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REVIEW ARTICLE

AGE STRUCTURE OF POPULATION AND ECONOMIC GROWTH: EVIDENCE FROM HENAN PROVINCE, CHINA

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ABSTRACT

Based on the time series data of population age structure and per capita GDP in Henan Province from 1986 to 2020, this paper uses VAR model to analyze the relationship between them. VAR model shows that the age structure of population is closely related to economic growth. In the short run, the total dependency ratio has a negative impact on economic growth, while the working-age population has a positive impact on economic growth. In the long run, both the total dependency ratio and working-age population have positive effects on economic growth. Among them, the influence of total dependency ratio on economic growth reaches a maximum of 6.2% at the 11th period, and the influence on economic growth stabilizes at 5.8% after the 11th period. The impact of working-age population on economic growth reaches a maximum of 23% in the fifth period, and after the fifth period, the impact on economic growth is stable between 17%-18%. On this basis, the age shift algorithm is used to predict the trend of the future population age structure of Henan Province. Considering the effect of future fertility policy liberalization and the adjustment of future fertility policy, two fertility rate scenarios (low (1.19) and high (1.86)) are set to predict the future population age structure. The results show that if the development rate is low, the adolescent population will be about 8.2919 million in 2050, and the aging degree will reach 26.23%; If the development rate is high, the adolescent population will be about 18.0471 million in 2050, and the aging degree will reach 19.14%. Projections suggest that raising the fertility rate effectively can alleviate the problem of the population crunch and ageing. Accordingly, this paper puts forward the policy suggestions of raising the fertility rate, implementing the two-child policy and optimizing the population age structure.

KEYWORDS

Age Structure Population, Economic Growth, The VAR Model

1. INTRODUCTION

There is a close relationship between the age structure of the population and economic growth. The population age structure of a region often affects the economic development. Since the Reform and Opening Up, Henan Province, as a province with a large population in the country, has shown the characteristic of a phased population age structure. According to statistics, affected by the first birth peak and the second birth peak, the juvenile population in 1953-1964 rose rapidly, from 14.248 million to 17.667 million, accounting for an increase of 3%. After 1982, the juvenile population affected by Family Planning declined, and the middle-aged and young population began to increase, accounting for 12 percent. After 2000, the elderly population gradually increased, and the problem of aging was serious.

Looking at the age structure of the population in Henan Province since 1953, it can be found that the region has undergone a transformation from "expansion" to "austerity", and is facing a "static" age structure at this stage, that is, the population of young and middle-aged people is decreasing, the elderly population is increasing, and the problem of "getting old before getting rich" gradually appears. Due to the differences in the age structure of the population in different provinces, the empirical conclusions of some regions may not be applicable to Henan. Therefore, based on the background of the age structure of the population in Henan Province, this paper analyzes the current situation, and then delves into the relationship between it and economic growth. It is hoped that it can help the government to give full play to the advantages of human resources in Henan Province, realize the transformation from a province with a large population to a strong province with a large population, and provide theoretical support for the modernization development in the future.

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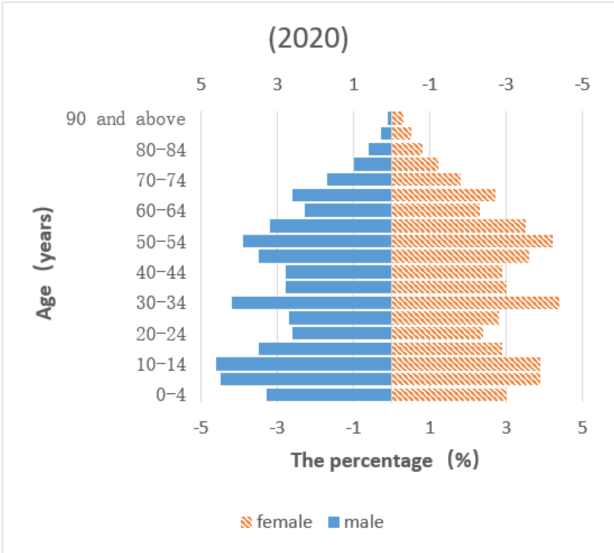

