneficiaries, and caregivers have been widely studied. For instance, existing research has explored the effects of LTCI on the utilization of formal and informal care in Europe, Korea, and China (Bakx et al., 2015; Cao & Xue, 2023; Kim & Lim, 2015). Other studies have highlighted its benefits in improving physical and mental health outcomes, as well as reducing mortality rates (Sohn et al., 2020; Wang et al., 2023). Additionally, LTCI has been shown to reduce healthcare utilization and medical expenses while increasing household consumption in other areas (Ariizumi, 2008; Feng et al., 2020; Liu et al., 2023).

Despite these explorations, relatively little attention has been given to the impact of LTCI on elderly care service providers, particularly for-profit enterprises and individual

businesses. Existing studies have predominantly focused on non-profit institutions or specialized care providers. For instance, Hackmann et al. (2021) found that Germany's LTCI expansion significantly increased the number of inpatient LTC firms, while Japan's LTCI policy introduced in 2005 substantially boosted the number of care facilities (Tomita et al., 2010). In China, Yu et al. (2023) demonstrated that LTCI policy prioritizing home care facilities can initially enhance the supply of elderly care institutions in specific regions. Related studies on health insurance policy, such as those by Buchmueller et al. (2016), Geddes & Schnell (2023), and Kondo & Shigeoka (2011), have explored the effects of insurance policy on healthcare service providers. However, comprehensive evidence on the impact of LTCI on elderly care firms remains scarce in China.

To bridge this gap, this study examines the effect of LTCI policy on the development of elderly care enterprises in China, focusing specifically on the number of new firm entries and their survival rates. Using data from China's industrial and commercial registration data and a difference-in-differences (DID) design, we find that LTCI policy significantly increases the number of new enterprise entries by 29% and increases the survival rate of elderly care enterprises by 0.981 percentage points. These findings are robust across various robustness checks, including alternative measurements of key variables, exclusion of data from Shandong and Jilin Provinces and province-level municipalities, the use of alternative control variables, and a propensity score matching DID (PSM-DID) approach.

Furthermore, service-only LTCI policy exhibits stronger effect on the development of elderly care enterprises compared to policy offering both service and cash benefits. These effects of LTCI policy are particularly pronounced among individual businesses, enterprises in the health and social work industry, and those located in eastern regions of China.

Our findings suggest that LTCI policy promotes the development of elderly care enterprises through two potential mechanisms. First, LTCI policy stimulates market demand for formal care services (Roquebert & Tenand, 2017). Cities with fewer medical institutions and higher levels of population aging tend to experience stronger demand for formal care services, driving the development of elderly care enterprises. Our analysis confirms that cities with higher market demand show greater increases in new enterprise entries and survival rates. Second, LTCI increases government expenditures on healthcare and social

security, which reduces operational risks and uncertainties for enterprises while signaling market opportunities that encourage related industries development (Klein, 1976). Empirical evidence shows that LTCI policy leads to increased government expenditure on social security and employment, and healthcare, reinforcing this mechanism.

At last, this study explores whether the LTCI policy's impact on the development of elderly care enterprises also influences labor demand in related industries. While existing literature has largely focused on the crowding-out effect of LTCI policy on informal family caregiving and its implications for caregivers' labor supply (Fu et al., 2017; Geyer & Korfhage, 2015; Pei et al., 2024), few studies have examined labor demand from the perspective of elderly care providers. Using the same dataset and DID design, we find that LTCI policy significantly increases the number of employees and employee retention rates in elderly care enterprises. Furthermore, LTCI policy also lead to higher employment levels in the health and social welfare industry, as well as in public management and social organization industry. These findings demonstrate that LTCI policy not only promotes the development of elderly care enterprises but also stimulate their labor demand, contributing to broader economic and social benefits.

This study makes several contributions to the literature. First, while prior research has largely focused on non-profit providers such as nursing homes, daycare centers, and community elderly care organizations (Ikegami et al., 2003; Tomita et al., 2010; Yu et al., 2023), this study highlights the impact of LTCI policy on for-profit enterprises and individual businesses, which are key providers in China's elderly care sector, as classified by the Chinese National Bureau of Statistics (2020). Second, while Feng et al. (2020) and Yu et al. (2021) theoretically suggest that LTCI can rapidly develop China's elderly care sector, this study provides robust empirical evidence supporting their claims. Finally, this study addresses a critical gap in the literature by examining the labor demand implications of LTCI policy for elderly care enterprises, offering new insights into the interplay between LTCI and employment dynamics in related sectors.

2. Background and Conceptual framework

2.1 Public LTCI policy in China

In response to the growing demand for LTC services driven by an aging population, the Chinese government launched the pilot of LTCI policy in July 2016. Initially, the pilot policy was implemented in 15 cities across 14 provinces, with Jilin and Shandong provinces serving as key contact regions. By 2020, the policy had expanded to include 49 cities. The pilot was designed with variations across cities to account for local conditions and ensure adaptability. As of June 2023, the LTCI policy had insured 170 million individuals across these pilot cities, with over 2 million beneficiaries and a total expenditure of approximately 65 billion yuan (National Healthcare Security Administration of China, 2023).

Eligibility for LTCI in China is tied to participation in one of the national health insurance programs: the Urban Employees Basic Medical Insurance (UEBMI), which covers urban employees, or the Urban and Rural Residents Basic Medical Insurance (URRBMI), which serves individuals not covered by UEBMI. Those insured under these programs in pilot cities are required to participate in LTCI through mandatory enrollment. The funding for LTCI is primarily drawn from health insurance pooling funds, supplemented by individual contributions, welfare funds, and financial subsidies from the government. Individual contributions are made by those who can afford the premiums, while low-income households receive financial assistance to ensure equitable access to LTCI coverage.

LTCI policy is specifically designed to assist individuals who are unable to care for themselves due to age-related deterioration, illness, disability, or other conditions resulting in functional impairments. To qualify, beneficiaries must undergo a professional assessment to confirm a certain level of disability. The policy provides two main types of benefits: service benefits and cash benefits. Service benefits encompass home care, institutional care, and hospital care, all of which deliver professional and formal care to disabled elderly individuals. Cash benefits, in contrast, are direct payments to beneficiaries or their families, allowing them the flexibility to allocate funds as needed. These include using the payments for formal care services or informal care provided by family members, friends, or professional caregivers selected by the beneficiaries.

Beyond the 49 pilot cities officially designated by the central government, some local governments have implemented LTCI policy by themselves, resulting in nearly 80 pilot cities across China. To minimize the effect of COVID-19 on macro-level data, which began in early 2020, this study focuses on pilot cities that adopted LTCI policy on or before July 2019. Furthermore, to ensure data consistency, only prefecture-level pilot cities are included in the analysis. As a result, this study examines 50 pilot cities identified through official pilot documents and local government records. Detailed information about the pilot cities included in this study, such as their provinces, pilot years, and types of benefits provided, can be found in Table A1 of the Appendix. Notably, *Qingdao* was the first city to implement a nationwide LTCI pilot in 2012. Other cities, such as *Dongying* and *Weifang*, also initiated pilot policy before the official government directive was issued in 2016. The remaining pilot cities adopted LTCI policy following the nationwide rollout in 2016, as outlined in official documentation.

2.2 Conceptual framework

LTCI policy can influence the development of elderly care enterprises—both in terms of the entry of new enterprises and survival—through two primary channels: stimulating market demand for formal care services and increasing government-related expenditures.

First, LTCI subsidies for formal care services have the potential to stimulate market demand, thereby fostering the development of elderly care enterprises. From a demand-side perspective, aging population and rising number of disabled individuals have significantly increased the societal need for formal care services. However, this potential demand has often failed to translate into effective demand due to the economic vulnerability of the elderly and traditional preference for family care (Brown et al., 2012; Brown & Finkelstein, 2007). The high cost of LTC forced many families to rely on informal care within households. For instance, Hashiguchi & Llena-Nozal (2020) found that the cost of long-term care ranges from one to six times the disposable income of elderly individuals, based on cross-country data. Additionally, traditional cultural norms emphasize that care for elderly family members is a familial responsibility, discouraging outsourcing care to formal providers (Brown et al., 2012). LTCI policy can help overcome these barriers by reducing the financial burden of formal care and shifting attitudes toward its use. Studies have shown that LTCI increases the

utilization of formal long-term care services among beneficiaries (Kim et al., 2013; Roquebert & Tenand, 2017). By lowering the economic barriers to formal care and increasing families' willingness to purchase formal LTC services, the policy generates greater demand for professional elderly care services. This promotes the development of elderly care enterprises, including attracting new entries and promoting the survival rate in related enterprises.

The second channel through which LTCI policy impacts elderly care enterprises is its effect on government-related expenditures. The role of LTCI in influencing public spending has been extensively studied in global contexts (Colombo & Mercier, 2012; OECD, 2020). In China, where LTCI policy is still in its pilot phase, the premium subsidies are relatively high, resulting in increased government responsibility for public healthcare and social security expenditures. Reimbursement rates for LTCI in China are also substantial, ranging from 70% to 90% (Feng et al., 2020; Han et al., 2024). These high levels of public investment have two critical effects on the elderly care industry. On the one hand, government subsidies for the costs of long-term care services help reduce the operational risks and uncertainties faced by elderly care enterprises (Yu et al., 2023). By alleviating financial pressures, these subsidies create a more stable operating environment, encouraging the entry of new enterprises into the market and improving the survival rates of existing firms. This dynamic supports the broader development of elderly care industry. On the other hand, increased government expenditure generates a "demonstration effect" that signals the direction of future economic and industrial transformations (Klein, 1976; Romer, 1990). This not only encourages sector confidence but also attracts social capital to actively invest in elderly care-related industries. The resulting influx of investment further accelerates the development and diversification of the elderly care industry.

