Influencing Factors of Basic Endowment Insurance Participation Rate of Urban Employees in Jiangsu Province — Analysis Based on Data from 2001-2020

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Abstract: The basic endowment insurance for urban employees has a wide range of people and great strength. It is of great practical significance to study the current situation and influencing factors of the basic endowment insurance participation rate of urban employees. Using the time series data of Jiangsu Province from 2001 to 2020, this paper empirically analyzes the impact of population structure and economic development on the participation rate of basic endowment insurance for urban employees in Jiangsu Province by constructing an econometric model. It is found that the increase of the proportion of the elderly population and the growth of per capita GDP in Jiangsu Province play a positive role in improving the insurance coverage rate.

Keywords: Jiangsu province; population aging; urban employees; endowment insurance; multiple regression

1. Introduction

China has the largest elderly population in the world, and the degree of aging in China will continue to deepen for a long time. The accelerating process of aging has had a far-reaching impact on mortality, life expectancy and even social and economic development. For the elderly, endowment insurance provides them with basic living security. For on-the-job workers, participating in endowment insurance eliminates their worries about old-age life. In terms of social mentality, people are more stable and less impetuous, which is conducive to social stability [1]. As a populous province with rapid socio-economic development, the degree of population aging in Jiangsu Province is higher than the national level [2]. It is of great practical significance to study the influencing factors of the basic endowment insurance participation rate of urban employees in Jiangsu Province.

This paper uses the relevant time series data such as urban workers' basic endowment insurance participation rate, economic development level and demographics in Jiangsu Province to construct an econometric model to investigate the influencing factors of urban workers' basic endowment insurance participation rate in Jiangsu Province.

2. Participation Rate of Basic Endowment Insurance for Urban Employees, Economic Development Level and Population Structure in Jiangsu Province

2.1. Current Situation of Basic Endowment Insurance Participation Rate of Urban Employees in Jiangsu Province

With the development of population aging, China has established a variety of endowment insurance systems through legislation, including the pension system for staff of government agencies and public institutions, the basic endowment insurance system for urban employees and the endowment insurance system for residents. Among them, the basic old-age insurance for urban workers is the largest and the highest level of security [3]. On August 3, 2007, Jiangsu Province issued the provisions on basic old-age insurance for enterprise employees in Jiangsu Province, which stipulated the welfare benefits enjoyed by enterprise employees, practitioners of individual businesses and flexible employees after retirement. In 2020, it issued the opinions of the provincial government on the return visit to the provincial overall planning system of basic endowment insurance for enterprise employees, which further standardized and unified the insurance policies.

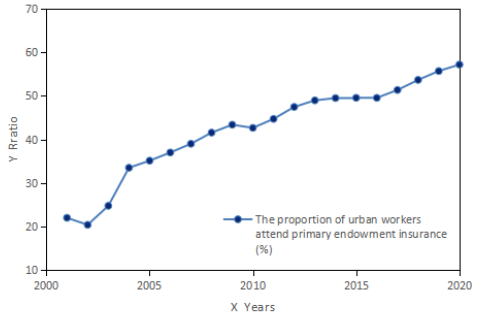

Figure 1. Participation rate of basic endowment insurance for urban employees in Jiangsu Province from 2001 to 2020

Figure 1 shows the basic endowment insurance participation rate of urban employees in Jiangsu Province, from 22.01% in 2001 to 57.16% in 2020, showing a rising trend as a whole.

2.2. Current Situation of Aging in Jiangsu Province

As a populous province in China, with the rapid development of economy, the problem of population aging in Jiangsu Province is becoming more and more serious. At the time of the fourth census in 1990, the population aged 65 and over in Jiangsu Province was 4.5598 million, accounting for 7.17% of the total population respectively. By the time of the seventh census in 2020, the figure has reached 12.11 million, and the proportion has also risen to 16.20%.

Figure 2 shows the change of the proportion of the elderly population in Jiangsu Province from 2001 to 2020. On the whole, the proportion of the elderly population in Jiangsu Province has been rising. As early as the 1980s, the proportion of the elderly population in Jiangsu Province reached 7%, reaching the international population aging standard, which means that Jiangsu Province has officially entered the aging society. After entering the 21st century, the degree of population aging in Jiangsu Province is becoming more and more serious. Especially after 2003, the proportion of the elderly aged 65 and above has been maintained at more than 10%, which has reached more than 16% by 2020. According to the prediction of some scholars, the aging level of Jiangsu Province will still show an upward trend in the next few decades, and the aging speed is accelerating. It is expected that the proportion of the elderly aged 65 and over will reach 31.57% in 2040 [4]. It can be seen that the situation of population aging in Jiangsu Province is very serious, which must attract our attention.

