A study on the population, structure and influence of family planning policy adjustment

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Abstract. In view of the present our country population continued to low birth rate, labor absolute decline in the number, population support than the emergence of a turning point, and other phenomena, this paper to national census data and Shanghai statistical yearbook data as the basis, using grey forecasting, Leslie matrix population simulation and prediction etc. to build a model, to China over the next three years amount and structure of the population development trend of were reasonable forecast, on China's current and medium-term demographic characteristics and influence made analysis shows that combining the Research Report on the typical population; influence of the new policy of family planning of Shanghai population quantity and structure, labor supply employment and pension and other aspects are discussed in detail.

Introduction

The quantity and structure of population is an important factor affecting the development of economy and society. From since the late 1970s, China encourages late marriage and late childbearing, advocating one child for one couple. The policy has been implemented for over 30 years, which effectively control the rapid growth of China's population, and make a positive contribution to the economic development and the improvement of people's life. But on the other hand, its negative effect also began to appear. Such as primary school enrollment (1995 since), the registration number (since 2009) decreased year by year, labor population absolute number began to fell into the channel, population dependency ratio transformation time is coming, these will have a series of influences on economic and social health, sustainable development, causing the attention of the central and the social from all walks of life. Third Plenary Session of the party's eighteen proposed open alone two children. Policy before and after the introduction of various aspects of the open "alone two children," the effect of a large number of studies and comments.

Models

Grey forecasting model[1] is from its sequence of looking for information model, to discover and understand the inherent law, will affect the target factors is considered as a grey quantity, to calculated and deduced based on a small number of existing information[2]. The model has strong portability and is suitable for short and medium term prediction.

The process of grey forecasting model is as follows:

The following use of the gray prediction model GM (1, 1) to determine the changes in the number of people in the middle and short term.

According to the National Bureau of statistics [3], the population growth rate (1987 - 2012) is obtained:

$X^{(0)}$ =[16.61 15.73 15.04 14.39 12.98 11.6 11.45 11.21 10.55 10.42 10.06 9.14 8.18 .58 6.95 6.45 6.01 5.87 5.89 5.28 5.17 5.08 4.87 4.79 4.79 4.95]

A • ccording to the grey prediction model, the results of the parameters obtained by Matlab programming are as follows: (see Table 1).

a=-0.0571, b=17.0178

Bring into function expression:

$$x(k+1) = -281.4e^{-0.0571k} + 298$$

Table 1: forecast for the next 30 years, the natural growth rate of the data column

YEARS	2013	2018	2023	2028	2033	2038	2043	2048
Natural growth rate	3.752	2.82	2.12	1.59	1.19	0.90	0.68	0.50

In order to test the reliability of the model and the authenticity of the data, we test the reliability of the model by predicting the natural growth rate of 2002 to 2011 and comparing with the real value. The specific test data are shown in table 2.

Table 2:2002 - Test of the grey model predictive value of natural population growth rate in 2011

Years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Real value	6.45	6.01	5.87	5.89	5.28	5.17	5.08	4.87	4.79	4.79
Predicted value	6.638	6.269	5.922	5.594	5.284	4.991	4.714	4.452	4.206	3.972
Residual	-0.188	-0.259	-0.052	0.296	-0.004	0.179	0.366	0.418	0.584	0.817
Relative error	0.0291	0.0432	0.0088	0.0502	0.0006	0.0347	0.0721	0.0857	0.1220	0.1707

Accuracy test (posterior difference ratio): C=0.2035

Posterior difference check list

Series	Posterior difference ratio	Accuracy rate
Class A	<0.35	≥0.95
Class B	<0.5	≥0.8
Class C	<0.65	≥0.7
Class D	≥0.65	<0.7

From the above table shows that the accuracy rate of more than 95%, so the prediction results are very reliable.

According to the national population census data, the use of gray model to predict the next thirty years, the number of people in china.

Table 3: prediction of the total population in the next thirty years in China

Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Population	139.64	140.74	141.84	142.96	144.08	145.21	146.35	147.50	148.66	149.83
Years	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Population	151.00	152.19	153.38	154.59	155.80	157.02	158.26	159.50	160.75	162.01
Years	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Population	163.29	164.57	165.86	167.16	168.48	169.80	171.13	172.48	173.83	175.20

The curves of population quantity and natural growth rate with time are plotted. See Figure 1, figure 2.

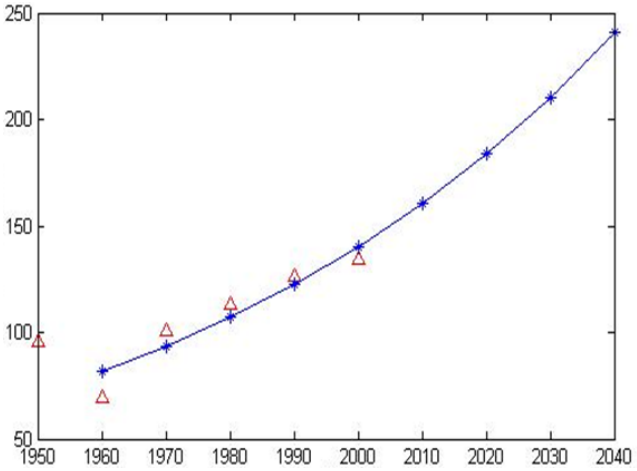

Fig. 1 population change curve

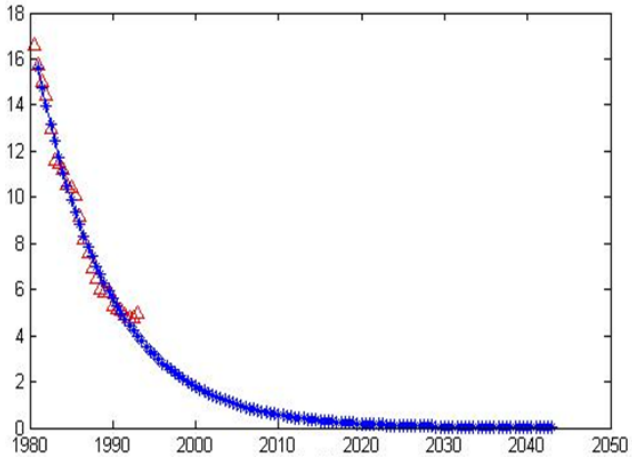

Fig. 2 curve of natural growth rate

Conclusion

Based on the research on the population and structure of the population, a comprehensive analysis was made on the selected typical population studies. Finally come to the conclusion: China's population problem situation is grim, it is necessary to carry out a comprehensive adjustment of family planning policy, this adjustment will contribute to the favorable changes in China's population structure.

The natural growth rate can be directly reflected by the chart, which is declining year by year. Integrated a variety of factors into consideration [4], we draw the conclusion as follows: the population of our country will experience from a slow climb (2013 - 2040, the population peak reached 15.8 million) [5], to stop growing (2040~2050, stable at about 15.6 billion), and to gradually decline in a series of processes[6].

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