Based on these theories it is hypothesized that LTCI policy would likely increase the entry of new enterprises and improves the survival rate of elderly care enterprises if LTCI policy can stimulate market demand for formal care services and increasing government-related expenditures.

3. Empirical strategy and data

3.1 Data

This study utilizes data from two primary sources: China's industrial and commercial registration data and China's National Bureau of Statistics.

Enterprise-related variables are obtained from China's industrial and commercial registration data, which includes records from 2009 to 2019 maintained by the State Administration for Industry and Commerce (SAIC). The SAIC is responsible for the unified registration of various market participants, such as enterprises, individual businesses, specialized farmer cooperatives, and non-profit organizations. This annual database comprehensively covers all enterprises registered in China since 1980, providing detailed information, including social credit codes, business scope, registration dates, addresses, industry classifications, and other enterprise attributes. Compared to other available micro-level datasets, China's industrial and commercial registration data offers a more complete and timely sample. Unlike the widely used Chinese Industrial Enterprise Database, which primarily focuses on large-scale industrial enterprises, this dataset encompasses all registered enterprises, including individual businesses and enterprises engaged in service industries. This makes it particularly suitable for this study, as it includes enterprises providing elderly care-related services across various industries. Furthermore, the database includes an extensive range of service industry enterprises, which aligns with the research objectives of this paper.

For enterprises with missing establishment or cancellation dates, supplementary information was retrieved from firm query websites, such as *Qichacha* and *Tianyancha*. Enterprises with incomplete registration data, such as missing registration dates, company status, cancellation dates, or registration authority addresses, were excluded from the sample to ensure the reliability and accuracy of the dataset.

To identify elderly care enterprises and individual businesses (hereafter referred to as "*enterprises*") that provide elderly care-related services, a multi-step screening process was applied. First, enterprises were identified as elderly care providers if their business scope included key phrases such as "*elderly care services*," "*care services*," "*nursing services*,"

and similar terms. Second, enterprises that did not directly provide elderly care services but instead specialized in investments or consulting related to elderly care were excluded from the sample. This step ensured that only enterprises actively engaged in delivering elderly care services were retained. Third, non-profit entities, including nursing facilities, daycare centers, and community-based elderly care service groups, were removed from the sample, leaving only profit-oriented enterprises and individual businesses. Enterprises that met the above criteria were retained regardless of their formal industry classification. Finally, enterprises located in Tibet, autonomous prefectures, regions, and county-level cities were excluded, leaving only those in prefecture-level cities. This exclusion helps ensure data consistency and analytical comparability, as the excluded areas often differ significantly in policy implementation and elderly care system. Figure 1 presents the yearly aggregate number of new enterprise entries and existing enterprises nationwide, as included in the sample. By the end of 2019, the final dataset included approximately 65,000 elderly care enterprises spanning 30 provinces and 290 prefecture-level cities.

[Insert Figure 1 here]

City-level control variables were collected from multiple sources, including the *Statistical Bulletin* for each city, the *China City Statistical Yearbook*, and the *Statistical Yearbook* for each province. These sources provide comprehensive data on the social and economic development of Chinese prefectural cities, including key indicators such as GDP, government revenue, population size, geographic area, and employment levels.

3.2 Variables

Dependent variable. The dependent variables in this study are the number of new enterprise entries and the survival rate of elderly care enterprises at the city level. The number of new enterprise entries is determined using enterprises' registration dates and the start dates of their business terms. Enterprises' registered addresses are used to identify their respective cities. Based on this information, the annual number of newly registered elderly care enterprises is calculated for each city. This variable, referred to as "*New entries*," measures the yearly inflow of enterprises entering the elderly care sector. To account for skewed distributions, we apply a natural logarithmic transformation to the

variable after adding 1. The total number of existing elderly care enterprises in each city is calculated annually using deregistration or termination dates of enterprises' business terms. For enterprises that remained active as of the end of 2019, the termination year corresponds to the expiration date of their business licenses. For enterprises that ceased operations through license expiration, voluntary cancellation, revocation, or relocation prior to the end of the statistical period, the termination year reflects the year in which their activities ceased. Using these registration and deregistration years, the total annual number of existing elderly care firms in each city is derived. This variable, referred to as "*Total number*," captures the stock of operational firms in the elderly care sector for each year.

The survival rate of elderly care enterprises at the city level is calculated following the approach outlined by Chen et al. (2021). Specifically, the survival rate measures the proportion of enterprises that remain operational from one year to the next. It is derived using the total number of existing firms in a given city at the end of year *t*, the number of new firm entries during *t*, and the total number of firms at the end of the previous year (*t-1*). The formula is expressed as:

$$Survival_{ct} = \frac{Total\ number_{c,t} - New\ entries_{c,t}}{Total\ number_{c,t-1}}$$

Key independent variable. The primary independent variable in this study is the implementation status of LTCI policy, which indicates whether a city is part of the pilot policy at the corresponding pilot year. By July 2019, 50 out of 290 prefecture-level cities had introduced LTCI policy. The pilot years for these cities were determined based on official documentation provided in Table A1. The LTCI treated group comprises the 50 cities that implemented LTCI policy. Among these, 34 cities were officially designated as pilot cities by the central government between 2012 and 2019. The remaining 16 cities introduced LTCI policy during 2016–2019 by local government initiatives. The control group includes 240 cities that had not implemented LTCI policy during the same period. Using this timeline, an indicator variable is constructed to reflect whether a city was covered by LTCI at a specific year.

Figure 2 illustrates the yearly trends in the average number of newly registered and existing elderly care enterprises per city, separately for the treated and control groups.

During the pre-implementation period (2009–2012), the treated and control groups exhibited relatively similar trends in the per-city average number of new and existing elderly care enterprises, with the treated group holding a slight advantage. However, this gap remained largely stable. Following the implementation of LTCI policy in 2013, a noticeable divergence emerged: cities in the treated group experienced a substantially faster increase in both the average number of new entries and existing enterprises. This divergence continued to widen through 2019, suggesting that the implementation of LTCI may have contributed to differences of enterprises' development between the two groups.

[Insert Figure 2 here]

Other control variable. To explore the effects of LTCI policy, the analysis incorporates a range of control variables that capture city-level characteristics and other factors likely to influence the entry and survival of elderly care enterprises. Economic development is accounted for using *GDP*, which reflects the overall economic capacity of each city. The development of the service industry, measured as *the proportion of service industry in GDP*, is also included, as service industry growth may affect the dynamics of elderly care enterprises. Government capacity is proxied using general public *fiscal revenue,* which indicates the extent of government intervention in economic activities and the availability of public resources. *Population size* and *the number of medical institutions* are included to account for potential demand for elderly care services and the infrastructure available to support enterprises in this sector. Labor costs are measured using *the average wages of workers* in each city, which captures the cost of hiring employees in the local labor market. To ensure consistency and comparability, all variables—except for *the proportion* of service *industry*—are transformed logarithmically before being included in the regression analyses. These transformations help address potential skewness in the data and standardize the scales of the variables. Detailed descriptions of these variables are provided in Table A2 of the Appendix.

Table 1 provides the descriptive statistics of key variables, including their means, standard deviations, and minimum and maximum values. On average, 22 new elderly care enterprises enter each city annually, while the total number of existing firms per city

averages 63. However, the data reveals significant variation across cities, with some cities recording as many as 1,090 new enterprise entries in a single year. The average survival rate of elderly care enterprises at the city level is 97.5%, indicating that most firms remain operational over time.

[Insert Table 1 here]

3.3 Empirical model

To evaluate the impact of LTCI policy on the development of elderly care enterprises, we exploit the variation in the timing of policy implementation across the 50 pilot cities. A DID strategy with city and year fixed effects is applied, allowing us to estimate the causal effect of the LTCI policy on the development of elderly care enterprises, such as the number of new enterprise entries and the survival rate of enterprises. The empirical model is based on the following equation:

$$Y_{ct}=\beta_0+\beta_1\times LTCI_{ct}+\beta\times X_{ct}+City_c+Year_t+\mu_{ct} \quad (1)$$

In this equation, the dependent variable Y_{ct} represents the development of elderly care enterprises for city c in year t. Specifically, this includes the annual number of new enterprise entries (*New entries*$_{ct}$) and the survival rate of elderly care enterprises (*Survival*$_{ct}$). The key explanatory variable, $LTCI_{ict}$, is an interaction term of $Treat_{ic}$ and $Post_{ct}$. Here, $Treat_{ic}$ is a treatment indicator that equals 1 if city c belongs to the treated group (i.e., one of the pilot cities) and 0 otherwise. $Post_{ct}$ is a time indicator that equals 1 for years following the implementation of LTCI pilot policy and 0 for the pre-policy period. Together, $LTCI_{ict}$ captures the effect of LTCI policy during the post-implementation period in treated cities. The vector X_{ct} includes time-varying city-level control variables, as discussed previously, such as GDP, population size, the number of medical institutions, average wages of workers, fiscal revenue and the proportion of service industry. These controls account for factors that may influence enterprises' development independently of LTCI policy. City fixed effects ($City_c$) are included to control for time-invariant differences across cities, such as geographic, historical, or institutional characteristics that may affect enterprises' development. Year fixed effects ($Year_t$) are included to account for nationwide temporal shocks or trends that could influence enterprise outcomes, such as macroeconomic

conditions or national policy changes. The error term (μ_{ct}) captures any remaining unobserved factors affecting enterprises' development in city c during year t. Standard errors are clustered at the city and year level to account for potential serial correlation and heteroskedasticity in the panel data. The coefficient of interest, β_1, represents the estimated effect of LTCI policy on the dependent variable.

