

Research on the Impact of China's Defense Expenditure on Economic Growth Since the 21st Century

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Abstract

National defense construction has always been an important issue that cannot be ignored by the country. National defense expenditure is a part of the national financial expenditure, which is inextricably linked with the economy. This paper uses the latest data of defense expenditure and GDP from 2000 to 2020 since the 21st century, and through the test of sequence stability and cointegration, concludes that defense expenditure and economic growth are long-term and stable equilibrium relations. On this basis, the direct modeling shows that China's defense expenditure has a significant positive impact on China's economic growth at this stage. Based on this conclusion, corresponding policy recommendations are given.

Keywords

Defense Expenditure; Economic Growth; Stability; Cointegration.

1. Introduction

1.1. Research Background and Practical Significance

National security and stability is an indispensable and important foundation for economic development. China's national defense can be traced back to the establishment of the Xia Dynasty in the 21st century BC. From the beginning of the Opium War in 1840 to the founding of New China in 1949, the old China had a state without defense and suffered from the bullying of imperialist powers; After the founding of the People's Republic of China, in the face of the severe situation, the Party and the government strengthened the construction of national defense and protected the regime. In the new era of socialism with Chinese characteristics, although the world is generally in peaceful development and the people's living standards and quality have been improved qualitatively, in the trend of globalization, opportunities and challenges coexist. There may be hidden dangers behind peaceful development. Some developed countries are trying to curb the development of developing countries, which poses a threat to China's security to a certain extent. From the past history to the current international and domestic situation, it has been shown that national defense is related to the survival and development of a country and a nation. National defense construction is of great significance, and the research on national defense expenditure is necessary. And national security is the basis of ensuring our national economic development. Therefore, it is very necessary to determine the impact of our national defense expenditure on economic growth.

Secondly, in the just held National Congress, "national security" and "national defense expenditure" were one of its key words, and the conference mentioned the "overall national security concept". The General Assembly also pointed out that national security is the foundation of national rejuvenation, and social stability is the premise of national prosperity. The Twentieth National Congress also mentioned that we should achieve the centenary goal of building the military as scheduled, accelerate the building of the people's army into a world-class military, adhere to the Party's absolute leadership over the military, and create a new situation in the modernization of national defense and the military. This shows the importance

that China attaches to national defense expenditure. Building and strengthening the people's army and national defense construction will inevitably require national defense expenditure, which is a part of the national financial expenditure. There are inextricable links between national defense expenditure and the economy. Studying the impact of national defense expenditure on economic growth is of great significance to contemporary research and development.

1.2. Literature Review

According to the collected documents, the conclusions drawn by different students are different and classified according to the conclusions:

1.2.1. Defense Expenditure has a Positive Impact on the Economy

Through literature search, it is found that most scholars believe that the impact of defense expenditure on the economy is positive and positive. Yang Yue, Jia Niping, Zeng Lining, Zeng Li (2018), based on the data of defense expenditure and GDP from 1997 to 2017, discussed the relationship between China's defense expenditure and economic growth in the past 20 years. Based on the VAR model, the results show that there is a positive correlation between defense expenditure and the economy. Defense expenditure has a positive impact on the economy and can promote economic development; The economy can also promote the development of national defense, and there is a benign relationship between the two. Han Jingti and Luo Chunxiang (2010) proposed that defense spending in developing countries has a significant positive impact on national economic growth by using the Fedel-Lam theoretical model based on panel data.

1.2.2. Defense Expenditure has Both Positive and Negative Impacts on the Economy

Some scholars believe that defense expenditure has not only a positive impact on the economy, but also a negative impact. Shang Lei (2009) used impulse response to analyze the relationship between China's defense expenditure and economic growth from 1979 to 2007. It shows that China's defense expenditure has a negative impact on economic growth in the short term and a positive impact in the long term. Deng Yan (2020), a scholar, made an empirical study of China's defense expenditure and GDP from 1994 to 2017 by constructing a vector autoregressive VAR model, and concluded that if the defense expenditure is controlled within a certain range, it will promote economic growth, but if the defense construction is carried out excessively, it will inhibit economic growth. Two scholars including Ding Yongmei (2013) mentioned that the positive effect of defense expenditure can offset the resources it consumes, but if it goes beyond this range, continued growth will have a negative impact on the economy.