Figure 1: Pyramid of Population Age Structure in Henan Province in 2020. Source: Henan Statistical Yearbook (2020)

2. Literature Review

The study on the influence of population age structure on economy in foreign countries can be summarized as two points. Taking fertility rate as a starting point to analyze the impact of population structure on economy, and there are mainly the following opinions: Deardorff (1976) believes that reducing fertility rate can promote economic development, that is, slow population growth can improve per capita capital to a certain extent under the capital gold rate. Lee and Mason (2010) also came to the conclusion that the decline of the fertility rate can bring the "first demographic dividend", reduce the burden of families to raise children, and promote economic development. But he also believes that the continued low fertility rate will lead to a decline in the number of young people and an increase in the number of old people, and eventually to the problem of aging. Studies with mortality as the starting point include: Kimball (1990) believes that a low mortality rate can lead to an increase in the saving rate, so as to effectively reduce the preventive demand of households and exert a positive effect on economic growth. Deaton (2017) also believes that a low mortality rate means a longer life span for human beings in the society, and the change of population structure can bring saving rate agglomeration and promote economic development. However, scholar Horioka (2010) put forward the opposite view. He believed that the continuously decreasing mortality rate would put too much burden on the family to provide for the elderly, which would have a negative impact on the economy.

There are abundant studies on the relationship between population age structure and economic growth in China. Most scholars directly or indirectly measure the impact of demographic dividend on the economy: Cai (2010) started from the relationship between population transition and the development of dual economy, and concluded that there is an inverted U-shaped relationship between fertility rate and GDP growth rate, and either too high or too low fertility rate is detrimental to economic development. Dong and Zhao (2013) reached the same conclusion as foreign scholars, that is, with the decrease of the child dependency ratio and the increase of the elderly dependency ratio, the saving rate will increase and promote economic growth. Li and Ni (2015) argue that the contradictory demographic structure will affect urban housing demand in terms of time and space, resulting in spatial mismatch in the city's real estate industry, which in turn will cause economic fluctuations. Guo and Lu (2014) used the data of the 1988-2009 urban household survey to analyze the income inequality between the child population and the elderly population, and believed that the economic problems caused by income inequality will gradually worsen with the age of the adolescent population.

Combining with the research results of domestic and foreign scholars, it can be seen that scholars mostly analyze the impact of population age structure on the economy from the perspective of the impact path, such as saving rate, wage income, etc. And the indicators of population age structure mostly select the child dependency ratio, the proportion of the elderly, etc. This paper tries to divide the core variable population age structure into two sub-variables, the total dependency ratio and the proportion of working-age population, to further study the impact on economic growth. It is hoped that it can provide a theoretical basis for the formulation of policies in the future, which is of great significance to Henan Province to make full use of its advantages in population resources and stabilize economic development.

3. Model and Data

3.1 Variable Selection

This paper investigates the influence of population age structure on regional economic growth at the provincial level. Therefore, taking the age structure of the population as the core explanatory variable, it is divided into two sub-variables: total dependency ratio (dr) and proportion of working-age population (pl). Among them, the total dependency ratio (dr) is the sum of the child dependency ratio and the old-age dependency ratio, which is the proportion of the non-working age population in the working age population. Among them, the non-working age population refers to the sum of the juvenile population aged 0-14 years and the elderly population aged 65 years and above. Working-age population refers to the young and middle-aged population aged 15-64. Proportion of Working-age Population (pl): Proportion of the population aged 15-64 in the total population. The ratio of real GDP to total population at the end of the year was used to get GDP per capita as the explained variable to analyze the relationship between population age structure and economic growth. Among them, real GDP is the GDP of the region obtained by excluding price factors in 1978 as the base period. Variables such as per capita physical capital stock (pk), natural population growth rate (gr) and fiscal expenditure on science and technology (f) were added to control the influence of capital, population, science and technology and other factors.

