

# Government Subsidies and Fiscal Burdens for Home-based Elderly Care Services

Yiwan Sun \*, Shaopeng Qin

College of Insurance, Central University of Finance and Economics, Beijing, China

\* Corresponding Author: Yiwan Sun

**Abstract.** Based on the number of older people of different ages, genders and health conditions from 2021 to 2050, this paper measures the scale of demand for China's home-based elderly care services. We simulated government subsidies' scale and fiscal burden under nine scenarios with different subsidy standards and coverage processes. The results show that the policy coverage and subsidy standards significantly affect the government subsidies and fiscal burdens of home-based elderly care services. To balance fiscal sustainability, China should start the procedure with "low standard with small coverage" and gradually transfer to "high standard with wide coverage."

**Keywords:** Home-based Elderly Care Services; The Scale of Demand; Government Subsidies; Fiscal Burdens.

## 1. Introduction

At present, the aging of China's population is accelerating. *The 14th Five-Year Plan of the National Economic and Social Development of the People's Republic of China and the Outline of Vision 2035* put forward the goal of "developing inclusive elderly care services". However, the development of home-based elderly care services in China is relatively slow, and the imbalance between supply and demand has always been a critical problem limiting its development. What is the size of the demand for home-based elderly care services in China? How do we determine the mode and standard of the government subsidies to benefit more older people when the finance can afford it?

Developed countries started theoretical research on home-based elderly care services earlier and have rich practical experience. Domestic academic research on government subsidy policies for home-based elderly care services focuses on the discussion of policy types and government roles (1) and a comparative evaluation of different practice models at home and abroad (2,3), construction of performance evaluation system (4), the structure of management mechanism and exertion of regulatory role (5). In recent years, some scholars have also discussed the sustainability of government purchase of elderly services from the perspective of public service expenditure and fiscal policy (6). However, these studies are mainly qualitative or assess the practical experience of a particular city as an example, which has certain limitations.

In summary, for measuring the scale of demand for home-based elderly care services, few studies discuss the pressure on the supply side from the perspective of government subsidies and measure the fiscal burden. Based on this, this paper discusses the issues of how to set the subsidy standard and how to extend the policy coverage in order to take into account the fiscal soundness of government subsidies and analyzes the degree of influence of different parameters on the government subsidy policy so as to provide a scientific basis for the formulation of the future subsidy policy for home-based elderly care services in China.

## 2. Measurement of Home-based Elderly Care Service Needs

The total demand for home-based elderly care services is the sum of the needs of the elderly with various health conditions.  $i=\{1,2,3\}$  represent the three health conditions of self-care, partial disability and complete disability, respectively.  $G=\{\text{male, female}\}$  indicate gender.  $r$  represents the starting age of enjoying home-based elderly care services, and  $z$  represents the ultimate age. Supposing the



starting age of 60 and the ultimate age of 100, we take 2021 as the base period and 2050 as the end year to estimate the total demand for home-based elderly care services for 30 years.  $TE_t$  represents the total demand for home-based elderly care services in year  $t$ , and it can be expressed as follows:

$$TE_t = \sum_{x=r}^z \sum_{i=1}^3 L_{t,x}^G (1 - \varepsilon_{t,x}) d_{t,x,i}^G E_{t,i} \quad (1)$$

Where  $L_{t,x}^G$  refers to the number of  $x$ -year-old people in year  $t$ .  $\varepsilon_{t,x}$  denotes the proportion of institution-care elderly in the elderly aged  $x$  in year  $t$ .  $d_{t,x,i}^G$  represents the proportion of older people with the health condition  $i$  of  $x$ -year-old people in year  $t$ .  $E_{t,i}$  represents the cost of home-based elderly care services with the health condition  $i$  in year  $t$ . What's more, the probability of health conditions in the elderly is derived from the results of the Ability of Daily Living (ADL) questionnaire survey in *the China Health and Retirement Longitudinal Study* (CHARLS) in 2013, 2015, and 2018. This paper draws on the smoothing treatment and the use of a uniform distribution to set the rate of growth of disability rate to forecast the disability rate from 2021 to 2050 (21,25). The specific approach is shown as:

$$\Delta d_{13-15,x,i}^G = \left( \frac{d_{2015,x,i}^G}{d_{2013,x,i}^G} \right)^{\frac{1}{2}} - 1, \quad \Delta d_{15-18,x,i}^G = \left( \frac{d_{2018,x,i}^G}{d_{2015,x,i}^G} \right)^{\frac{1}{3}} - 1 \quad (2)$$