1.2.3. Defense Expenditure has No Significant Impact on the Economy

Sun Kaili (2006), based on China's data from 1989 to 2005, used qualitative and quantitative methods to study and analyze defense expenditure and economic growth. Using the Field-Lam model, he mentioned that China's defense expenditure in 1989-2005 did not have a significant impact on the national economy. The national economy has a one-way effect on defense expenditure, while the impact of defense expenditure on the national economy is very small. Han Jingti and Luo Chunxiang (2010) also mentioned that although defense expenditure has a significant positive impact in developing countries, there is no significant relationship between defense expenditure and national economic growth in developed countries.

To sum up, many different scholars have different conclusions about the impact of defense expenditure on economic growth. The conclusions are different, and the reasons are as follows: Firstly, Different scholars have different research methods. Some scholars conduct their research based on VAR model and impulse response, and some scholars use Field-Lam model for analysis. Different research methods may lead to different conclusions. Secondly, Different scholars have studied at different times. Most scholars carried out research based on the late

20th century to the early 21st century, and have not studied and analyzed the data since the 21st century. Moreover, The countries studied have certain differences. Even at the same time, for developing countries and developed countries, although the research object is the same, the conclusions are obviously different.

Because the conclusions drawn for different countries and at different times are different, and most scholars are based on the data at the end of the 20th century. They have not taken into account the impact of defense expenditure on economic development since the 21st century, and their conclusions may not be applicable to China's development in the 21st century. Secondly, the development of the contemporary world is changing with each passing day. It is important to keep pace with the development of the times. Therefore, in order to better understand the current development situation of China, my research is about the impact of China's defense expenditure on China's economic growth since the 21st century, and draw my own conclusions from it, and then give some policy suggestions for China's current development based on the conclusions.

2. Analysis of the Current Situation and Trend of Defense Expenditure and GDP

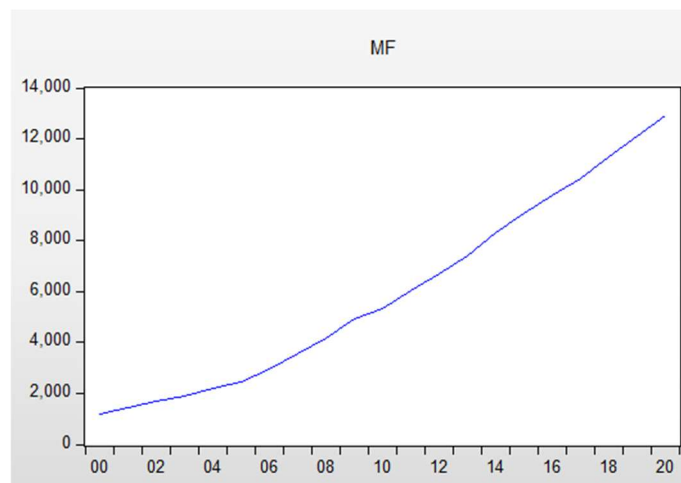


Fig. 1 Current situation of defense expenditure (MF stands for defense expenditure)

According to the collected data of defense expenditure from 2000 to 2020, the scale of China's defense expenditure has been steadily increasing year by year. In recent years, the Chinese government has always made efforts to coordinate national defense construction with economic construction. While China's economy continues to grow, the overall scale of national defense expenditure has maintained a reasonable and stable growth. China's defense expenditure in 2021 will increase by 6.8% compared with 2020. In 2022, the national budget for national defense expenditure will be 1476.081 billion yuan (of which 1450.45 billion yuan will be allocated at the central level), an increase of 7.1% over the implementation of the previous year's budget. However, compared with the United States and other major military powers, China's defense expenditure is still insufficient and still at a low level. As the world's second largest economy, China's increase in defense spending is not only the need to maintain national security and respond to complex situations, but also the necessary requirement to fulfill the responsibility of a major country and show its commitment. Therefore, from this perspective, China's defense expenditure will continue to grow at a reasonable and stable level.