4. Empirical Results

4.1 Treated and control group differences

Table 2 presents summary statistics for the dependent and control variables, comparing treated and control cities. The mean values and standard deviations of key variables highlight significant differences between the two groups. The findings reveal that pilot cities experienced a substantial increase in the number of new enterprise entries. However, the difference analysis shows no significant difference in the survival rates of elderly care enterprises between treated and control cities. In addition, pilot cities significantly outperform control cities in several socio-economic indicators, including GDP, fiscal revenues, population size, the number of medical institutions, the average wages of workers, and the proportion of service industry. These differences underscore the economic and infrastructural advantages of treated cities.

[Insert Table 2 here]

4.2 The effect of LTCI policy on the development of enterprises

Table 3 reports the results of DID analysis based on Equation (1), estimating the impact of LTCI policy on the number of new enterprise entries and survival rate. Columns (1) to (3) present the results for the logarithm of the number of new enterprise entries (plus one), while Columns (4) to (6) examine the survival rate of elderly care enterprises. Moreover, Columns (1) and (4) do not control for any covariates or fixed effects; Columns (2) and (5) only control the city fixed effects and year fixed effects; Columns (3) and (6) include all control variables and fixed effects.

The findings show that LTCI policy significantly increases both the number of new enterprise entries and the survival rate of elderly care enterprises. Across the three specifications, the results consistently indicate a positive effect of LTCI policy. In particular, the preferred specification in Column (3) demonstrates that LTCI policy increases the number of new enterprise entries by approximately 29%. Similarly, Column (5) and (6) show that LTCI policy has a significant positive impact on the survival rate of elderly care enterprises when covariates and fixed effects are included. In the preferred specification, the DID coefficient of 0.981 indicates that LTCI policy increases the survival rate of elderly care enterprises by 0.981 percentage points.

[Insert Table 3 here]

The validity of DID approach relies on the assumption that the selection of pilot cities is unrelated to other underlying factors driving changes in the development of elderly care enterprises. To test this assumption, we employ a parallel trends test, which examines whether the treated and control groups exhibit similar trends in the dependent variables prior to the policy implementation. Following Beck et al. (2010), we adopt an event study approach to estimate dynamic effects and conduct the parallel trends test. We estimate the DID coefficient β_j for each year using the following equation:

$$Y_{ct}=\beta_0+\sum_{j=2009}^{2019}(\beta_j \times LTCI_{ct})+\beta \times X_{Ct}+City_c+Year_t+\mu_{ct} \qquad (2)$$

Figure 3 plots the estimated coefficients for each year. Before the implementation of LTCI policy, the coefficients are close to zero, indicating no significant differences between treated and control cities. After the implementation of LTCI policy, the coefficients increase, suggesting a growing positive impact of LTCI policy on new firm entries and survival rates. These results confirm that the parallel trend assumption is satisfied and that the observed effects can be attributed to the effect of LTCI policy. Although not all yearly coefficients are statistically significant, the results suggest that an overall upward trend in the policy's effects on enterprises' development over time. This indicates that LTCI policy's impact on enterprise entries and survival gradually materializes after implementation.

[Insert Figure 3 here]

4.3 Component effects of LTCI policy

LTCI policy in pilot cities is implemented through two types of benefits: service benefits and cash benefits. The majority of pilot cities adopt service benefits, where the costs of nursing services are shared between the medical insurance fund, individuals, and other parties. A smaller subset of cities implements both service and cash benefits. Different benefit types have varying implications for elderly care enterprises (Fu et al., 2017; Geyer & Korfhage, 2015; Wang et al., 2021). Service benefits are more likely to encourage the use of formal care services, fostering the development of elderly care enterprises. In contrast, cash benefits may incentivize informal family care, reducing demand for formal care services and limiting the expansion of enterprises in the sector (Geyer & Korfhage, 2015; Han et al., 2023). Cash benefits involve direct subsidies to elderly individuals or their caregivers, which can be used flexibly for expenses such as hiring caregivers, including family members, friends, or professional nurses.

Table 4 examines the heterogeneous effects of LTCI policy on enterprises' development based on benefit types. Among the 50 pilot cities, 37 implement service-only benefits, while 13 adopt both service and cash benefits. Columns (1) and (2) present the regression results for the number of new enterprise entries using DID method. In contrast, Columns (3) and (4) present the regression results for the survival rate of elderly care enterprises using DID method.

The results show that service-only LTCI policy has a more significant impact on the development of elderly care enterprises. Specifically, service-only LTCI policy leads to a larger increase in the number of new entries and significantly improves the survival rate of elderly care enterprises. In contrast, LTCI policy with both service and cash benefits has a smaller impact on the number of new enterprise entries and no significant effect on survival rate. The stronger effect of service-only LTCI policy can be explained through their more direct interaction with both market demand and government expenditures. Service benefits tend to directly stimulate market demand for formal care services by reducing users' access costs and encouraging the utilization of institutional care. In contrast, cash benefits provide greater flexibility for households and may be diverted to informal care or other non-service expenditures. Moreover, although both benefit types involve similar levels of public funding,

service benefits channel resources directly into formal care institutions, while cash benefits are given to households and may not translate into formal service consumption, thus weakening the effect of government subsidies on enterprises' development.

[Insert Table 4 here]

4.4 Heterogeneous analysis

This section examines the heterogeneous effects of LTCI policy on the number of new entries and the survival rate of elderly care enterprises. The analysis investigates these effects from three different perspectives: enterprise type (individual businesses versus enterprises), industry type (health and social work industry versus other related industries), and district type (eastern versus central and western regions).

Enterprise type. Elderly care enterprises are classified into two categories based on the framework established by Feng and Li (2023): individual businesses and enterprises. According to China's *Civil Code*, individual businesses refer to natural persons or families engaged in commercial and industrial activities, while enterprises include companies, sole proprietorships, and partnerships. These two categories differ substantially in legal status, organizational structure, operational scale, and risk tolerance. Enterprises generally operate on a larger scale, have more resources, and are capable of offering comprehensive and professional services. However, their greater complexity means that they often require more time and resources to adjust to policy changes, such as LTCI policy. Conversely, individual businesses are smaller, more flexible, and quicker to adapt to policy changes, allowing them to provide highly personalized services.

The regression results in Panel A of Table 5 reveal that LTCI policy has a larger and more significant effect on individual businesses compared to enterprises. The implementation of LTCI policy leads to a 45.6% increase in the number of new entries and a 4.875 percentage point increase in the survival rate of individual businesses. In comparison, enterprises experience a 30% increase in new entries and a 0.870 percentage point increase in survival rate, although these results are also statistically significant.

Industry type. In accordance with the *Statistical Classification of the Elderly Care Industry* in 2020 and the *Classification of National Economic Industries (GB/T 4754-*

2017) released by the Chinese National Bureau of Statistics, elderly care enterprises are categorized into two groups based on their industry type. Enterprises in the health and social work industry are directly involved in providing medical and social services that align closely with the objectives of LTCI policy, such as improving access to formal care services for the elderly. Enterprises in this industry typically possess specialized capabilities, enabling them to respond effectively to policy support, expand their service offerings, and improve service quality. Additionally, these enterprises may receive direct financial subsidies under LTCI policy. In contrast, some elderly care enterprises are classified under other industries, such as business services or residential services, due to their engagement in broader activities beyond elderly care. These enterprises are less aligned with the primary goals of LTCI policy and instead rely more on market demand and internal adjustments for their growth and development.

The regression results in Panel B of Table 5 demonstrate that LTCI policy has a larger impact on enterprises in the health and social work industry. The number of new entries in this industry increases by 51%, and the survival rate improves by 1.574 percentage points. In comparison, enterprises in other industries experience smaller increases of 33.4% in new entries and 0.421 percentage points in survival rate. These findings highlight the differential impact of LTCI policy, with enterprises in the health and social work industry benefiting more significantly due to their closer alignment with the policy's objectives.

District type. To explore regional variations in the effects of LTCI policy, cities are categorized into two groups based on their location: eastern and central-western regions. The eastern region includes cities from economically advanced coastal provinces such as Beijing, Tianjin, Shanghai, Jiangsu, and Guangdong. These cities are characterized by higher levels of economic development, larger populations, and greater fiscal capacity. In contrast, cities in central-western regions generally have less developed economies, smaller markets, and fewer resources. The eastern region's more developed infrastructure and larger markets make it better equipped to implement and benefit from LTCI policy. Local governments in these cities also have stronger financial capacities to promote the development of elderly care industries and facilitate the adoption of LTCI policy. As a result, LTCI policy is

expected to have a larger and more significant impact on the development of elderly care enterprises in the eastern region compared to the central-western regions.

The regression results in Panel C of Table 5 confirm these expectations. In the eastern region, LTCI policy increases the number of new enterprise entries by 23.2% and improves the survival rate of enterprises by 0.944 percentage points. In the central-western regions, the corresponding increases are 10.4% for new entries and 0.532 percentage points for survival rate. However, the results for the central-western regions are not statistically significant, underscoring the stronger impact of LTCI policy in the eastern region.

[Insert Table 5 here]

4.5 Robustness checks

4.5.1 Placebo test

To ensure the validity of the results, a placebo test is conducted following the approach of Chetty et al. (2009). In this test, cities are randomly assigned treated status to create a "false" LTCI variable. Specifically, 50 cities are randomly selected as the treated group, while the remaining cities serve as the control group. The randomization ensures that the false treatment status is unrelated to actual changes in the development of elderly care enterprises. This process is repeated 500 times to generate a distribution of placebo estimates, which helps determine whether the observed treatment effects could have occurred by random chance. If the actual estimates lie at the tail of the placebo distribution, it provides evidence that the results are not spurious.