Take the average of the two as the rate of change in the probability of health conditions:

$$\Delta d_{x,i}^G = \frac{1}{2} (\Delta d_{13-15,x,i}^G + \Delta d_{15-18,x,i}^G) \quad (3)$$

Then, the health condition probability of the elderly of different ages and genders from 2021 to 2050 is shown as:

$$d_{t,x,i}^G = d_{2018,x,i}^G \times (1 + \Delta d_{x,i}^G + u_{[-1,1]}) \quad (4)$$

The per capita cost of home-based elderly care services in different health conditions over the years has been adjusted according to the CPI index. The CPI index is predicted based on the ARIMA (1, 1, 0) time series model after 2021. The average annual cost of home-based elderly care services with different health conditions in 2021-2050 is calculated.

### 3. Government Subsidy Standards and Policy Coverage Process

This paper simulates the different coverage processes and subsidy standards in formulating government subsidy policies for home-based elderly care services based on the calculation of the demand for home-based elderly care services from 2021 to 2050. Further, the study discusses the fiscal burden under different scenarios.

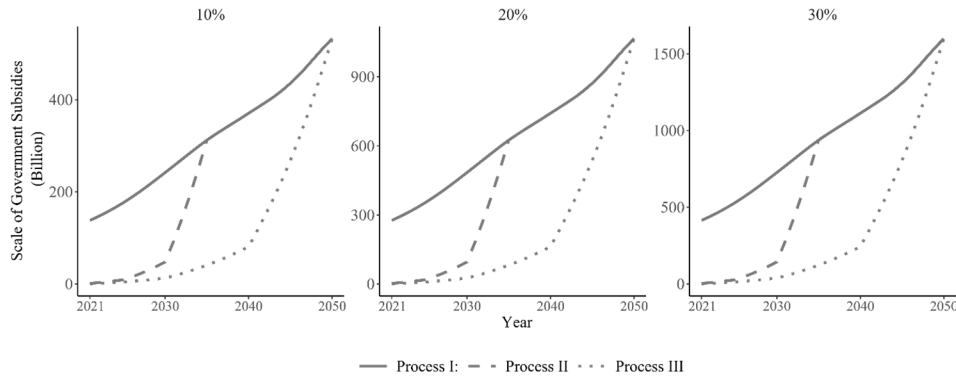
#### 3.1. Three Schemes of Government Subsidy Standard

Comprehensively considering the actual situation, we set three scenarios to measure the scale of government subsidies and fiscal burden of home-based elderly care services namely as high, medium and low schemes of 30%, 20% and 10% of government subsidies, respectively. According to the rigidity of their demand and the urgency of achieving the national goal of "all elderly people enjoy basic elderly care services" by 2035, we simulate the incremental expansion process of the government subsidy policy as the following three coverage processes.

Process I: At the beginning of the forecast period, the policy will fully cover all the elderly who have the demand for home-based elderly care services. Process II: It is assumed that the policy would gradually cover an elderly group with a health condition from 0 to 100% every five years. The policy covers all the elderly aged 60 and above who require home-based elderly care services step-by-step. Process III: It is assumed that the policy gradually covers an elderly group with a health condition from 0 to 100% every ten years. The policy covers all the elderly aged 60 and above who require home-based elderly care services step-by-step.

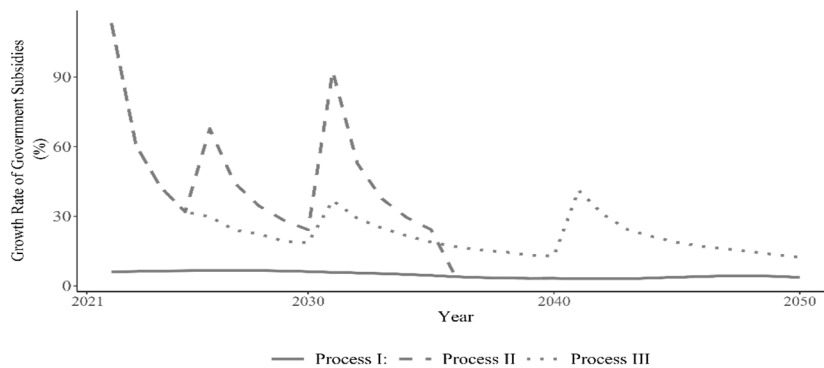
### 3.2. Measurement Results

Substituting the relevant parameters into equation (1), the scale of government subsidy for home-based elderly care services under the low, medium and high schemes are measured under the three coverage processes for a total of nine scenarios, and the results are shown in Figure 1. We can see the average annual government subsidy scale increases with the improvement of government subsidy standards, and the average annual subsidy scale under the medium and high schemes is 2 times and 3 times that under the low plan, respectively.