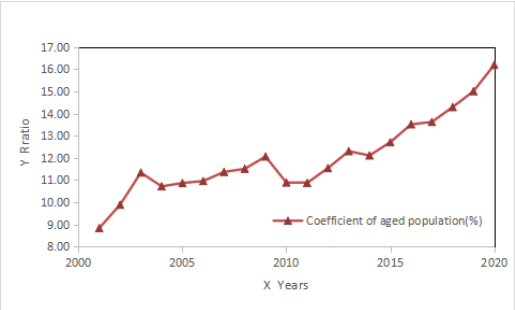

Figure 2. Population aging level in Jiangsu Province from 2001 to 2020

2.3. Proportion of Working Age Population in Jiangsu Province

There is a special period, which demographic economists call the "demographic dividend" period. During this period, labor resources are relatively rich, the burden of raising is light, and it is very beneficial to economic development. The rapid decline of a country's population fertility rate has accelerated the aging of the population. At the same time, the child dependency ratio has decreased rapidly, the proportion of working age population has increased, but the elderly dependency ratio has not yet reached the highest level. These have become the reasons for the demographic dividend period. Before 2012, China was in a period of demographic dividend. According to the data released by the National Bureau of statistics, in 2012, China's working age population aged 15 to 59 showed an absolute decline for the first time in a long time, a decrease of 3.45 million over the previous year, which means that the inflection point of the disappearance of China's demographic dividend has appeared in 2012 [5].

Figure 3 shows the change of the proportion of working age population in Jiangsu Province from 2001 to 2020. It can be seen from the figure that it began to change in 2011. In 2011 and before, the proportion of working age population in Jiangsu Province showed an overall upward trend, corresponding to the decline of the overall dependency ratio. However, after 2012, the proportion of working age population decreased year by year, and the change of population age structure means the increase of the overall dependency ratio

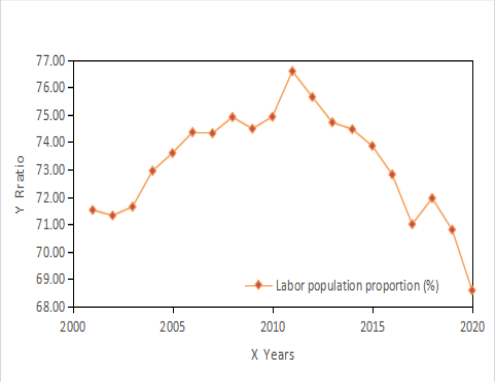

Figure 3. Proportion of working age population in Jiangsu Province from 2001 to 2020

2.4. Per Capita GDP of Urban Residents in Jiangsu Province

Jiangsu Province is one of the provinces with relatively developed economy in China. In 2020, its provincial GDP has reached 10271.9 billion yuan, becoming the second province with a GDP of more than 10 trillion yuan after Guangdong [6]. Its economic scale is roughly the same as that of Canada, Russia, South Korea and other countries. It is estimated that the per capita GDP of Jiangsu Province would reach 125000 yuan in 2021, which has ranked first among all provinces (regions) in China for 12 consecutive years.

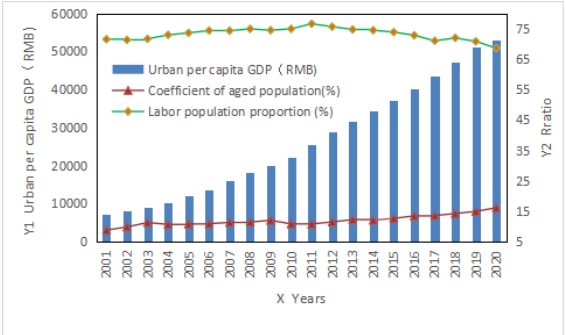

Figure 4 Per capita GDP of urban residents in Jiangsu Province from 2001to 2020

Figure 4 shows the growth of per capita GDP of urban residents in Jiangsu Province from 2001 to 2020. From 2001 to 2020, the per capita GDP of urban residents in Jiangsu Province increased from 7311 yuan to 53102 yuan, with an average annual growth rate of 11%. On the whole, it showed a continuous upward trend and the development trend continued to improve.