The results of the placebo test are presented in Figure 4. The distribution of 500 placebo estimates is centered around zero, indicating no systematic effect of the false treatment. In contrast, the actual estimates (represented by vertical dashed lines) are clear outliers, confirming that the observed effects of LTCI policy are not driven by unobservable factors or random variation. These findings validate the robustness of the main results, which means the increase in new enterprise entries and survival rates of elderly care enterprises can be attributed to LTCI policy.

[Insert Figure 4 here]

4.5.2 Alternative methods

To ensure the robustness of our findings, we also adopt several alternative approaches to perform robustness checks, including redefining key variables and some other methods.

Alternative measure of enterprise' development and LTCI. In the first approach, the dependent variables and LTCI policy variable are redefined. The number of new entries is replaced with net entry, which is calculated as the number of new enterprise entries minus the number of deregistered enterprises in city *c* at the end of year *t*. To account for skewed distributions, the natural logarithm of the absolute value of net entry plus one is taken. Similarly, The survival rate is recalculated as the total number of existing enterprises in city *c* at the end of year *t* divided by the total number of enterprises at the beginning of year *t* (or equivalently, the end of the previous year). The formula for survival rate is expressed as:

$$Survival_{ct} = \frac{Total\ number_{c,t}}{Total\ number_{c,t-1}}$$

The regression results, presented in Columns (1) and (2) of Panel A of Table 6, show that LTCI policy continues to have a significantly positive impact on both the number of new entries and survival rate of elderly care enterprises. In addition, considering that the number of new entries includes zero values, a straightforward log transformation could introduce bias in the estimation. To address this issue, we adopt the Poisson pseudo-maximum likelihood (PPML) regression to perform robustness analysis, as recommended by Chen & Roth (2024). The regression result is shown in the Panel A of Table A4 in the Appendix and shows that LTCI policy continues to have a significant effect on the number of new entries. In Panel B of Table A4, we shift the recorded deregistration year forward by one or two years to account for potential delays in the registration data, as the exit year of enterprises recorded by the SAIC may lag the actual exit by one or two years. We find the regression results are still consistent with basic regressions.

Second, we refine the independent variable "LTCI". For cities where the policy began in the second half of the year (e.g., July, November, or December), the policy implementation year is lagged by one year to form a new LTCI variable. The results, shown in Columns (3) to (6) of Panel A of Table 6, confirm the robustness of the findings, with

LTCI policy still showing significant positive effects on the development of elderly care enterprises.

Alternative regression methods. First, to ensure comparability between treated and control cities, propensity score matching (PSM) is used to construct a subsample that balances observable characteristics. Two PSM approaches are employed. The first uses baseline characteristics from 2010 (prior to the LTCI policy) for nearest neighbor matching (1:6). The second conducts year-by-year matching, selecting control cities annually based on nearest neighbor criteria (1:6). After matching, a DID analysis was performed on the balanced sample. As shown in Columns (1) to (4) of Panel B of Table 6, both methods obtain results consistent with the basic findings.

Second, a concern with using TWFE regressions in a DID design is the problem of negative weights, as treated observations may serve as controls. This can lead to misleading negative coefficients even when all average treatment effects are positive. To address this, we conduct robustness checks using the estimator proposed by Sun and Abraham (2021), which accounts for treatment effect heterogeneity. The regression results in Columns (5) to (6) of Panel B of Table 6 confirm that LTCI policy significantly increases the number of new entries and the survival rate of elderly care enterprises.

Alternative control variables. To address the concern that pilot cities may have been selected based on pre-determined characteristics, we modify the control variables by interacting city characteristics from 2010 with year dummies. This approach allows trends in enterprises' development to vary based on initial city conditions, such as GDP per capita, population size, the number of medical institutions, average wages of workers, fiscal revenue, and the proportion of service industry. The results, shown in Panel C of Table 6, demonstrate that even with these alternative controls, LTCI policy significantly increases the number of new entries and the survival rate of elderly care enterprises, further supporting the robustness of the findings.

Including 2020-2021 data. We expand the dataset to include observations from 2020 and 2021 to examine whether the basic findings hold in the presence of potential disruptions caused by the COVID-19 pandemic. In the original analysis, data from 2020 onward were excluded to avoid potential bias from pandemic-related shocks to enterprises' development

and city-level characteristics. The results in Panel D of Table 6 show that even with the inclusion of post-pandemic data, LTCI policy continues to have a significant positive effect on the development of elderly care enterprises. These findings are consistent with the basic results, demonstrating the robustness of our analysis.

Controlling the effect of simultaneous policy. The China's 2014 Business Registration Reform was implemented gradually across cities in Guangdong Province between 2012 and 2014, and was extended nationwide in 2014. To address potential confounding effects from this overlapping policy, we include this policy indicator to conduct a robustness check. The results, reported in Panel E of Table 6, are consistent with our baseline findings, indicating that the business registration reform does not bias our main findings.

Deleting some inappropriate samples. we address potential biases by removing specific samples that may introduce confounding effects. Cities in Jilin and Shandong provinces are removed, as they were key contact regions for the LTCI policy and may have been influenced by unobservable local factors or policy spillovers. We also exclude province-level municipalities (Beijing, Chongqing, Tianjin, and Shanghai), which differ from other cities in governance and policy implementation. For instance, Beijing's LTCI pilot was limited to specific districts and overseen by separate authorities. As shown in Panels C and D of Table A4, excluding these cities does not affect the conclusion that the LTCI policy significantly promotes enterprise development.

[Insert Table 6 here]

5. Mechanisms

5.1 Market demand for formal care service

To explore how LTCI policy affects market demand for formal elderly care services in pilot cities, we consider two primary factors: the availability of medical institutions and the degree of population aging. First, we use the number of medical institutions as a proxy for local market demand for formal elderly care services to elderly care enterprises, considering that medical institutions and elderly care enterprises often function as alternative providers. According to the 2020 classification of the elderly care industry issued by the National

Bureau of Statistics of China, formal care services are mainly provided by elderly care institutions, enterprises, and social organizations. Moreover, in many regions of China—particularly where the elderly care industry remains underdeveloped—medical institutions, especially those providing geriatric or long-term inpatient care, play a substantial role in delivering services that overlap with those of elderly care institutions. As a result, a greater number of medical institutions may indicate a lower un-met demand for elderly care enterprises, as these institutions partially absorb the market for formal care. Second, the degree of population aging is a direct indicator of demand for formal care services. Cities with a higher proportion of elderly individuals typically exhibit greater demand for such services, as the prevalence of age-related disability and chronic illness increases with age.

To investigate this mechanism , we conduct subgroup analyses by dividing cities into two groups based on the median number of medical institutions in 2010. Cities with more medical institutions are categorized as having low market demand for formal care services, while those with fewer medical institutions are considered to have high market demand. The regression results, shown in Panel A of Table 7, reveal that after the introduction of LTCI policy, cities with high market demand experience a more significant and larger increase in both the number of new enterprise entries and the survival rate of elderly care enterprises compared to cities with low market demand. Furthermore, we group cities based on the percentage of the population aged 60 and above in 2010 to measure the degree of population aging. Cities with a higher proportion of elderly individuals are categorized as having high market demand for formal care services, while those with a lower proportion are classified as having low market demand for formal care services. The results of this subgroup analysis, presented in Panel B of Table 7, indicate that cities with high market demand see a larger increase in the number of new entries and the survival rate of elderly care enterprises following the implementation of LTCI policy.

These findings suggest that the rising demand for formal elderly care services, driven by LTCI policy, plays a critical role in fostering the development of elderly care enterprises. The subgroup analyses align with the argument that LTCI policy has substantially increased market demand for formal care services, which in turn has significantly contributed to the observed improvements in the number of new entries and survival rate of elderly care

enterprises. The expansion of market demand is therefore a key mechanism through which LTCI policy influences enterprises' development.

[Insert Table 7 here]

5.2 Government-related expenditures

Another important mechanism through which LTCI policy affects the development of elderly care enterprises is its impact on government-related expenditure. Specifically, the policy may drive increased spending by local governments to encourage the supply of formal care services. In China, government expenditures related to long-term care services are typically classified under two major categories: social security and employment expenditures, and healthcare expenditures. To explore this mechanism, we examine the effects of LTCI policy on these two types of government-related expenditures. Using data from annual public government expenditure classifications reported in each city's *Statistical Bulletin on National Economic and Social Development*, we conduct regression analyses on the logarithm of social security and employment expenditures, as well as healthcare expenditures. The results are presented in Table 8.

The findings in the Panel A of Table 8 show that LTCI policy significantly increases social security and employment expenditures, and healthcare expenditures following its implementation. To address the concern regarding the potential bundled nature of LTCI policy and government expenditures, we extend the analysis by adding two interaction terms: one between social security expenditures in 2010 and time trend, and another between the proportion of elderly population in 2010 and time trend. This helps clarify whether the observed increase in government expenditures is a result of LTCI policy. The regression results are shown in Panel B of Table 8 and suggest that LTCI policy has significant effects on social security and employment expenditures, and healthcare expenditures. Overall, the results align with the argument that increased government-related expenditures, driven by LTCI policy, supports the entries and survivals of elderly care enterprises.

