

# *Will Domestic Economic Growth be affected by Postponed Retirement?*

—From the perspective of labor capital

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**Abstract**—With economic growth model as a tool, the paper sets to analyze the effect of postponed retirement on domestic economic growth by taking into account the effect of such labor force-affected factors as adoption of two-child policy and increased fiscal input on education and fixed investment with alleviated bottom-reaching pressure on social security fund on the basis of gradual postponed retirement plan. Both quantity and quality of labor force are weighed here. As suggested by the study results, postponed retirement can significantly raise domestic economic aggregate in a time-dependent manner, and produce a positive effect on the economic growth speed in the long run.

**Keywords**—postponed retirement; population age structure; labor resource; economic growth component

## I. INTRODUCTION

It is pointed out in the *Outline of the 13<sup>th</sup> Five-Year National Economic and Social Development Plan* that “domestic economy is planned to maintain a moderate to high-speed growth and double the gross domestic product (GDP) during the 13<sup>th</sup> Five-Year Plan period”. According to the third plenary session of the 18<sup>th</sup> Central Committee of Communist Party of China, it is necessary to “draft a gradual retirement postponement policy”. The proposition of those two goals promotes the relationship between postponed retirement and economic growth to become a focus of both social and academic circles. Then will the implementation of gradual retirement postponement plan facilitate domestic economic growth? To investigate the effect of postponed retirement on economic growth will be of great significance for the economic development and policy enactment in our country.

When studying the correlation between postponed retirement and economic growth, domestic and foreign scholars mainly rely on the establishment and simulation of overlapping generation (OLG) model, computable general equilibrium (CGE) model, or a combination of them. To study and analyze the relationship of postponed retirement with social economic development, Li and Merette (2005) [1] adopted OLG-CGE model, Vogel Ludwig and Börsch-Supan (2013) [2], Fan Changke and Lin Guobin (2015) [3], Wang Tianyu (2016) [4], and Yan Chengliang (2016) [5] the OLG model, and Peng and Mai (2013) [6] and Xiao Hao (2016) [7]

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the dynamic CEG model. Both domestic and foreign academic circles analyze the relationship from either labor force or pension system. A study developed by Burtless and Quinn (2002) [8] with America as the research object indicated raising the age of retirement, especially that of women, in America after 1980s did bring some benefits to both individuals and national economy and promote the economic development. Ichino (2007) [9] expounded the substitution relation between senile workers and young ones to prove that the pension payment pressure could be alleviated through postponed retirement on the prerequisite that the employment prospect of senile workers was never deteriorating. The research conducted by Bloom, Canning and Fink (2010) [10] suggested aging population-induced economic recession could be resisted if the government postponed the retirement.

Starting from the perspective of labor capital, this paper refers to the economic growth model in neoclassical economics, adds some control variables, and combines with gradual postponed retirement policy, in the hope to find out the effect of postponed retirement on domestic economic growth and provide empirical support for the improvement of policies related to postponed retirement and economic and social development planning.

## II. RESEARCH DESIGN

### A. Model building and variable selection

Based on the MRW model established by Mankiw (1992), the model in this paper is set up as follows:

$$Y_t = \beta_0 + \beta_1 K_t + \beta_2 H_t + \beta_3 L_t + \beta_4 X_t + \mu_t \quad (1)$$

Where  $Y$  means the economic aggregate expressed as GDP over the years,  $K$  means capital stock expressed as the same over the years,  $H$  means the labor quality expressed as average years of education received by the labor force,  $L$  means the labor quantity expressed as number of employees over the years,  $X$  is a total of some other variables that could affect the economic growth, such as financial deepening progress (in M2/GDP), openness of import/export (in total foreign trade value/GDP), fiscal expenditure (in total fiscal expenditure/GDP), and ratio of urban to rural income (in per capita disposable income of urban households/per capita net

income of rural households),  $t$  indicates the year, and  $\mu$  is the residual item.

**B. Data sources**

The data used in the present paper are from the statistical data of our country during 1996-2016, among which GDP, number of employees over the years, M2, total foreign trade value, total fiscal expenditure, per capital disposable income of urban households, and per capital net income of rural households are extracted from 1996-2016 China Statistical Yearbooks, capital stock data from the computation by Shan Haojie (2008), and labor quality data figured on the basis of “education of nationwide employees” in 1996-2016 China Labor Statistical Yearbooks. All the price-related data in this paper are based on the immutable prices in 1978.