The data is from the age structure indicators of the resident population in HENAN STATISTICAL YEARBOOK from 1986 to 2020. The missing data in some years was obtained by using the age composition index of provinces, autonomous regions and municipalities directly under the Central Government and the dependency ratio index of population age structure of each region in CHINA POPULATION & EMPLOYMENT STATISTICAL YEARBOOK. Take the logarithm of all indicators with price factors to reduce the effect of heteroscedasticity.

3.2 VAR Model Establishment

Vector autoregressive model, or VAR model, is a commonly used econometric model proposed by Christopher Sims. It is used to predict and analyze the dynamic impact size, positive and negative and duration of the random disturbance term on the system. The specific operation is to regress the lagging variables with the current variables in the model. The general mathematical formula can be expressed as:

$$y_t = \Phi_1 y_{t-1} + \ldots + \Phi_p y_{t-p} + Hx_t + \varepsilon_t, (t = 1, 2, \ldots, T) \quad (1)$$

Among them, y_t is an n-dimensional endogenous variable vector; x_t is m-dimensional exogenous variable vector; T is the number of samples. $n \times n$ dimension matrix $\Phi_1, \ldots, \Phi_p$ and the $n \times m$ dimension matrix H are the coefficient matrixes to be estimated; p is the lag order; ε_t is a random disturbance term, which can be correlated with each other simultaneously, but is not correlated with its own lag value and is not correlated with variables on the right-hand side of the equation. Assuming that $\sum$ is a positive definite matrix of ($n \times n$), the expansion of Equation (1) is as follows:

$$\begin{pmatrix} y_{1t} \\ y_{2t} \\ \vdots \\ y_{nt} \end{pmatrix} = \Phi_1 \begin{pmatrix} y_{1t-1} \\ y_{2t-1} \\ \vdots \\ y_{nt-1} \end{pmatrix} + \cdots + \Phi_p \begin{pmatrix} y_{1t-p} \\ y_{2t-p} \\ \vdots \\ y_{nt-p} \end{pmatrix} + H \begin{pmatrix} x_{1t} \\ x_{2t} \\ \vdots \\ x_{mt} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \vdots \\ \varepsilon_{nt} \end{pmatrix}, (t = 1, 2, \ldots, T) \quad (2)$$

The above equation is a $\mathrm{var}(p)$ model consisting of k equations with n time series variables.

The model was established based on the variables of per capita GDP (pgdp), total dependency ratio (dr) and working-age population proportion (pl) :

$$\ln(pgdp) = \beta_1 dr + \beta_2 pl + \beta_3 \ln(pk) + \beta_4 \ln(f) + \beta_5 gr \quad (3)$$

Substitute Equation (2) into VAR model to obtain the following formula:

$$\begin{pmatrix} \ln pgdp_t \\ dr_t \\ pl_t \\ \ln pk_t \\ \ln f_t \\ gr_t \end{pmatrix} = c + \sum_{i=1}^{n} \Phi \begin{pmatrix} \ln pgdp_{t-i} \\ dr_{t-i} \\ pl_{t-i} \\ \ln pk_{t-i} \\ \ln f_{t-i} \\ gr_{t-i} \end{pmatrix} + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \\ \varepsilon_6 \end{pmatrix} \quad (4)$$

4. The Empirical Analysis

4.1 Stationarity Test of Variables

In order to avoid spurious regression, the ADF test method is used to test the stability of variables such as per capita GDP, total dependency ratio, proportion of working-age population, per capita physical capital, natural growth rate of population and expenditure on science and technology. The results are shown in Table 1. It is known that all variables are not stable at the significance level of 5%, so the second-order difference of lnpgdp, lnf and lnpk, and the first-order difference of dr, pl and gr are continued to be tested. The results show that all variables pass the stationarity hypothesis test at 5% significance level.

4.2 Selection of Lag Order

LR, FPE, AIC, SC and HQ are used as the criteria to determine the optimal lag order, and the results are shown in Table 2.

From Table 2, it can be concluded that when the lag order of the VAR model is 3, expressed as VAR (3), the statistical values of the above test methods pass the significance level of 5%. Therefore, the VAR model in this paper is the optimal choice to choose a lag of 3 order.