[Insert Table 8 here]

6. Extended analysis: LTCI and labor demand

The potential impact of LTCI policy on labor demand in related industries, particularly within elderly care enterprises, is a critical issue to address. Beyond facilitating the development of elderly care enterprises, LTCI policy may help address the insufficient supply of formal care services while simultaneously creating employment opportunities for the working-age population. This can ultimately enhance household income levels and improve overall welfare (Hackmann et al., 2021). Existing literature has extensively documented the positive effects of LTCI on labor participation, particularly among women. Studies such as Fu et al. (2017), Geyer and Korfhage (2015), Pei et al. (2024), and Wang et al. (2023) consistently find significant and positive spillover effects of LTCI introduction on family caregivers' labor force participation, with notable variations by gender and age. Furthermore, research by Fu et al. (2017) and Klimaviciute et al. (2019) indicates that LTCI has a greater and more pronounced effect on women's labor force participation and working hours.

However, much of this literature focuses on individual labor supply rather than the labor demand generated by enterprises and institutions. To address this gap, we explore the effect of LTCI policy on the labor demand of elderly care enterprises using data from China's industrial and commercial registration data. Specifically, we measure an enterprise's insured employees as a proxy for its total workforce, aggregating this data to the city level. Similarly, we calculate the number of new employees and the retention ratio of employees at the city level. The regression results, presented in Columns (1) to (3) of Table 9, indicate that LTCI policy significantly increases the number of new employees and the retention ratio of employees of elderly care enterprises. Although the coefficient for the logarithm of new employees is positive, it is not statistically significant.

To further explore employment dynamics, we construct a net employment growth rate for elderly care enterprises at the city level, following the approach of Davis & Haltiwanger (1992):

$$Netgrowth_{ct} = \frac{employees_{c,t} - employees_{c,t-1}}{(employees_{c,t} + employees_{c,t-1})/2}$$

Building on this, we decompose the net employment growth rate into two components—*employment creation rate and employment destruction rate*—using methodologies proposed by Groizard et al. (2015) and Yuan & Luo (2023). The employment creation rate is defined as the positive component of net employment growth ($Creation_{ct}$=max($Netgrowth_{ct}, 0$), while the employment destruction rate is defined as the negative component ($Destruction_{ct}$= max($-Netgrowth_{ct}, 0$). These measures are non-negative, with higher values indicating more employment creation or reduction, respectively.

The regression results for these variables, shown in Columns (4) to (6) of Table 9, suggest that LTCI policy has a marginally negative effect on the employment destruction rate of elderly care enterprises, indicating a slight reduction in job loss. However, the policy's effects on the net employment growth rate and the employment creation rate are not statistically significant, although the coefficients align with theoretical expectations. These results suggest that LTCI policy may contribute to a modest reduction in employment destruction within the elderly care sector.

[Insert Table 9 here]

In addition to the effect on enterprise-level employment, we also explore the broader labor demand within the elderly care sector using data from Chinese cities' statistical yearbooks. Employment figures are classified into two relevant categories: employees in the health and social welfare industry, and employees in public management and social organization industry. These industries are closely linked to the provision of formal long-term care services and the implementation of LTCI policy. The regression results for these categories, presented in Columns (1) and (4) of Table 10, demonstrate that LTCI policy significantly increases the number of employees in both the health and social welfare industry, and public management and social organization industry. To examine the role of population aging in this relationship, we conduct subgroup analyses by dividing cities into two groups based on the proportion of elderly individuals aged 60 and above in 2010. The results of the subgroup analyses, shown in Columns (2), (3), (5) and (6) of Table 10, indicate that cities with a higher degree of population aging exhibit more significant and larger

increases in employment within both industries following the implementation of LTCI policy. These findings suggest that the impact of LTCI policy on labor demand is larger in cities with larger aging populations, where the demand for formal care services is higher.

[Insert Table 10 here]

7. Discussions and Conclusions

Population aging has led to a growing demand for LTC services and professional care providers. In response to this challenge, the Chinese government officially introduced the pilot of LTCI policy in 2016. While much of the existing literature has focused on the impact of LTCI policy on family welfare—benefiting both care recipients and caregivers (Liu et al., 2023; Sohn et al., 2020; Wang et al., 2023)—relatively little is known about its effect on elderly care providers in developing countries, particularly for-profit providers and elderly care enterprises.

This study employs a DID approach to examine the effect of LTCI policy on the development of elderly care enterprises in China, focusing on two key dimensions: the number of new enterprise entries and their survival rates. The findings reveal that LTCI policy significantly increases both the number of new entries and the survival rate of elderly care enterprises. These effects are particularly pronounced among individual businesses, enterprises in the health and social work industry, and enterprises located in eastern regions of China. This research contributes to the growing body of literature on the positive effects of LTCI policy on the elderly care sector (Hackmann et al., 2021; Tomita et al., 2010). Additionally, the study finds that the type of LTCI policy implemented plays a crucial role. Policy offering only service benefits has a more substantial impact on the development of elderly care enterprises compared to the policy offering both service and cash benefits. This difference can be attributed to the fact that cash benefits encourage informal family care, thereby reducing the demand for formal care services provided by elderly care enterprises (Geyer & Korfhage, 2015; Han et al., 2023).

The study also identifies two key mechanisms through which LTCI policy promotes the development of elderly care enterprises. First, the policy significantly increases demand

for formal care services. Cities with fewer medical institutions and a higher proportion of elderly individuals exhibit larger numbers of new enterprise entries and higher survival rates of elderly care enterprises, underscoring the critical role of market demand in driving enterprises' development. Second, LTCI policy leads to an increase in government-related expenditures, particularly in social security and employment-related expenditure, as well as healthcare expenditure. These increases in public expenditures further support the development of elderly care enterprises.

Beyond enterprises' development, this study explores the impact of LTCI policy on labor demand within the elderly care sector. The findings indicate that LTCI policy increases the number of new employees and stimulates employee retention in elderly care enterprises. Additionally, the policy significantly boosts employment in broader industries related to formal care services and LTCI, such as health and social welfare industry, as well as public management and social organization industry. These results align with findings from Hackmann et al. (2021) and demonstrate that LTCI policy not only promotes the new entries and survivals of elderly care enterprises but also enhances employment opportunities within the elderly care sector. From another perspective, these findings highlight the broader significance of LTCI policy in improving labor force participation and overall family welfare.

LTCI policy's ability to stimulate the development of elderly care enterprises and expand labor demand addresses the dual challenges of insufficient LTC services and related employment opportunities. Furthermore, it plays a critical role in promoting economic development and enhancing family welfare. These findings carry significant policy implications for the expansion of LTCI pilots in China and other middle-income and developing countries grappling with rapidly aging populations and growing LTC needs. However, this study has certain limitations that should be acknowledged. First, the promotion of elderly care enterprises through LTCI policy comes at the cost of increased government-related expenditure and additional resource allocation. Future research should focus on the cost-benefit analysis of LTCI to assess its long-term economic sustainability. Second, we have to recognize that the evidence for the mechanism, particularly regarding market demand, is only suggestive due to limited data.

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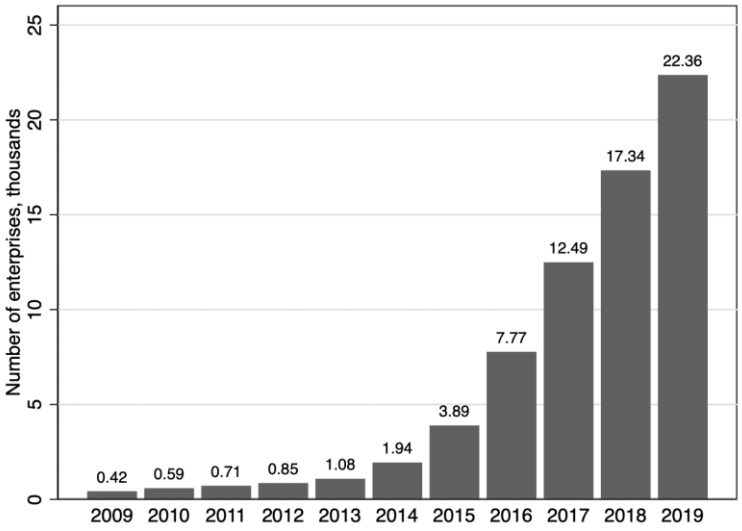
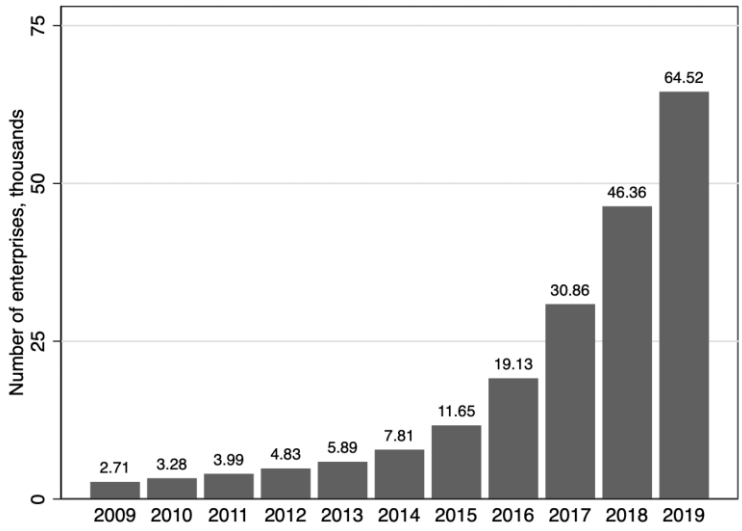
Figure and Tables