3. Regression Analysis between the Basic Endowment Insurance Participation Rate and Relevant Indicators

3.1. Model Construction

There are many factors that affect the basic endowment insurance participation rate of urban employees in a region, including the level of regional economic development, population age structure, aging level and so on. This paper selects the following economic and social indicators as explanatory variables to build an econometric model to analyze the participation rate of basic endowment insurance for urban employees in Jiangsu Province.

Assumptions:

① X_1 represents per capita GDP of Jiangsu Province.

② X_2 represents the proportion of the elderly aged 65 and over.

③ X_3 represents the proportion of working age population (population aged 15-64).

So, $$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u \quad (1)$$

In this equation, Y represents the basic endowment insurance participation rate of urban employees in Jiangsu Province, X represents various factors affecting the participation rate and u is a random disturbance term.

3.2. Regression Analysis

Based on the time series data of per capita GDP, population age structure and aging level of urban residents in Jiangsu Province from 2001 to 2020, the econometric model is regressed by Ordinary Least Squares method to analyze their impact on the participation rate of basic endowment insurance for urban workers in Jiangsu Province.

Table 1 is a summary of the above indicator data.

Put the data in Table 1 into equation (1) respectively, and use ordinary least squares method for regression analysis. The results are shown in Table 2.

Table 1. Relevant data of Jiangsu Province from 2001 to 2020

Year	Participation rate of basic endowment insurance for urban workers (%)	Per capita GDP of urban residents(yuan)	Proportion of elderly population (%)	Proportion of working age population (%)
	Y	X_1	X_2	X_3
2001	22.01	7311	8.84	71.52
2002	20.40	8088	9.89	71.32
2003	24.77	9140	11.34	71.64
2004	33.50	10319	10.72	72.95
2005	35.11	12098	10.87	73.60
2006	36.99	13799	10.96	74.36
2007	39.00	16009	11.37	74.32
2008	41.55	18215	11.51	74.91
2009	43.36	19996	12.06	74.49
2010	42.64	22273	10.89	74.92
2011	44.70	25570	10.87	76.59
2012	47.45	28808	11.54	75.65
2013	48.95	31585	12.30	74.72
2014	49.48	34346	12.11	74.47
2015	49.54	37173	12.71	73.86
2016	49.53	40152	13.51	72.82
2017	51.33	43622	13.62	71.00
2018	53.65	47200	14.29	71.95
2019	55.68	51056	15.01	70.80
2020	57.16	53102	16.20	68.59

Source: The contents of the table are obtained from the data of *China Statistical Yearbook* and *Jiangsu Statistical Yearbook* from 1999 to 2021. In addition, the per capita GDP of urban residents has been deflated and converted into the constant price of 2008, removing the impact of price level differences caused by inflation on the value of economic indicators.

Table 2. Partial data of regression analysis

Variable	Coefficients	Standard error	t Statistic	P-value
Intercept	-176.963	24.52347	-7.21608	0.00000206
X Variable 1	0.000447	0.0000824	5.421689	0.0000565
X Variable 2	2.890105	0.751964	3.84341	0.001435
X Variable 3	2.358538	0.27522	8.569642	0.00000225

The estimated results of the model are as follows:

$$Y = -176.96 + 4.47 \times 10^{-4} X_1 + 2.89 X_2 + 2.36 X_3 \quad (2)$$

t value:(5.422) (3.843)(8.570)

$$\overline{R}^2 = 0.966 \quad F = 184.157$$

3.3. Model Analysis

The modified determination coefficient $\overline{R}^2$ is 0.9665, indicating that this model has 96.65% explanatory power. The F value is 184.157, which follows the F distribution with degrees of freedom (3,16). When the significance level is 1%, the F value is more than 5.29, which passes the joint test. The above shows that the interpretation effect of the model is very significant on the whole, and the joint linear effect of each explanatory variable is significant. Next, test the significance of the estimated regression coefficient. The original hypothesis, HO: α=0, H01:β=0, can be tested according to the distribution table in which the T value obeys (n-x-1). If the t value in the model is larger than that in the distribution table, the original hypothesis is abandoned, which means the result is significant. When the degree of freedom is 16 and the significance level of bilateral test is 1%, the t value is 2.921. So by comparison, β1, β2, β3 all pass the significance test with a significance level of 1%, indicating that the fitting effect of the model is very good.