4.3 AR Root Test of VAR Model

After determining the lag order, it is necessary to test the AR root of the VAR model to determine whether the selected lag order model is stable. The specific test method is as follows: if any dot falls outside the unit circle, the model is unstable; If all the dots fall within the unit circle, the model is stable. The AR root test in this paper is shown in Figure2.

It can be seen from Figure2 that there were 18 AR roots in the inspection figure. Although the two AR roots on the right are close to the edge of the unit circle, the modulus values were 0.9918 and 0.9918 respectively according to the AR root inspection table. In other words, the modulus values of the 18 AR roots were all less than 1, and all points were within the unit circle. It shows that the VAR model with lag order 3 is stable and can be analyzed in the next step.

Table 1: ADF Unit Root Test of Variables

Variable	Statistic	1%	5%	10%	P -Value	Conclusion
lnpgdp	-0.0528	-3.6702	-2.9640	-2.6210	0.9459	non-stationary
Δlnpgdp	-2.8202	-3.6702	-2.9640	-2.6210	0.1845	non-stationary
Δ2lnpgdp	-4.2318	-3.6793	-2.9678	-2.6230	0.0026	stationary
dr	-2.4416	-3.6617	-2.9604	-2.6192	0.1392	non-stationary
Δdr	-8.5931	-3.6702	-2.9640	-2.6210	0.0000	stationary
pl	-2.2374	-3.6617	-2.9604	-2.6192	0.1979	non-stationary
Δpl	-8.1516	-3.6702	-2.9640	-2.6210	0.0000	stationary
lnf	1.2718	-3.6793	-2.9678	-2.6230	0.9978	non-stationary
Δlnf	-2.6945	-3.6793	-2.9678	-2.6230	0.0871	non-stationary
Δ2lnf	-3.6919	-3.7115	-2.9810	-2.6299	0.0105	stationary
lnpk	1.1640	-3.6892	-2.9719	-2.6251	0.9970	non-stationary
Δlnpk	-1.8255	-3.6702	-2.9640	-2.6210	0.3615	non-stationary
Δ2lnpk	-5.9087	-3.6793	-2.9678	-2.6230	0.0000	stationary
gr	-0.7438	-4.2846	-3.5629	-3.2153	0.9603	non-stationary
Δgr	-4.4322	-4.2967	-3.5684	-3.2184	0.0073	stationary

Note: Δ denotes the first-order difference, Δ2 denotes the second-order difference; The null hypothesises above are the variables and have unit roots; The test types of lag order, intercept term and trend term follow the minimum rules of AIC, SC and HQ.

Table 2: Statistical Test Results of the Optimal Lag Order

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-106.5058	NA	9.44E-05	7.759021	8.04191	7.847618
1	158.4052	401.9339	1.39E-11	-8.027943	-6.047721	-7.407762
2	236.7801	86.48269	1.07E-12	-10.95035	-7.272798	-9.798588
3	339.0346	70.52034*	3.45e-14*	-15.51963*	-10.14474*	-13.83628*

Note: * Denotes that the variables are significant at the 5% level.