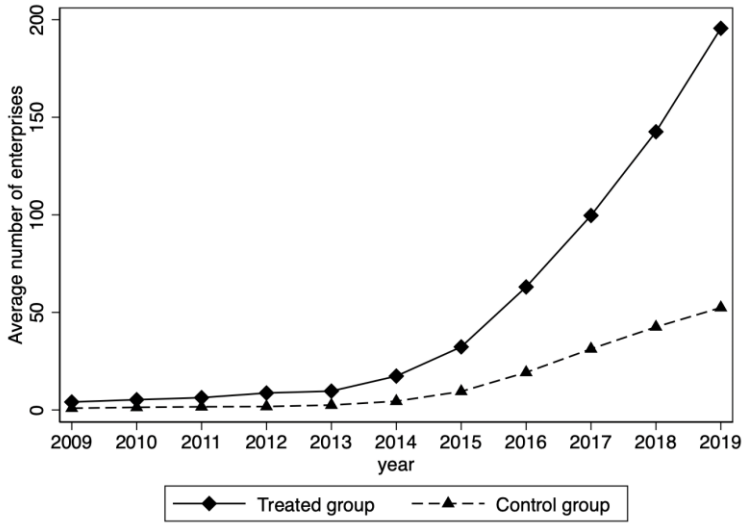
Panel A: Aggregate number of new enterprise entries



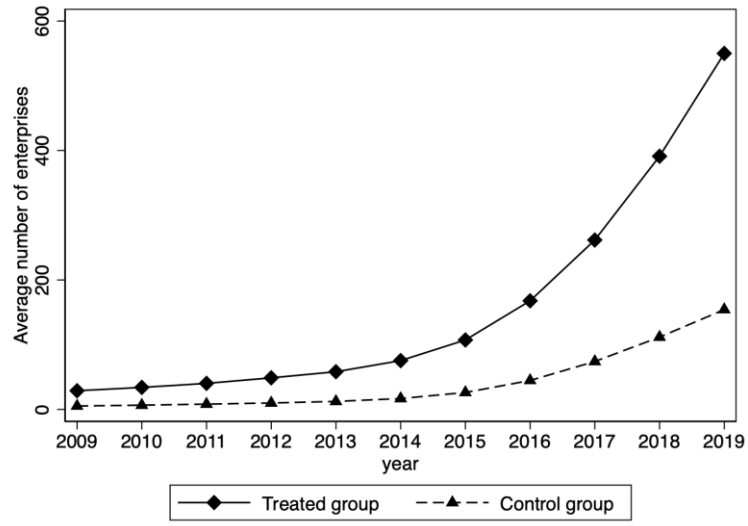
Panel B: Aggregate number of existing enterprises

Figure 1. Yearly aggregate number of elderly care enterprises nationwide.

Note: The data is from the registry database of State Administration for Industry and Commerce (SAIC). The Y-axis represents the yearly aggregate number of elderly care enterprises nationwide, comprising both new enterprise entries and existing enterprises each year.



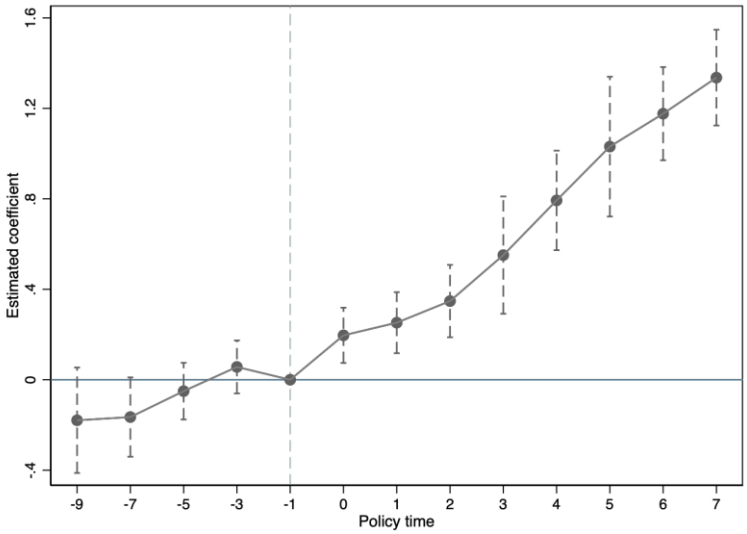
Panel A: Average number of new enterprise entries, by year and group



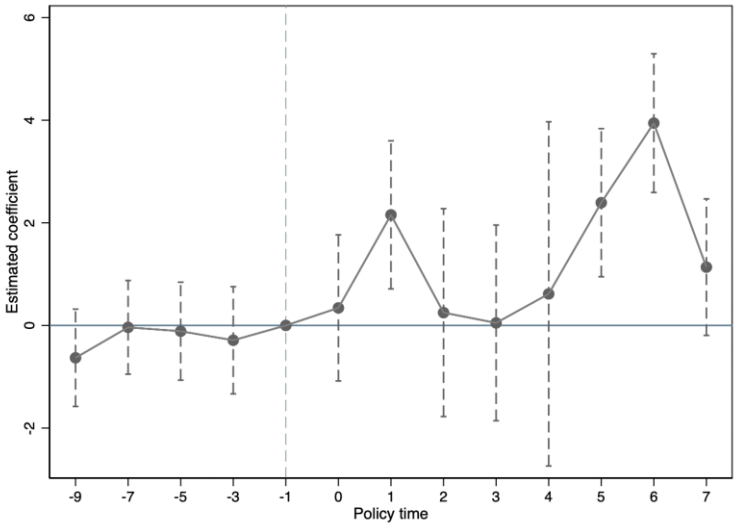
Panel B: Average number of existing enterprises, by year and group

Figure 2. Average number of enterprises per city over time: treated and control groups

Note: The data is from the registry database of State Administration for Industry and Commerce (SAIC). The Y-axis represents the yearly average number of elderly care enterprises per city, calculated separately for the treated and control groups. It includes both new enterprise entries existing enterprises.



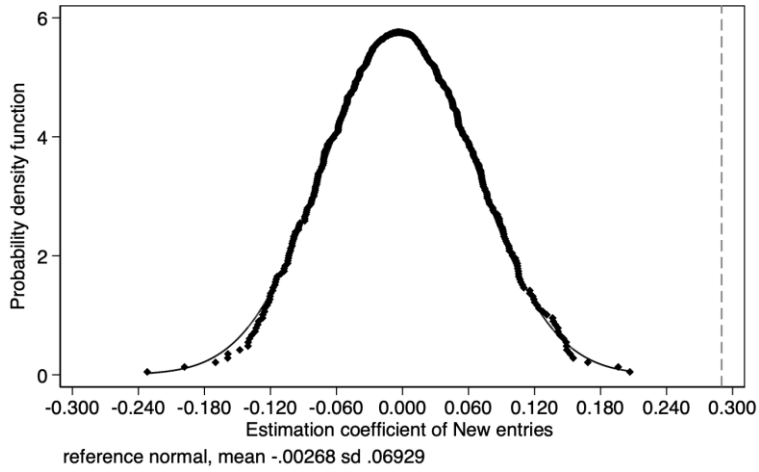
(a) Ln New entries



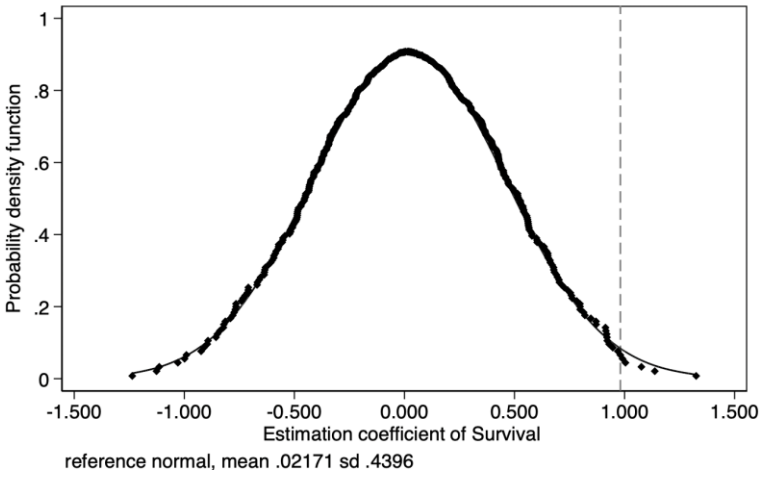
(b) Survival

Figure 3. Event study

Note: X-axis represents a specific period in comparison to the benchmark period. LTCI was implemented in period 0. Due to the long pre-intervention period, we merge every two pre-intervention periods to obtain one estimated coefficient. Control variables include per capita GDP, population, city area, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors are clustered at the city and year level. Figures (a) and (b), depict the effect trend of survival and new entry of elderly care enterprises. The dashed lines represent 95% confidence intervals.



(a) Ln New entries



(b) Survival

Figure. 4. Placebo test based on false treatment status.

Note: The vertical dashed line represents the coefficient size of LTCI effect in the basic regression results. All control variables, year fixed effect and city fixed effect are added. Control variables include per capita GDP, population, city area, average wage, fiscal revenue and the proportion of service industry at city level.

Table 1. Descriptive statistics

Variables	N	Mean	S.D.	Min	Max
Ln New entries	3,190	1.892	1.485	0	6.995
Survival	3,019	97.487	5.080	42.857	100
Ln Total number	3,190	2.936	1.512	0	8.280
ln GDP (RMB)	3,190	25.636	0.974	22.897	29.389
Ln Population	3,190	15.070	0.719	12.259	17.592
Ln Medical institutions	3,190	7.535	0.884	4.344	9.955
Ln Average wage (RMB)	3,190	10.760	0.379	9.451	12.062
Ln Fiscal revenue (RMB)	3,190	23.002	1.115	19.639	27.298
Proportion of Service Industry	3,190	40.070	9.843	9.76	83.52

Note: Some cities' total number of existing enterprises in the previous year is 0, leading to the missing value of Survival rate.