**Figure 1.** The scale of government subsidies for home-based elderly care services

Figure 2 gives the growth rate of government subsidies for home-based elderly care services under each process, with the same trend of the rate under the high, medium, and low subsidy standards. At Process I, the growth rate of government subsidies falls from 6.13% to 3.63% during the forecast period, showing a flat downward trend except for slight fluctuations between 2045 and 2050, and lower than the growth rates of Process II and III. We can see that each process grows faster in the initial stage of expanding population coverage and then slows down until the growth rate gradually declines after the policy achieved full coverage. The size of the government subsidy increases rapidly when the covered size suddenly expands, because more seniors are included in the system.



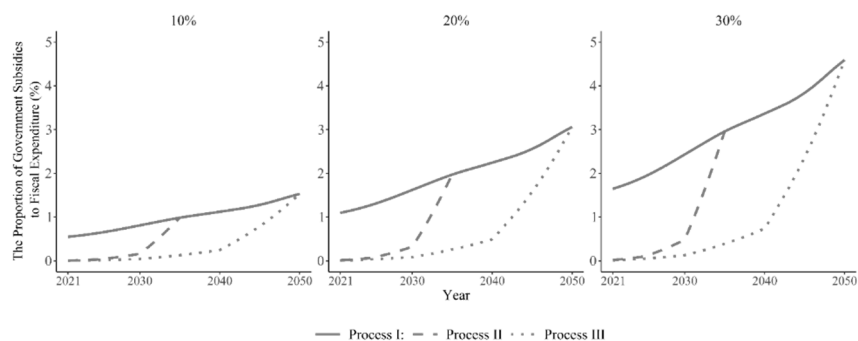
**Figure 2.** The growth rate of government subsidies for home-based elderly care services

A comparison of the nine scenarios shows that the size of government subsidies is strongly influenced by two factors: the number of people covered by the policy and the standard of government subsidies. The government's fiscal affordability will profoundly constrain the performance of its role. How do we meet the needs of residents for elderly care services while considering the sustainability of the government's subsidy for elderly care service policies? We will discuss this further below.

### 4. Fiscal Burden of Home-based Elderly Care Services and Sensitivity Analysis

The fiscal burden of home-based elderly care services reflects by the ratio of government subsidy expenditure on home-based elderly care services to fiscal expenditure. According to *China Statistical Yearbook 2021*, the historical data of fiscal expenditures from 1978 to 2020 shows that the total fiscal

expenditures exhibit a noticeable time-series growth trend. In this paper, we use the AR (1) time series model to forecast the changes in fiscal expenditure in future years using the growth rate of fiscal spending in past years from 1978 to 2020 as historical data, and then estimate the total fiscal expenditure in 2021 to 2050. The proportion of government subsidy expenditure to fiscal expenditure under the three coverage processes is shown in Figure 3. As far as the single coverage process is concerned, the range of changes in the financial burden under the low, medium and high schemes of Process I is: 0.55%-1.54%, 1.10%-3.06%, 1.65%-4.59%, respectively, that is, when the government subsidy standard is raised to the level of 20% and 30%, the financial burden will increase to 2 times and 3 times the original, which will bring certain pressure to the finance. It can be seen that under the same coverage process, the higher the government subsidy standard, the heavier the financial burden when achieving full coverage.



**Figure 3.** The proportion of government subsidy expenditure to fiscal expenditure

## 5. Conclusion

The study measures the scale and the demand trend for home-based elderly care services in China from 2021 to 2050 by predicting the number of the elderly of different age, gender and health status. After verifying that the government subsidy policy can indeed improve the level of home-based elderly care services by using the econometric model, this paper measures the scale of government subsidy and fiscal burden of home-based elderly care services under nine scenarios from the perspective of government subsidy, by assuming different subsidy standards and different policy coverage processes in numerical simulations. It is proved that under the same coverage process, the fiscal burden will increase by the corresponding multiple as the government subsidy rate increases. Therefore, the government subsidy policy for home-based elderly care services should start with "low standard with small coverage" and gradually transfer to "high standard with wide coverage."

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