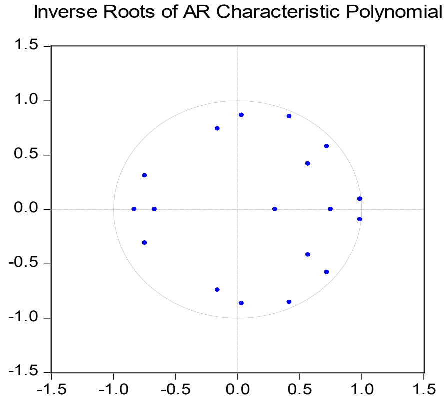

Figure2: AR Root Test

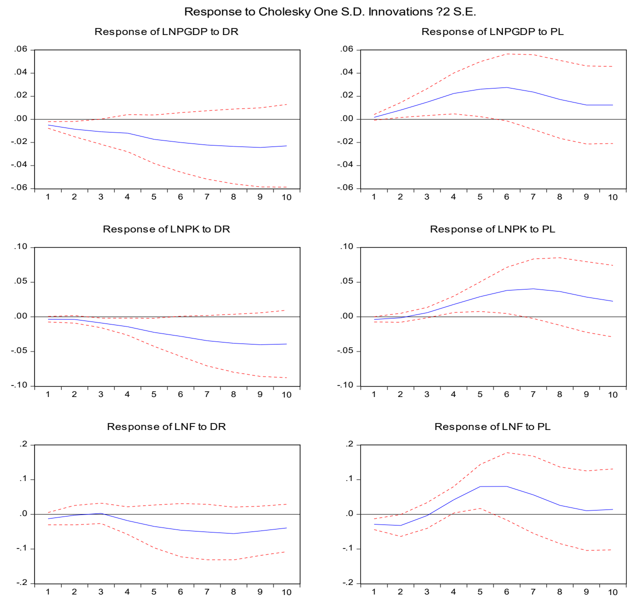

Figure 3: Impulse Response Results

4.4 Impulse Response

Impulse response function is used to describe the reaction of an endogenous variable to the shock brought by the error term, that is, the impact degree on the current value and future value of the endogenous variable after the shock of one standard deviation is applied to the random error term. Therefore, the impulse response results based on the specified VAR model are shown in Figure 3.

The solid curve in Figure4 represents the impulse response function, and the dashed line represents the confidence interval. Conclusions can be drawn as follows:

(1) When the total dependency ratio (dr) is given a positive impact, per capita GDP, per capita physical capital stock, and fiscal expenditure on science and technology have different responses. Both per capita GDP and per capita physical capital stock continued to decline until the seventh period. Fiscal expenditure on science and technology showed an upward trend in the initial period and reached the maximum in the third period. This indicates that the total dependency ratio is negatively correlated with per capita GDP and per capita physical capital stock, that is, the higher the total dependency ratio, the lower the per capita GDP and per capita physical capital stock, which is in line with practical experience. This is because the total dependency ratio reflects the burden of the whole society's families on the support of the young population and the elderly population. If the burden is too large, the family's expenditure will increase, income and savings will decrease, which will exert a certain inhibitory effect on the social economy.

(2) When a positive impact is given to the working-age population (pl), GDP per capita, physical capital per capita, and fiscal expenditure on science and technology show similar responses. Per capita GDP showed an upward trend, reaching the maximum in the 6th period and leveling off in the 9th period. Per capita physical capital reaches the maximum in the 7th period, then starts to decline and finally reaches a plateau; The fiscal expenditure on science and technology reaches the maximum in the fifth period and becomes stable in the ninth period. This indicates that labor force has a huge promoting effect on social economy, capital and science and technology. Although the effect starts to decrease in the middle and later period, the overall effect is still significant.

4.5 Variance Decomposition

Variance decomposition is the contribution proportion of each endogenous variable in the evaluation model to the predicted variance. Based on the research in this paper, the variance decomposition of per capita GDP is mainly affected by the total dependency ratio, working-age population, capital, population, science and technology and other factors. The results of variance decomposition are shown in Table 3.

As can be seen from Table 3, the strength of economic growth to explain itself reached 100% in the first period, indicating that economic growth

Table 3: Variance Decomposition Results

Period	S.E.	LNPGDP	DR	PL	LNPK	LNF	GR
1	0.008331	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.018336	69.33762	0.446985	9.904282	16.85578	3.292859	0.162468
3	0.029696	62.91642	0.177592	19.01865	15.32500	2.335079	0.227258
4	0.044221	56.60691	0.333514	24.70531	16.97917	1.061776	0.313324
5	0.059984	56.03981	0.188339	25.03164	17.87192	0.578803	0.289492
6	0.075200	53.12784	0.186122	24.56985	21.29488	0.544078	0.277229
7	0.087254	50.40282	0.698433	23.09752	24.31138	1.26259	0.227257
8	0.096087	47.5301	2.126949	21.36909	26.11847	2.622195	0.233201
9	0.102338	45.45579	4.337787	20.03377	26.05597	3.835074	0.281608
10	0.107412	44.37875	5.786509	19.23747	25.77038	4.426383	0.400506
11	0.112891	44.15946	6.206838	18.86274	25.76355	4.536199	0.471215
12	0.120087	43.81632	6.011609	18.52331	26.61253	4.5451	0.491128
13	0.12811	42.97584	5.781989	18.14758	27.87102	4.744077	0.479494
14	0.135524	41.78176	5.718014	17.74427	29.13538	5.133255	0.48732
15	0.141531	40.76166	5.79825	17.4577	29.95042	5.503742	0.52823

