Research on Policy of Delayed Retirement, Old-age Labor Supply and Urban-rural Income Gap

-An Empirical Analysis based on Inter-provincial Data of China

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Abstract—**Based on the panel data of 28 provinces from 2003 to 2015, this paper uses the fixed effect model to empirically study the relationship between the delayed retirement policy and the urban-rural income gap. The study proves a significant positive correlation between the population of employed elderly and the urban-rural income gap, indicating that the implementation of the delayed retirement policy will influence the urban and rural income gap by increasing the supply of old-age labor. Therefore, the policy of delayed retirement should be incrementally implemented and the interests and contradictions of various aspects should be weighted so as to ensure the steady and healthy development of the economy.**

Keywords—Delayed Retirement; Urban-rural Income Gap; Population Aging

I. INTRODUCTION

The income gap between urban and rural residents is widening while Chinese economy is growing at a rapid pace (Lin, 1998[1]). The continuous expansion of the urban-rural income gap will undermine the coordinated development of China's urban and rural economy and the long-term sustainable development of the Chinese economy (Ouyang, 2014[2]). On the other hand, a stable workforce scale and a relatively young workforce structure are conducive to the sustainable economic growth (David, Jeffrey, 1998[3]). As aging population and pressure of labor supply intensify in China, the Chinese government officially decided to research and develop a policy on gradually delaying retirement age at the Third Plenary Session of the 18th CPC Central Committee. Delayed retirement policy can directly increase the supply of old-age labor force. Nevertheless, whether the implementation of the policy can effectively narrow the income gap between urban and rural areas demands further discussion.

II. LITERATURE REVIEW

As one of the significant means to alleviate the shortage of labor supply, the delayed retirement policy was firstly proposed by Chen [4] (1994) and was formally put on the agenda at the Third Plenary Session of the 18th CPC Central Committee. Whether the delayed retirement policy can ease the shortage of labor force remains contentious academically. Some scholars believe that there is an alternative relationship between old-age employment and youth employment. Old-age

workers leaving the labor market can improve the employment of young workers (Wise, 2004[5]). The practice of delayed retirement policy will aggravate the overall unemployment rate in the labor market (Michello, 2006[6]). While Kalwij et al [7] (2010) found that old-age employment imposed no significant squeeze-out effect on youth employment. Instead, there is a certain degree of complementarity between the two (Gruber, 2011[8]). If properly implemented, the policy may create more employment opportunities for young workers (Fan, 2015[9]). On the other hand, the delayed retirement policy that changes the scale and the age structure of the labor force will inevitably reshape the economic output and the urban-rural income gap. Zhong[10] (2010) reassessed the role of the labor market in adjusting the urban-rural income gap, proving that the effectiveness of labor market adjustment in narrowing the urban-rural income gap far outweigh the results from traditional statistics, Li[11] (2014) explored the influence on the urban-rural income gap posed by shifts in the population age structure, indicating that the average age of the rural workforce and the urban-rural income gap are positively related, and that the urban-rural income gap caused by shifts in the population structure can not be bridged.

Based on existing researches, this paper, using the 2003 to 2015 panel data of 28 provinces, municipalities and autonomous regions (Xinjiang, Tibet and Hainan excluded) in China, through fixed effect model, empirically studies the correlation between the supply of old-age labor and the urban-rural income gap.

III. MODEL ESTABLISHMENT

A. Model Setup

With reference to the models of Chao [12] (2014) and Zhao [13] (2017) and others, this paper establishes three models of the relationship between the total elderly employment population and the urban-rural income gap, between the elderly male employed population and the urban-rural income gap as well as between the elderly female employed population and the urban-rural income gap.

$$tl_{it} = \beta_0 + \beta_1 to_{it} + \sum_{n=2}^{7} \beta_n \, controls_{it} + \varepsilon_{0it} \quad (1)$$

$$tl_{it} = \beta_0 + \beta_1 mo_{it} + \sum_{n=2}^{7} \beta_n \, controls_{it} + \varepsilon_{0it} \quad (2)$$

$$tl_{it} = \beta_0 + \beta_1 fo_{it} + \sum_{n=2}^{7} \beta_n \, controls_{it} + \varepsilon_{0it} \quad (3)$$

where *tl* denotes the urban-rural income gap, measured by the Theil index of urban-rural income, *to*, *mo* and *fo* is the population of employed elderly, the employed elderly male and female respectively, *control* is the control variables, including urbanization level *urban*, foreign trade dependency ratio *open*, fixed asset investment *linv*, social security expenditure proportion *ins*, binary contrast coefficient *stru* and non-nationalization degree *private*, index *it* represents represents the index data of the *i*th province in the *t* year (i =1, 2, 3 ......31, t = 2003, 2004 ... 2015), ε is a random perturbation term that is independently and identically distributed.