**C. Prediction about labor**

*1) Labor quantity*

In this paper, cohort-element method is employed to predict about the number of workforce from 2017 to 2050. It is assumed in *National Population Development Plan 2016-2030* that total fertility rate in the future keeps being around 1.8. The average life expectancy in our country by 2050 is supposed to be 79.3, human mortality adopts that classified by age in the 6<sup>th</sup> demographic census data, labor participation rate adopts the data in 2016 statistical yearbook. After the gradual postponed retirement policy is enforced, the scheduled retirees are re-counted as workforce. The labor quantity can be figured out after the enforcement of the policy by referring to the gradual postponed retirement plan. TABLE I offers the quantity of some labor force as computed.

TABLE I. PREDICTED DOMESTIC LABOR QUANTITY AFTER IMPLEMENTATION OF POSTPONED RETIREMENT (IN 10,000 PEOPLE)

Time	Labor quantity	Time	Labor quantity
2017	77464	2035	74079
2020	77202	2040	72689
2025	76172	2045	71591
2030	74944	2050	68766

*2) Labor quality*

The present paper adopts the labor quality determination method proposed by Zhang Xiaoxue et al (2002) [11] and the admission age prescribed in corresponding criteria. The admission rate data are from China Educational Statistical Yearbook. In accordance with the 13th Five-Year Plan for National Educational Development, the gross admission rates of senior high school and higher education are supposed to grow by 1% every year. In the meantime, in view of the bottom-unveiling declination in social security fund caused by postponed retirement as well as the effect of increased expenditure on education and fixed investment, this paper concludes that the input of every 10 billion Yuan into education would raise the gross admission rate of higher education by 0.11%. Based on the social security fund budget and fiscal expenditures in 2016, this paper sets to figure out the effect of higher fiscal expenditure on labor quality and capital stock. The labor quality after enforcement of postponed

retirement is also assessed through computation. Labor quality is partly revealed in TABLE II.

TABLE II. PREDICTED LABOR QUALITY TRENDS AFTER IMPLEMENTATION OF POSTPONED RETIREMENT (YEAR)

Time	Labor quality	Time	Labor quality
2017	10.34	2035	13.13
2020	10.63	2040	14.05
2025	11.29	2045	14.75
2030	12.23	2050	15.4

**III. RESEARCH RESULTS**

**A. Data processing**

The aforesaid data are introduced into the model to undergo regressive calculation and the results are listed in TABLE III. According to the results, the regression passes F-test, indicating the significance of the modeling results. The model also receives the T-test and all the variables and constants pass the test with confidence level being 95% and R<sup>2</sup> being 0.926. The model fits well, which means the prediction model erected in this paper can be used to predict about domestic economic growth in the future.

TABLE III. RESULTS OF REGRESSION ANALYSIS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	6.983	7	0.998	32649.859	0.000 <sup>a</sup>
Residual	0	13	0		
Total	6.983	20			

**B. Parameter setting**

When applying the erected model to predicting about the future economic growth here, it is necessary to make hypotheses about related data in the prediction model.

- Labor quantity and quality result from the computation in this paper;
- Capital stock is supposed to grow by 10% every year according to the computation by Shan Haojie (2008);
- Financial deepening is assumed to grow at 3.17% in the future on the basis of 1996-2016 *China Statistical Yearbooks*;
- Openness of import/export is assumed to keep being around 40% in the future according to 1996-2016 *China Statistical Yearbooks*;
- Fiscal expenditure is supposed to account for 23% of GDP in the future according to 1996-2016 *China Statistical Yearbooks*;
- Urban-rural income distribution: in light of the data in 1996-2016 *China Statistical Yearbooks*, the future urban-rural income distribution ratio is assumed to remain as 3.1 in the present paper.

C. Analysis of economic growth change after implementation of postponed retirement

The introduction of related data into the model produces the data about domestic economic development during 2017-2050. Fig. 1 is about the change in domestic economic aggregate in the future, from which it is obvious that domestic economic aggregate in case of postponed retirement implementation will be significantly higher than that without the policy and the effect is increasingly stronger over the time.

