

Econometric analysis and research of GDP influencing factors in China

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Abstract:

China is in the stage of economic transformation and development, and it should also maintain steady GDP growth. This study combines the econometric research theory of the factors affecting GDP. Proposed an analytical model for the factors influencing GDP And empirical testing using sample data from 2013-2022, Using econometric economy to analyze the factors affecting GDP, And estimated the OLS parameters of this model with the help of EVIEWS software. The model equation shows that the change in GDP will be significantly affected by three factors: the year-end savings balance of residents, total fiscal expenditure, and total fixed asset investment. Using these influencing factors to take corresponding countermeasures to promote the sustained growth of GDP.

Keywords: GDP, influencing factors, econometric analysis, analysis model, sustained growth

1. Introduction

As a measure of the status quo of national economic development, GDP is the English abbreviation of GDP, which refers to the value of all the final products and services created by the country in a certain period. Through GDP, one can see a country's economic situation, an important indicator for measuring economic conditions. GDP is affected by factors such as consumption, investment, government expenditure, and net exports, which reflect the relationship between these influencing factors, namely $GDP = A + B + C + DX$. Among them, A is consumption, B is investment, C is fiscal expenditure, and DX is net export. Since China's reform and opening up in 1978, China's GDP has increased from 362.4 billion yuan in 1978 to \$1 or 4 trillion in 2003. At comparable prices, the average annual growth rate is 9 or 4%, 6 or 1 percentage point higher than the world annual growth rate in the same period. From \$1.4 trillion in 2003 to \$10 trillion in 2014, by 2022, the average annual GDP growth rate will be 6%, along with social transformation. The econometric analysis of the influencing factors of GDP can put forward beneficial measures for GDP growth and then promote the sustainable development of the economy.

2. Literature Review

As one of the most important national macroeconomic statistical indicators, GDP. At present, many scholars do not think that GDP alone can reflect the national eco-

nomie strength, but GDP is still an important tool for grasping the macroeconomic operation status. In formulating economic policy, it is necessary to strengthen the econometric analysis of the influencing factors of GDP to put forward effective management decisions based on scientific judgments of the economic situation. From the economic growth theory development perspective, the earliest economists, such as Malthus, mainly used classical theory to explain the phenomenon of economic growth and analyzed the factors affecting economic growth from the perspective of population and division of labor. In the modern economic theory, the economic growth is divided into two parts: inside and outside. The exogenous growth theory holds that economic growth is mainly affected by the cumulative effect of capital; from the endogenous growth perspective, it is closely related to technological progress. The formation of China's GDP is a complex economic process, influenced by multiple factors such as economy, policy, science and technology level, and nature. There are many theoretical and applied studies on the prediction of total GDP or per capita GDP. There are three main methods for domestic and foreign scholars to study China's GDP:

- (1) time series methods: to study the law of GDP development with time. Through the historical data of time series, reveal the law of change at any time, establish ARMA, ARCH, and other models, extend this law to the future to predict the future of the phenomenon;
- (2) the econometrics model of co-integration test: by an-

analyzing the essential factors affecting the development of GDP, study the co-integration relationship between GDP and these factors, establish the econometrics model;

(3) the production function model; analyze the relationship between input and output under certain technical conditions, etc. Because GDP can not only measure the national output and income scale but also can measure the overall economic fluctuations and economic cycle state, it becomes the most attention in the macroeconomic economic statistics, is considered a measure of national economic development, judges the macroeconomic operation one of the most important indicators, and the government economic development strategy and economic policy important basis.

Based on the above research means, this paper, according to the influencing factors of GDP, using the econometric analysis of GDP and the model by EVIEWS software OLS parameter estimation, through the model equation, the annual savings balance of urban and rural residents, the total fiscal expenditure and total investment in fixed assets on the influence of GDP, and analyze the economic significance of these influencing factors.