B. Selection of Variables

With reference to indicator selection in available studies (Li, 2002 [14], Zhu, 2017 [15]), this paper chooses the Thiel index tl in the urban and rural areas as the explained variable, and the total population of employed elderly *to*, population of employed elderly male *mo* and the population of employed elderly female *fo* as the explanatory variables. To control variable sets, this paper identifies six control variables, including fixed asset investment *linv*, urbanization level *urban*, binary contrast coefficient *stru* (Chenery H.,1988 [16]), non nationalization degree private, foreign trade dependence degree open (Lu, Chen, 2005 [17], Gan, Zheng, 2011 [18]), and the social security expenditure proportion *ins*.

- **Explained Variable**: *tl*, Urban-rural income Theil

$$tl = \left(\frac{I_c}{I}\right)\ln\left[\frac{\frac{I_c}{L_c}}{\frac{I}{L}}\right] + \left(\frac{I_n}{I}\right)\ln\left[\frac{\frac{I_n}{L_n}}{\frac{I}{L}}\right]$$

  index. . where *n, c* are rural and urban areas respectively, and I、L are income and population. The higher value of *tl* indicates the greater urban-rural disparity, and vice versa.

- **Explanatory Variables**: The total population of employed elderly (*to*): the total population of employed elderly male and female. The total population of employed elderly male (*mo*): the total population of employed elderly male at the age of 55-64. The total population of employed elderly male (*fo*): the total population of employed elderly female at the age of 50-59.

- **Controlled Variables**: Fixed asset investment (*linv*): the natural logarithm of the actual fixed asset

investment. The level of urbanization (*urban*): the ratio of non-agricultural population to total population. Urban-rural binary contrast coefficient.

$$stru = \frac{\frac{Y_n/Y}{N_n/N}}{\frac{Y_c/Y}{N_c/N}},$$ Y、N are production value and

employment respectively. Non-nationalization degree (*private*): the ratio of non-state-owned fixed asset investment to total fixed asset investment in the region. Foreign trade dependence degree (*open*): the ratio of the total volume of import and export trade (based on the location of business unit) to the regional GDP. Social security expenditure (*ins*): the proportion of social security expenditure in public budget expenditure.

IV. EMPIRICAL ANALYSIS

A. Data Sources

The data on the population of employed elderly in this paper is based on the data from China General Social Survey (CGSS) from 2003 to 2015. Due to different gender-based delayed retirement policy, male workers aging 55-64 and female workers aging 50-59 are defined as older workers. Since the survey was not implemented in 2007 and the data for 2004, 2009 and 2014 were not published, the data for the four years was excluded. Other data is calculated by using relevant data from the sixth census, *China Labor Statistics Yearbook, China Population and Employment Statistical Yearbook*, *China Statistical Yearbook*, and the statistical yearbooks of each province. Sample data is processed and statistically analyzed with Stata 14.0.

B. Analysis of Regression Results

With the method of short panel data analysis, the correlation test is carried out to find that there is no multicollinearity in the samples. The results of Hausman's test show that *P=0.000*, strongly rejecting the null hypothesis at 1% level, and that the sample should adopt a fixed effect model. The regression results of the three models all prove that *Prob>F=0.000*, strongly rejecting the null hypothesis that there is no individual fixed effect, and that the individual fixed effect should be included in the model.