in the early stage mainly relied on its own contribution, and then due to other factors, its explanation of itself gradually began to decline and remained at about 40%. The contribution of total dependency ratio to economic growth increased in the fourth period, reached the maximum in the 11th period, and then stabilized at about 5.8%, which was consistent with the previous impulse response results. In terms of the overall trend, the average contribution rate of the total dependency ratio to economic growth is about 4.7%.

The contribution of working-age population to economic growth increased first and then decreased. The working-age population did not contribute much to economic growth in the early years, but its contribution increased by 10 percentage points in the second and third periods, respectively. At the fifth stage, the contribution rate reached 25.03%, and then the contribution rate was stable between 17% and 18%. Looking at the overall trend, the working-age population's share of economic growth has averaged about 20 percent.

4.6 Population Age Projections

This paper uses the age shift method to predict the future population age structure in Henan Province. The method of age shifting refers to the calculation of the population of each age group in the next year based on the actual population of each age group in a certain year as the base period for predicting the future year. Specific methods are as follows:

$$P_{X+1,T+1} = P_{X,T} \times S_X)(\quad X = 0,1,\ldots,99 \tag{5}$$

$$P_{0,T} = P_{womem\ \text{of childbearing age},T} \times TFR \tag{6}$$

$$P_{15-year-old\ \text{women of childbearing age},T+1} = P_{\text{Total population aged 14},\ T} \times S_M \times S_{14} \tag{7}$$

$$P_{Y+1-year-old\ \text{women of childbearing age},T+1} = P_{Y-year-old\ \text{women of childbearing age},T} \times S_Y)(\quad Y = 14,15,\ldots,48 \tag{8}$$

Several indicators involved in the above three formulas: 1) $P_{X+1,\ T+1}$ denotes the number of people aged X+1 at year T+1, which is equal to the product of the number of people aged X in the previous year and the survival rate (1-mortality rate) of the population at that age. Based on this, the number of people aged 1-99 at year T+1 is calculated. 2) $P_{0,T}$ stands for the number of population at the age of 0 in year T, that is, the number of births, which is equal to the product of the annual number of women of childbearing age and the fertility rate (TFR) in that year. According to the yearbook, the age of women of childbearing age is 15-49 years old, and there are still data of childbearing age women under 18 years old and over 45 years old in Henan Province. Therefore, the age of women of childbearing age selected in this paper is consistent with the yearbook; 3) $P_{Y+1\text{-year-old women of childbearing age},\ T+1}$ is the number of women of childbearing age at Y+1 years old at T+1, and SM is the sex ratio.

Since the sampling data is more accurate than the census data, this paper selects the sixth census data of Henan Province to calculate the future population structure. Population structure is affected by fertility rate, mortality rate, sex ratio and population migration, so fertility rate is divided into two stages, high and low, to compare the population characteristics under different fertility rates. Firstly, according to the current fertility level, the average fertility rate of recent years is 1.19 to carry out the population prediction of low fertility rate. Secondly, it is assumed that the fertility rate will rise in the future after the two-child policy, showing new characteristics of population size, and the set fertility rate will reach 1.86. The mortality rate is based on the minimum mortality rate in census data and sample survey data before 2020. It is based on the minimum mortality rate in the past year because it is predicted that future medical advances will increase human life expectancy and reduce mortality rates. The sex ratio takes 2020 as the base, and the future population size of Henan Province after calculation is shown in Table 4 without considering the impact of other policies such as population migration.