3.4. Serial Correlation Test

Serial correlation is a common problem in the analysis of time series data. If there is a serial correlation problem, the t value, F value and determination coefficient calculated by Ordinary Least Squares method may be larger than the normal level, so that the original results that are not significant are considered significant. As this paper uses time series data, it is necessary to consider whether there are serial related problems in the model. The test results of the model by Cochrane-Orcutt method are shown in Table 3.

Table 3. Partial data of model

Year	Prediction:Y	Residual error: U_t	U_{t-1}	$U_t - U_{t-1}$	$(U_t - U_{t-1})^2$	U_t^2
2001	20.53	1.48				2.18
2002	23.44	(3.04)	1.48	(4.52)	20.43	9.26
2003	28.86	(4.09)	(3.04)	(1.05)	1.09	16.71
2004	30.68	2.82	(4.09)	6.91	47.69	7.94
2005	33.44	1.67	2.82	(1.15)	1.33	2.78
2006	36.26	0.73	1.67	(0.93)	0.87	0.54
2007	38.33	0.67	0.73	(0.07)	0.00	0.44
2008	41.12	0.43	0.67	(0.23)	0.05	0.19
2009	42.51	0.85	0.43	0.42	0.17	0.72
2010	41.16	1.48	0.85	0.63	0.40	2.19
2011	46.51	(1.81)	1.48	(3.29)	10.85	3.29
2012	47.68	(0.23)	(1.81)	1.58	2.51	0.05
2013	48.92	0.03	(0.23)	0.26	0.07	0.00
2014	49.02	0.46	0.03	0.44	0.19	0.22
2015	50.57	(1.03)	0.46	(1.50)	2.24	1.07
2016	51.76	(2.23)	(1.03)	(1.20)	1.44	4.99
2017	49.34	1.99	(2.23)	4.22	17.85	3.97
2018	55.11	(1.46)	1.99	(3.45)	11.94	2.14
2019	56.20	(0.52)	(1.46)	0.94	0.88	0.27
2020	55.34	1.82	(0.52)	2.34	5.47	3.29

According to the OLS results, DW is estimated to be 1.98. According to the Dobbin-Watson test, when k = 3 and N = 20, the results are $d_L = 1.10$, $d_U = 1.54$, $d_U < DW < 4 - d_U$. Consequently, there is no sequence correlation in the model and it can be considered that the result of OLS estimation is blue.

4. Conclusion

Based on the time series data of economic

development and population age structure in Jiangsu Province from 2001 to 2020, this paper attempts to analyze the influencing factors of old-age insurance participation rate of urban employees in Jiangsu Province. The test shows that the model has high significance and does not have serial correlation problems. It is an optimal model with high reliability. The research conclusions are summarized as follows:

To begin with, the per capita GDP of urban residents in Jiangsu Province is positively correlated with the participation rate of basic old-age insurance for urban employees. With the increase of per capita GDP of urban residents, the participation rate of basic old-age insurance for urban employees would increase. The reason may be that with the rapid development of social economy in Jiangsu Province, the disposable income of urban residents is increasing, and the affordability of insurance also is improving. The environment of steady economic development in Jiangsu Province has provided good conditions for the increasing participation rate of basic old-age insurance for urban workers.

Additionally, there is a positive correlation between the proportion of the elderly population and the participation rate of basic old-age insurance for urban employees, which shows that the aging population in Jiangsu has a positive effect on the participation rate. With the aggravation of population aging, the endowment of the elderly population has attracted more and more attention. Personally, with the increase of age, people's willingness to participate in endowment insurance would also increase. Therefore, with the increase of the proportion of the elderly population, the participation rate of old-age insurance for urban employees increases.

Last but not least, the insurance coverage rate is also affected by the proportion of labor force population. At present, the proportion of labor force population is in a downward trend, which has a negative effect on the participation rate of basic old-age insurance for urban workers. But in fact, with the decline of the proportion of labor force population, the participation rate of basic old-age insurance for urban employees still shows an upward trend. With the miniaturization of family structure, people are no longer focused on the concept of "raising children and preventing old age", but look for a reliable way of social endowment. Therefore, it may also promote the increase of insurance coverage rate. The difference between the model and the reality shows that the other two explanatory variables have a great impact, or the impact of other factors leading to the decline of the proportion of the working population has not been highlighted.

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