TABLE I. ANALYSIS OF REGRESSION RESULTS

Variable Names	Model 1	Model 2	Model 3
	tl	tl	tl
to	0.001** (2.77)	-	-
mo	-	0.001** (2.68)	-
fo	-	-	0.001** (2.66)
linv	-0.013** (-2.28)	-0.012** (-2.29)	-0.012** (-2.18)
urban	-0.230** (-2.61)	-0.236** (-2.75)	-0.234** (-2.61)
stru	0.004* (1.86)	0.004* (1.87)	0.004 (0.90)
private	0.026* (1.80)	0.025* (1.76)	0.026 (1.67)
open	-0.022* (-1.71)	-0.021* (-1.74)	-0.021 (-1.68)
ins	0.087 (1.61)	0.089 (1.65)	0.087 (1.57)
R2	0.683	0.682	0.680
F	29.20(0.0000)	30.61 (0.0000)	28.54 (0.0000)
Individual Effect	Fixed		

a. *, ** and *** indicate significance at the 1%, 5% and 10% level, respectively (The same below).

The regression results in Table 3 demonstrate that the population of the employed elderly is positively related with the urban-rural income gap at the 5% level. Increasing labor supply of both the elderly male and female will widen the urban-rural income gap, and the influence of the two is not obviously different. The conclusion is probably inaccurate with using the sample data. However, it is difficult to verify the conclusion without sufficient overall data on old-age labor supply of each province.

Moreover, fixed asset investment and the urban-rural income gap are positively correlated at the 5% level, and the reason might be the difference in urban-rural fixed asset investment. With the increase in fixed asset investment, the raise in investment differences will further widen the urban-rural income gap (Hui, 2011[19]), the level of urbanization is negatively correlated with the urban-rural income gap at the 5% level. When the urban scale enlarges along with urbanization, cities gradually shift their industries to the surrounding hinterland where sees higher wages and the accelerated accumulation of industries and capitals. The urbanization process with rural population moving to urban areas is an important means to bridge the urban-rural income gap (Zeng, 2015[20]), The raise in the degree of non-nationalization will enlarge the income gap between urban and rural areas, the optimization of urban-rural binary structure and open economy will be positive to narrow the urban-rural income gap.

C. Robustness Test

This paper selects urban-rural income ratio *gap* (per capita urban disposable income and per capita rural net income) instead of Theil Index to carry out the robustness test on the correlation between the population of employed elderly and the urban-rural income gap.

TABLE II. RESULTS OF ROBUSTNESS TEST

Variable Names	Model 1	Model 2	Model 3
	gap	gap	gap
to	0.002** (2. 51)	-	-
mo	-	0.004** (2. 33)	-
fo	-	-	0.004** (2.52)
linv	-0.191** (-2.65)	-0.188** (-2.64)	-0.185** (-2.57)

Table II, cont			
urban	-1.111 (-0.99)	-1.193 (-1.10)	-1.145 (-1.01)
stru	0.061** (2.07)	0.062** (2.10)	0.062** (2.11)
private	0.330** (2.16)	0.320** (2.09)	0.330* (2.04)
open	-0.316* (-1.76)	-0.314* (-1.75)	-0.315* (-1.76)
ins	1.233* (1.71)	1.260* (1.74)	1.218 (1.68)
R2	0.489	0.488	0.487
F	18.39 (0.0000)	19.14 (0.0000)	17.69 (0.0000)
Individual Effect	Fixed		

The results show that the population of employed elderly and the urban-rural income gap are positively correlated at the 5% level, the fixed asset investment, foreign trade dependence and urbanization levels are negatively correlated with the urban-rural income gap, and the remaining variables are positively correlated with the urban-rural income gap. The conclusions of the robustness test and the fixed-effect regression are basically the same.

V. CONCLUSION

The delayed retirement policy can directly increase the old-age labor supply in urban and rural areas, reshaping the age structure of urban and rural labor force, changing per capita effective output in both urban and rural areas and consequentially the urban-rural income gap. The empirical results of the paper show that there is a positive correlation between the population of employed elderly and the urban-rural income gap. The increase of the old-age male and female labor supply will both enlarge the urban-rural income gap.

As the ageing population intensifies and the labor gap looms, the delayed retirement policy is on the agenda. The delayed retirement policy can directly increase the supply of old-age labor force and positively bridge the labor gap and alleviate the pension pressure of the state. Nonetheless, the implementation of the policy must take into account its impact on the labor market and the urban-rural income gap, and weigh the interests and contradictions in all aspects. A flexible and gradual delayed retirement policy is a must for solving the real problems arising in economic development.

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