Table 4 shows projections of population size for different fertility rates. The results show that when the population size develops to 2050 at the current fertility level (TFR=1.19), the juvenile population will shrink by 8.296 million and the elderly population will increase by 10.8652 million. When the population size grows to 2050 at a high fertility level (TFR=1.86), the youth population shrinks by 3,535,200 and the elderly population increases by 8,468,300. Compared with the population size of the low fertility level, the high fertility rate reduces the degree of future population reduction and increase, making the youth population decrease by 4.7608 million and the elderly population increase by 2.3969 million.

It can be seen that if the current fertility level is maintained, the elderly burden and aging problem of the future society will be very serious, and increasing the fertility rate can not only reduce the burden of elderly support and effectively alleviate the problem of future aging.

5. Conclusions and Suggestions

Firstly, based on the population structure data of Henan Province from 1986 to 2020, the relationship between the age structure of the population and economic growth in Henan Province is analyzed based on the VAR model. Secondly, the age transfer method was used to predict the future population size of Henan Province, and the conclusions were as follows: (1)The impulse response shows that the total dependency ratio has a negative effect on economic growth in the short term, that is, the higher the total dependency ratio, the slower the economic growth; Working age population has a positive role in promoting economic growth. (2) Variance decomposition shows that both dependency ratio and working-age population contribute to economic growth in the long run, while the contribution of dependency ratio to economic growth is small. The contribution rate of dependency ratio to economic growth reaches the maximum in the 11th period, and then stabilizes at about 5.8%. The contribution of the working-age population to economic growth reached a maximum of 23% in the fifth period, and then stabilized between 17% and 18%. (3) The population prediction

Table 4: Total Population and Proportion of the Working-Age Population of Henan Province from 2023 to 2050

year	Low fertility rate TFR=1.19				High fertility rate TFR=1.86			
	Population	Juvenile population	Elderly population	Proportion of working-age population	Population	Juvenile population	Elderly population	Proportion of working-age population
2023	9848.60	1433.69	1489.10	70.32	10334.91	2080.53	1379.57	66.52
2024	9854.78	1350.14	1500.03	71.08	10366.81	2034.97	1382.59	67.03
2025	9856.55	1323.99	1517.92	71.17	10393.91	2046.87	1392.70	66.91
2030	9815.86	1242.61	1804.35	68.96	10485.59	1872.80	1634.94	66.55
2035	9689.83	1149.70	2148.20	65.97	10535.99	1763.29	1932.80	64.92
2040	9482.46	1089.45	2332.61	63.91	10597.51	1823.27	2075.55	63.21
2045	9162.42	1002.53	2332.15	63.60	10550.56	1860.86	2043.67	62.99
2050	8751.37	892.19	2295.59	63.57	10393.65	1804.71	1989.42	63.50

Note: Projections are based on 2020 census data. Population data are calculated year by year using an age-shifting algorithm. The unit of population is 10,000, and the proportion of working-age population is a percentage.

results show that if the current fertility level of 1.19 develops, there will be a sharp decrease in the juvenile population and a sharp decline in the elderly population in the future, and the aging problem will become more serious. Increasing the fertility rate to a fertility level of 1.86 can not only increase the youth population, but also reduce the growth rate of the elderly population, and effectively alleviate the aging problem in the future.

Combined with the analysis of VAR model and the results of population projection, the following suggestions are put forward: (1) Appropriately increase the fertility rate. Coping with the aging population is the primary problem in Henan Province at this stage. Increasing the fertility rate can effectively alleviate the aging trend, which requires the implementation of the “two-child” policy. The government should not only pay attention to the policy publicity, but also improve the corresponding subsidy and security system to reduce the bearing burden of the population of childbearing age. (2)It is necessary to pay attention to the cultivation of a working-age population. The working-age population is the main force for creating the economy. We should not only make full use of the advantages of human resources, but also pay attention to the improvement of the comprehensive quality of talents, strengthen the supply of public infrastructure and create a harmonious institutional environment. (3) Improve the retirement system. For the capable elderly population, the retirement age can be appropriately extended or encouraged to re-employ, so as to create material wealth and reduce the burden of family old-age care.

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