3. Data Description and Econometric Model

This paper selects the data from China from 2013 to 2022 for analysis. We can see China's economic development by analyzing the factors affecting GDP. Many factors affect GDP, mainly including urban and rural residents' savings, fixed asset investment, fiscal expenditure, etc., and using X1, X2, X3, X4 to show. The selected data are from the statistical data published on the official website of the Bureau of Statistics. The collected data are analyzed statistically, and the EVIEWS software describes the linear relationship between the explained variables Y and the explanatory variables. The constructed model equation is as follows:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \mu_i$$

Where Y represents the total GDP, and X in Eq1, X2, X3, X4 It represents the year-end savings balance of urban and rural residents, total fiscal expenditure, total investment in fixed assets, and GDP of the previous period, μ_i For the random disturbance term, the parameters to be estimated are treated with $\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4$ representation. Estimate the OLS parameters of the model with EVIEWS software and determine the values of each parameter. The model results are as follows:

$$Y = 1975.587 + (-0.028259)X_1 + (-0.0649824)X_2 + 0.4913698X_3 + 1.037397X_4 \\ (1.684048)(-0.256726)(-1.237895)(3.648016)(12.68845)$$

$$R^2 = 0.9897635 \quad DW = 1.532988 \quad F = 5287.273$$

4 Empirical Analysis

4.1 Economic significance test

(1) The savings of urban and rural residents are related to the GDP. From the above equation, we can see that the savings coefficient of urban and rural residents is negative, which reflects the increase of the savings balance of urban and rural residents at the end of the year, which leads to a decrease in GDP, which will restrict the development of the domestic economy to a certain extent.

(2) The total fiscal expenditure is related to the GDP. From the above model, we can see that the increase in fiscal expenditure and the decrease in GDP are not in line with the law of economic development and have no economic significance.

(3) The relationship between the total investment in fixed assets and GDP. The above formula shows that the total increase in fixed asset investment and the increase in GDP are the two positive correlations consistent with the economic significance.

(4) The relationship between the previous GDP and the GDP of the current period. From the above equation, we can see that with the increasing GDP of the previous and current periods, the two are positively correlated, reflecting the correlation of economic development. Through the economic significance test, it can be seen that the total fiscal expenditure does not conform to the economic significance. After eliminating the item and the variable X2, the OLS method is used for parameter estimation. The model results are as follows:

$$Y = 1438.418 + (-0.093897)X_1 + 0.349556X_3 + 1.049285X_4 \\ (1.326594)(-0.986880)(5.372868)(12.58228)$$

$$(Data \text{ in parentheses represents the } t\text{-value}) \quad R^2 = 0.989880 \\ DW = 1.3416867 \quad F = 6879.6824$$

4.2 Statistical tests

According to the above model, X1, X3, and X4 coefficients align with the economic significance. By testing these variables, the adjusted model coefficient is 0.989880, close to 1, indicating that the model fits well. T was used to test whether the variables were within the regression model, given the significance level $\alpha = 0.05$, $n = 28$, $K = 3$, check the T and F distribution table, the critical value was determined to be $0.028t(28) = 2.057$, and the t-Statistic value for X1 was -0.997809 . A multiple regression equation is used to solve the multicollinearity, and Y makes a simple regression with each explanatory variable, as follows:

$Y=1438.418+(-0.093897)X_1+0.339545X_3+1.0392846X_4$
(1.417389) (-0.996880) (5.372867) (12.59248) $R^2=0.998$
490, $F=6768.6583$, $DW=1.347937$

It can be seen from the above equation that the model fit is very good, and the X_4 fit is better. It can be seen that the more residents save in financial institutions, the less GDP is affected by other factors, and the previous GDP impacts the four variables. Thus, there is multicollinearity between these variables, while X_1 , X_3 , and X_4 remain in Eq. That is, the equation is:

$Y=1349.208+(-0.093897)X_1+0.339549X_3+1.0392938X_4$

5. Conclusion

As one of the most important national macroeconomic statistical indicators, the GDP composition includes consumption, investment, government expenditure, and net export, a comprehensive indicator that can reflect the country's national strength and wealth and can also be regarded as the country's economic performance. Many scholars do not think that GDP alone can reflect the national economic strength, but GDP is still an important tool for grasping the state of macroeconomic operations. In formulating economic policy, it is necessary to strengthen the econometric analysis of the influencing factors of GDP to put forward effective management decisions based on scientific judgments of the economic situation. From the economic growth theory development perspective, the earliest economists, such as Malthus, mainly used classical theory to explain the phenomenon of economic growth and analyzed the factors affecting economic growth from the perspective of population and division of labor. In the modern economic theory, the economic growth is divided into two parts: inside and outside. The exogenous growth theory holds that economic growth is mainly affected by the cumulative effect of capital; from the endogenous growth perspective, there is a close relationship with technological progress. In terms of research on the factors influencing GDP, the academic circle has also carried out a lot of research. Some scholars believe that urban economic growth is related to improving total factor productivity, which is affected by property rights and technological progress. According to the analysis and comparison of economic growth in different regions, some scholars believe that GDP growth is affected by the degree of marketization, the development of foreign trade, and other factors. Using the multivariate regression model, some scholars regard consumption expenditure, capital formation, and other factors as explanatory variables and believe that scientific economic development strategies should be formulated by combining the influence of these

factors. In this study, based on the influencing factors of GDP, the author analyzed the influencing factors of GDP through the econometric model and analyzed the influencing factors in variables to understand the national economic development. First, by examining the analysis of these influencing factors, Choosing urban and rural residents' savings, investment, and fiscal expenditure are the influencing factors of GDP; these influencing factors were identified with X_1 , X_2 , X_3 to indicate that savings for both urban and rural residents increased by 1% at the end of the year, Fiscal revenue will decrease by 0.092786%; The coefficient of X_3 is the elasticity of total fixed asset investment in GDP, With a total fixed-asset investment increase of 1%, GDP will increase by 0.348595%; The coefficient of X_4 is the elasticity of the previous GDP, Or a 1% increase in the previous GDP, GDP, which will increase by 1.039295%.

According to the analysis results, in formulating economic strategies to promote GDP development, China should first pay attention to fixed asset investment. With increasing fixed asset investment, GDP continues to grow. To exert a positive impact, spending behavior should also be strengthened to improve the government's purchasing power and promote social investment. At the same time, savings and the system are needed, along with measures to attract people to store their savings in banks to provide financial support for developing financial services. To stimulate investment, interest rates can also be lowered appropriately to encourage consumers to invest directly or indirectly with money.

To sum up, using the empirical analysis of the factors influencing GDP, it can be found that GDP growth will be affected by money supply, import and export balance, and fiscal revenue. According to the above analysis conclusions, combined with China's economic development, targeted suggestions are put forward, specifically as follows: First, financial institutions have enough deposit balance. The savings of urban residents can promote the development of the national economy to a certain extent. No "capital panic" and economic development will be restricted only when the savings are sufficient. Secondly, the state encourages exports and implements preferential tax policies in taxation. According to the production situation of domestic products, different preferential tax policies are implemented to ensure a sufficient supply of domestic products. Finally, under the background of the new era, for the national economy to maintain stable growth, the central and local governments need to implement active economic policies to drive the rapid growth of the economy.

References

- [1] Sun tight, Ding Zhifan. Empirical study on the influencing factors of economic growth efficiency in China [J]. Statistics and Decision-making, 2015 (7): 125-128.
- [2] Li Qingjuan, Xi Xi. Empirical analysis of the factors influencing GDP in Inner Mongolia [J]. China's Collective Economy, 2022 (31): 25-27.
- [3] Chen Xikang, Yang Cuihong, Zhu Kunfu, et al. Forecast analysis and Policy Suggestions on China's economic growth rate 2023 [J]. Proceedings of the Chinese Academy of Sciences, 2023,38 (1): 81-90. DOI:10.16418/j.issn.1000-3045.20221226001.
- [4] Wu Jiamu. Econometric analysis and study of factors influencing GDP [J]. Accounting study, 2021 (10): 161-163. DOI:10.3969/j.issn.1673-4734.2021.10.076.
- [5] Yang Lingling. Analysis of the current situation and influencing factors of China's foreign exchange reserve scale —— Analysis based on econometric model [J]. Shang, 2013 (6): 119,110.
- [6] Wang Dingli. Econometric analysis of the factors influencing GDP [J]. Business Theory of China, 2017 (9): 175-178. DOI:10.3969/j.issn.1005-5800.2017.09.086.
- [7] Zuo Shengwei. Econometric analysis of the factors influencing GDP [J]. China Securities and Futures, 2011 (2): 168-169. DOI:10.3969/j.issn.1008-0651.2011.02.113.