Table 2. Differences between treated and control groups

	(1)		(2)		(1)-(2)
	Control group		Treated group		
Variable	N	Mean/(SD)	N	Mean/(SD)	Mean difference
Ln New entries	2640	1.737	550	2.638	0.901***
		[1.397]		[1.660]	(0.068)
Survival rate	2,477	97.485	542	97.493	0.008
		[5.096]		[5.010]	(0.241)
LTCI	2640	0	550	0.265	0.265***
		[0.000]		[0.442]	(0.009)
Ln GDP	2640	25.458	550	26.490	1.032***
		[0.860]		[1.038]	(0.042)
Ln Population	2640	14.979	550	15.506	0.527***
		[0.667]		[0.796]	(0.032)
Ln Medical institutions	2640	7.462	550	7.887	0.425***
		[0.858]		[0.924]	(0.041)
Ln Average wage	2640	10.736	550	10.878	0.142***
		[0.371]		[0.394]	(0.018)
Ln Fiscal revenue	2640	22.815	550	23.898	1.083***
		[0.993]		[1.228]	(0.049)
Proportion of Service Industry	2640	39.217	550	44.163	4.946***
		[9.396]		[10.869]	(0.453)

Note: This table shows mean values and standard deviations of the key variables by cities' treated status (Treat). The standard deviations are reported in brackets and the standard errors are reported in parentheses. The difference is the value between the mean of the treated group and the control group. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 3. The effect of LTCI policy on new entries and survival of enterprises

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dep: Ln New entries			Dep: Survival		
LTCI	2.551***	0.282***	0.290***	-4.001***	0.755*	0.981**
	(0.096)	(0.045)	(0.045)	(0.466)	(0.446)	(0.452)
Ln GDP			0.053			3.006***
			(0.085)			(0.639)
Ln Population			0.132			0.395
			(0.151)			(0.825)
Ln Medical institutions			-0.007			-0.080
			(0.025)			(0.206)
Ln Average wage			0.087			-2.465***
			(0.133)			(0.927)
Ln Fiscal revenue			0.098*			0.739
			(0.057)			(0.451)
Proportion of Service Industry			0.005			0.046
			(0.003)			(0.031)
Constant	1.771***	1.879***	-4.804	97.687***	97.449***	22.493
	(0.025)	(0.009)	(3.023)	(0.093)	(0.075)	(22.120)
Year fixed effect	No	Yes	Yes	No	Yes	Yes
City fixed effect	No	Yes	Yes	No	Yes	Yes
Mean of Y	1.892	1.892	1.892	97.487	97.487	97.487
Observations	3,190	3,190	3,190	3,019	3,019	3,019
R-squared	0.133	0.900	0.900	0.029	0.503	0.512

Note: New entries represent the number of new enterprise entries in the entire city. Survival rate represents the survival rate of elderly care enterprises in the entire city. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 4. Differential effects of LTCI benefits

	(1)	(2)	(3)	(4)
	Dep: Ln New entries		Dep: Survival	
	Service benefit	Service and cash benefit	Service benefit	Service and cash benefit
LTCI	0.298***	0.228***	0.754*	1.402
	(0.050)	(0.085)	(0.439)	(1.028)
Control variables	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Mean of Y	1.857	1.783	97.475	97.498
Observations	3,047	2,783	2,880	2,616
R-squared	0.896	0.891	0.522	0.506

Note: New entries represent the number of new enterprise entries in the entire city. Survival rate represents the survival rate of elderly care enterprises in the entire city. Service benefit represent polit cities implementing LTCI policy with service benefit. Service and cash benefit represent polit cities implementing LTCI policy with service and cash benefit. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 5. The heterogeneous effect of LTCI policy

	(1)	(2)	(3)	(4)
	Dep: Ln New entries		Dep: Survival	
	Panel A: Enterprise Type			
	Individual business	Enterprises	Individual business	Enterprises
LTCI	0.456***	0.300***	4.715***	0.870*
	(0.073)	(0.045)	(2.390)	(0.449)
Mean of Y	0.521	1.979	91.505	97.309
Observations	3,190	3,190	1,648	3,037
R-squared	0.648	0.909	0.363	0.430
	Panel B: Industry Type			
	Health and social work	Other industry	Health and social work	Other industry
LTCI	0.510***	0.334***	1.574*	0.421
	(0.057)	(0.048)	(0.842)	(0.368)
Mean of Y	1.274	1.523	94.736	98.669
Observations	3,190	3,190	2,514	2,931
R-squared	0.860	0.872	0.434	0.347
	Panel C: District Type			
	Eastern	Central and western	Eastern	Central and western
LTCI	0.232***	0.104	0.944*	0.532
	(0.052)	(0.100)	(0.485)	(1.254)
Mean of Y	2.114	1.734	97.445	97.518
Observations	1,331	1,859	1,302	1,717
R-squared	0.915	0.890	0.524	0.509
Control variable	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes

Note: New entries represent the number of new enterprise entries in the entire city. Survival represents the survival rate of elderly care enterprises in the entire city. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 6. Robustness checks.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Alternative definition					
	New dependent		New treatment			
	Ln Net entries	New survival	Ln New entries	Ln Net entries	Survival	New survival
LTCI	0.315***	8.281***	0.308***	0.335***	1.173**	8.963***
	(0.054)	(2.760)	(0.049)	(0.059)	(0.488)	(2.967)
Observations	3,190	3,019	3,190	3,190	3,019	3,019
R-squared	0.885	0.279	0.901	0.885	0.512	0.279
	Panel B: Other regression methods					
	Matching based on 2010 characteristics		Matching year by year		Alternative robust estimators	
	Ln New entries	Survival	Ln New entries	Survival	Ln New entries	Survival
LTCI	0.197***	1.033**	0.212***	1.120**	0.334***	1.023**
	(0.048)	(0.499)	(0.047)	(0.483)	(0.049)	(0.437)
Observations	1,716	1,669	2,183	2,118	3,190	3,190
R-squared	0.917	0.508	0.916	0.551	0.901	0.513
	Panel C: Alternative controls		Panel D: More year		Panel E: Controlling the effect of simultaneous policy	
	Ln New entries	Survival	Ln New entries	Survival	Ln New entries	Survival
LTCI	0.107**	0.808*	0.212***	1.120**	0.273***	0..860**
	(0.045)	(0.480)	(0.047)	(0.483)	(0.038)	(0.347)
Observations	3,190	3,019	2,183	2,118	3,763	3,592
R-squared	0.913	0.524	0.916	0.551	0.920	0.571
Control variable	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes	Yes	Yes

Note: Net entries equal to the number of new entries minus the number of exiting. New survival equals the total number of existing enterprises divided by the total number of existing enterprises of the previous year. All number-related variables are transformed by adding 1 and then taking the natural logarithm. Alternative robust estimators are obtained based on Sun & Abraham (2021) and related event studies are shown in Figure A1. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 7. Mechanism: market demand for elderly care

	(1)	(2)	(3)	(4)
	Dep: Ln New entries		Dep: Survival	
	Panel A. Different number of medical institutions			
	higher	lower	higher	lower
LTCI	0.271***	0.202***	1.419*	0.470
	(0.085)	(0.051)	(0.800)	(0.477)
Observations	1,523	1,523	1,422	1,476
R-squared	0.867	0.925	0.466	0.604
	Panel B. Different aging			
	higher	lower	higher	lower
LTCI	0.268***	0.257***	1.231***	0.287
	(0.054)	(0.079)	(0.403)	(0.946)
Observations	1,507	1,683	1,485	1,534
R-squared	0.912	0.893	0.551	0.493
Control variable	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes

Note: New entries represent the number of new enterprise entries in the entire city. Survival represents the survival rate of elderly care enterprises in the entire city. Higher represents higher market demand for elderly care, while lower represents lower market demand for elderly care. In Panel A, higher represents smaller number of medical institutions and lower represents larger number of medical institutions. In Panel B, higher represents higher aging and lower represents lower aging. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 8. Mechanism: government-related expenditures

	(1)	(2)	(3)	(4)
	Social security and employment		Healthcare	
	Logarithm value	Absolute value	Logarithm value	Absolute value
	Panel A: The effect of LTCI on expenditure			
LTCI	0.056***	3.851***	-0.009	1.944***
	(0.016)	(0.711)	(0.021)	(0.354)
Observations	3,145	3,145	3,137	3,137
R-squared	0.972	0.866	0.972	0.871
	Panel B: Adding pre-existing trends in government spending			
LTCI	0.075***	1.614***	0.011	0.856***
	(0.022)	(0.600)	(0.026)	(0.297)
Observations	3,145	3,145	3,137	3,137
R-squared	0.972	0.921	0.973	0.926
Control variable	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes

Note: Social security and employment expenditure includes government expenditure on social welfare, disability services, the Red Cross, and minimum living allowances. Healthcare expenditure includes government expenditure on health and hygiene, such as health and hygiene management affairs, medical assistance, and elderly health and hygiene affairs. Pre-existing trends are captured by the interaction terms between 2010 social security expenditure and time trend, as well as between 2010 proportion of elderly population and time trend. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 9. The effect of LTCI on employees of elderly care enterprises

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	New employees	Ln New employees	Retention ratio	Growth rate	Creation rate	Destruction rate
LTCI	509.391***	-0.005	0.281**	5.424	5.304	-0.119*
	(164.269)	(0.134)	(0.126)	(3.623)	(3.622)	(0.069)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3190	3190	2,807	2,894	2,894	2,894
R-squared	0.253	0.629	0.203	0.190	0.190	0.179