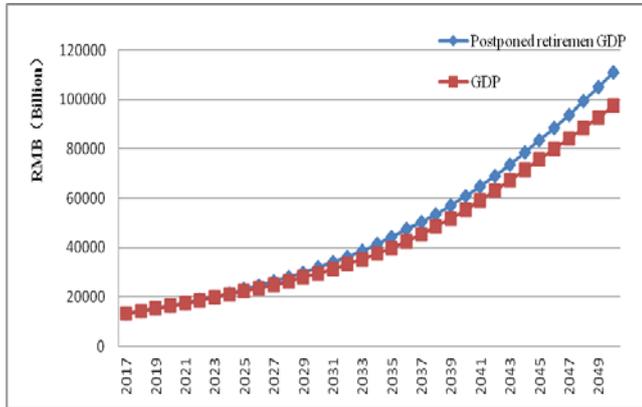


Fig. 1. Predicted domestic economic aggregate

In Fig. 2, the economic growths with and without implementation of gradual postponed retirement are compared. In view of the figure, we can find after the policy is implemented, domestic economic growth can be divided into three stages. Stage 1 is from 2022 in which the policy comes into effect to 2036, during which postponed retirement can significantly raise the economic growth rate and produce an obvious effect on domestic economic growth. This stage is a beginning stage for the implementation of gradual postponed retirement. The policy enables much workforce who are scheduled to retire to keep working, and the resulting more workforce does speedy domestic economic growth. Stage 2 is from 2037 to 2043. The postponed retirement policy begins producing a negative effect on domestic economic growth after being implemented for 16 years so that the economic growth rate is lower than that without the implementation. The declining economic growth rate may be attributed to the age structure of the population. In 2037, postponed retirement leads to a sharp decrease in both quantity and quality of newly increased senile workforce. The reason is that the newly increased senile workforce during this stage are mostly born in late 1960s and early 1970s who receive less education and are low in labor quality with more siblings and less education investment before implementation of birth control. In addition, they are physically inferior to the young labor force. Those account for the negative effect of gradual postponed retirement on economic growth in this stage. Stage 3 begins from 2043. In this stage, the implementation of postponed retirement is no longer as negative as in Stage 2 and can again stimulate the economic growth in our country. It is mainly because those retiring from work after 2038 are born after 1973 marked with implementation of birth control in spite of the high population gross. With higher education investment from the families,

they got to receive higher education also. Therefore, in this stage the contribution of higher labor quality to economic growth becomes even more remarkable with economic growth, especially with the development of technology-intensive industries. This is also called the second demographic bonus.

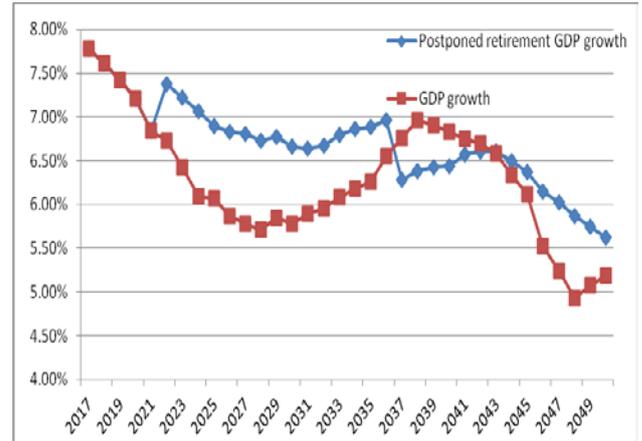


Fig. 2. Domestic economic growth prediction

It can also be viewed from Fig. 2 that the economic growths with or without implementation of postponed retirement policy are almost the same. The economic growth shows a decline from 2022 to 2029 but tends to rise from 2030 to 2036 and drops again after 2043. The research in this paper suggests implementation of gradual postponed retirement does lead domestic economic aggregate to rise in the future but with varying degrees in the resulting effect. Nevertheless, it is beneficial to the economic growth in our country when examined in a long run.

IV. CONCLUSION

A comparison of the economic growth in the two situations above arrives at the following conclusions. Firstly, the postponed retirement policy can raise economic aggregate of our country, because it can bring more workforces to effectively supplement the labor supply, and finance can be less bottom-unveiling after retirement age gets postponed so that more capital can be spent on education and fixed investment to improve labor quality. Secondly, the effect of postponed retirement on domestic economic growth varies in different stages. In the early stage of postponed retirement implementation, postponed retirement can exert a positive effect on the economic growth as it brings in a great number of experienced and sophisticated senile workforces. Later, due to the population structure and effect of the birth control policy in the last century, postponed retirement begins affecting the economic growth in a negative way. However, as more and better labor force are introduced by the postponed retirement policy, its effect on the economic growth turns to be positive again. Thirdly, postponed retirement is favorable for the long-term economic development in our country. As domestic economy keeps a transition from labor-intensive industries to technology-intensive industries, we demand more high-quality workforce. When reaching the age of retirement, high-quality labor force can still leverage their experience and techniques

to contribute to the economic development. In view of the factors above, the drafting of postponed retirement policy should take into consideration also the necessity of such measures as higher educational input, constant optimization of industrial structure, and supply of matching facilities for two-child policy.

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