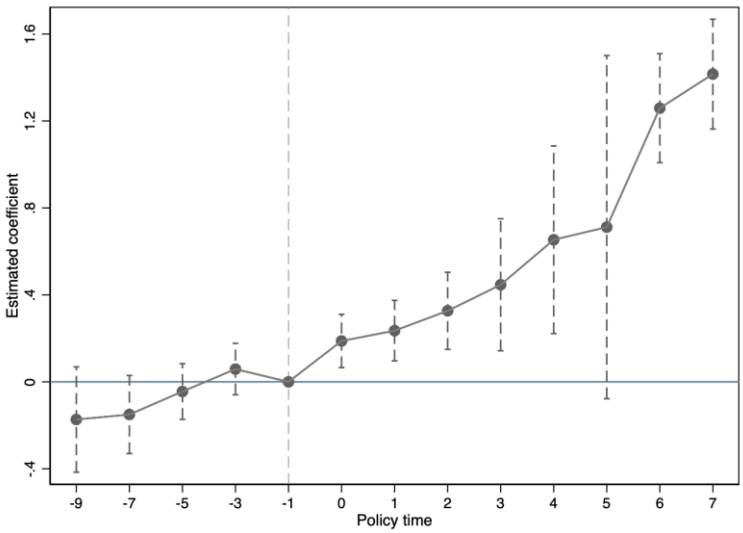
Note: New employees equal to the number of new entries to elderly care enterprises. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Table 10. The effect of LTCI on employment in related industries

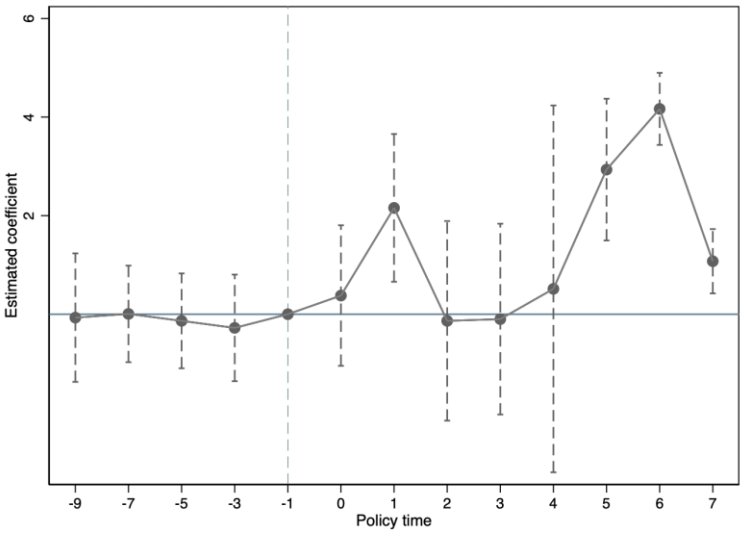
	(1)	(2)	(3)	(4)	(5)	(6)
	Health and social welfare industry			Public management and social organizations industry		
		Higher	Lower		Higher	Lower
LTCI	7.086***	7.467***	6.768***	4.385***	4.860**	4.585***
	(1.301)	(1.717)	(1.968)	(1.343)	(1.937)	(1.706)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,161	1,503	1,658	3,164	1,503	1,661
R-squared	0.963	0.955	0.972	0.977	0.966	0.984

Note: The number of employees in health and social welfare industry, and public management and social organizations industry are expressed in absolute numbers, measured in thousands of people. Higher represents higher aging and lower represents lower aging. Control variables include GDP, population size, the number of medical institutions, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.

Appendix



(a) Ln New entries



(b) Survival

Figure A1. Event study based on Sun & Abraham (2021)

Note: X-axis represents a specific period in comparison to the benchmark period. LTCI was implemented in period 0. Due to the long pre-intervention period, we merge every two pre-intervention periods to obtain one estimated coefficient. Control variables include per capita GDP, population, city area, average wage, fiscal revenue and the proportion of service industry at city level. Standard errors are clustered at the city and year level. Figures (a) and (b), depict the effect trend of survival and new entry of elderly care enterprises. The dashed lines represent 95% confidence intervals.

Table A1. The summary of pilot cities

Province	City	Implement Year	Benefit form
Shandong	Qingdao	2012	Service
Shandong	Dongying	2014	Service & Cash
Shandong	Weifang	2015	Service
Shandong	Rizhao	2015	Service
Jilin	Changchun	2015	Service
Jiangsu	Nantong	2016	Service
Shandong	Jinan	2016	Service
Jilin	Songyuan	2016	Service
Hebei	Xingtai	2016	Service
Jilin	Jilin	2016	Service
Hubei	Jingmen	2016	Service
Jiangxi	Shangrao	2016	Service & Cash
Hebei	Chengde	2017	Service
Shanghai	Shanghai	2017	Service
Anhui	Anqing	2017	Service & Cash
Zhejiang	Hangzhou	2017	Service
Jiangsu	Suzhou	2017	Service
Sichuan	Chengdu	2017	Service & Cash
Jiangsu	Xuzhou	2017	Service & Cash
Guangdong	Guangzhou	2017	Service
Shandong	Linyi	2017	Service
Zhejiang	Jiaxing	2017	Service
Jilin	Tonghua	2017	Service
Shanxi	Linfen	2017	Service
Shandong	Liaocheng	2017	Service
Heilongjiang	Qiqihar	2017	Service
Shandong	Taian	2017	Service
Chongqing	Chongqing	2017	Service
Jilin	Baishan	2017	Service
Zhejiang	Ningbo	2017	Service
Shandong	Binzhou	2018	Service & Cash
Shandong	Dezhou	2018	Service & Cash
Shandong	Jining	2018	Service
Xinjiang	Karamay	2018	Service & Cash
Shandong	Zibo	2018	Service
Beijing	Shijingshan district	2018	Service & Cash
Zhejiang	Taizhou	2018	Service
Shandong	Heze	2018	Service
Shandong	Zaozhuang	2018	Service
Shandong	Yantai	2018	Service

Hunan	Changsha	2018	Service
Shandong	Weihai	2018	Service
Jiangsu	Yangzhou	2018	Service & Cash
Guangxi	Hezhou	2018	Service
Jiangsu	Changzhou	2018	Service
Jiangsu	Wuxi	2019	Service & Cash
Zhejiang	Zhoushan	2019	Service & Cash
Hebei	Qinhuangdao	2019	Service
Zhejiang	Wenzhou	2019	Service & Cash
Xinjiang	Urumqi	2019	Service

Note: The determination of the implement year is based on policy documents.

Table A2. Variable definition

	Definition
Dependent variables	
New entries	Number of new entries of elderly care enterprises, add 1 and then take the logarithm
Survival	Survival rate in city-level. $Survival_{ct} = \frac{Total_{ct} - New_{ct}}{Total_{c,t-1}}$
Independent variable	
LTCI	$Treat_c \times Post_t$, $Treat_c$=1 represents city c is LTCI polit cities, $Post_t$=1 represents the year t is in or after the polit year
Control variables	
Ln GDP (RMB)	Represents GDP in city c and year t, taking the natural logarithm
Ln Population	Represents the total population in city c and year t, taking the natural logarithm
Ln Medical institutions	Represents the number of medical institutions in city c and year t, taking the natural logarithm
Ln Average wage (RMB)	Represents the average salary of on-the-job employees in city c and year t, taking the natural logarithm
Ln Fiscal revenue (RMB)	Represents the local government's general public budget revenue in city c and year t, taking the natural logarithm
The proportion of service industry	Represents the proportion of the tertiary industry in the GDP in city c and year t

Table A3. Balance test

		Mean			%reduct	t-test	
Variable		Treated	Control	%bias	bias	T value	P value
Ln GDP	Unmatched	26.137	25.060	120.5		8.35	0.000
	Matched	26.137	26.024	12.6	89.5	0.63	0.533
Ln Population	Unmatched	15.481	14.966	71.2		4.77	0.000
	Matched	15.481	15.436	6.2	91.3	0.32	0.749
Ln Medical institutions	Unmatched	7.319	7.043	29.8		1.90	0.058
	Matched	7.319	7.155	17.8	40.3	0.96	0.341
Ln Average wage	Unmatched	10.458	10.301	68.9		4.72	0.000
	Matched	10.458	10.445	6.1	91.2	0.29	0.775
Ln Public revenue	Unmatched	23.420	22.288	106		7.41	0.000
	Matched	23.420	23.290	12.2	88.5	0.59	0.557
Tertiary Industry Proportion	Unmatched	38.631	35.073	38.4		2.65	0.008
	Matched	38.631	37.897	7.9	79.4	0.38	0.702

Note: We use all controls used in baseline regression to perform six nearest-neighbors matching.

Table A4. More robustness checks.

	(1)	(2)	(3)	(4)
	Panel A: Poisson model		Panel B: Alternative measure of Survival	
	Ln New entries		Survival	
			One-year	Two-year
LTCI	1.128***		1.231**	1.628*
	(0.077)		(0.537)	(0.838)
Observations	3,190		3,190	3,190
R-squared	0.895		0.557	0.548
	Panel C: delete Shandong and Jilin province		Panel D: delete province- level municipalities	
	Ln New entries	Survival	Ln New entries	Survival
LTCI	0.119**	1.011*	0.314***	0.934**
	(0.056)	(0.589)	(0.047)	(0.475)
Observations	2,926	2,755	3,146	2,975
R-squared	0.898	0.508	0.895	0.510
Control variable	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
City fixed effect	Yes	Yes	Yes	Yes

Note: The dependent variable of Poisson model is the absolute value of number of new entries. "One-year" and "Two-year" adjustments refer to our assumption that the recorded exit year of firms in the registration data may lag behind the actual exit year by one or two years. Standard errors clustered at the city and year level are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% level, respectively.