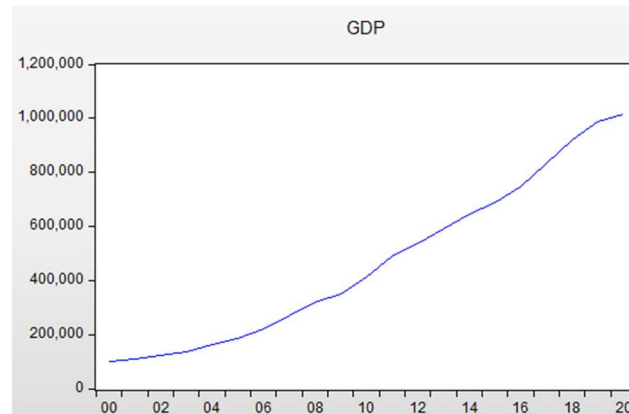


Fig. 2 Current situation and trend of GDP

From the collected data of China's GDP from 2000 to 2020, China's GDP is also rising steadily year by year. According to this trend, China's GDP will continue to grow steadily in the future.

3. Establishment and Analysis of Model

3.1. Modeling Basis

This paper studies the traditional time series of non-classical measurement, and has no source of macroeconomic theory. It is not difficult to see from the development status and trend chart of China's defense expenditure and GDP that both defense expenditure and GDP show a trend of steady growth year by year. This can not help but make people think about whether defense expenditure has an impact on economic growth and what impact it will have, or how the relationship between defense expenditure and economic growth is. Therefore, based on this current trend, this paper mainly studies the impact of China's defense expenditure on economic growth since the 21st century. Model the impact of defense expenditure on GDP.

3.2. Source of Data

This paper obtains the data of GDP from 2000 to 2020 through the 2021 China Statistical Yearbook officially released by the National Bureau of Statistics, and obtains the data of defense expenditure from 2000 to 2020 through the white paper issued by the Ministry of Defense every two years. Among them, defense expenditure is expressed in MF.

3.3. Establishment of Model

From the trend chart of defense expenditure and GDP, defense expenditure has been steadily increasing year by year, and GDP has also been steadily increasing year by year. There may be a linear relationship between the two. However, without the support of macroeconomic theory, if the linear estimation equation is directly established for the two variables, the problem of "pseudo regression" will likely occur, that is, the two variables that have no relationship with each other are highly correlated. Therefore, before the establishment of the model, it is necessary to carry out corresponding tests, including unit root test and cointegration test, to prevent the occurrence of the false regression problem of the model.

3.3.1. Autocorrelation Diagram and Partial Autocorrelation Diagram

First of all, check whether the sequence is stable by comparing the intuitive autocorrelation and partial autocorrelation diagrams. The autocorrelation and partial autocorrelation diagrams of defense expenditure MF series and GDP series are obtained by using Eviews software. The results are as follows:

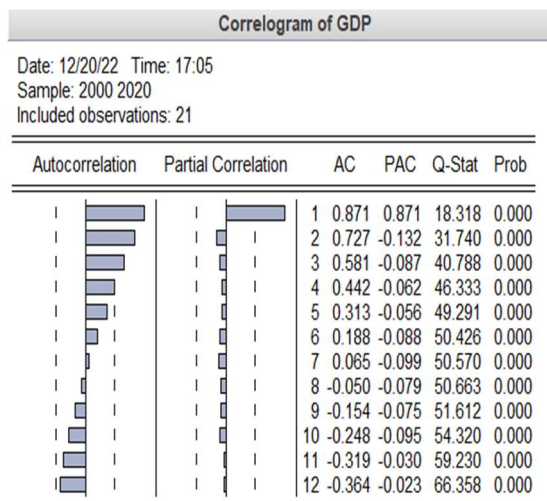


Fig. 3 Correlogram of GDP

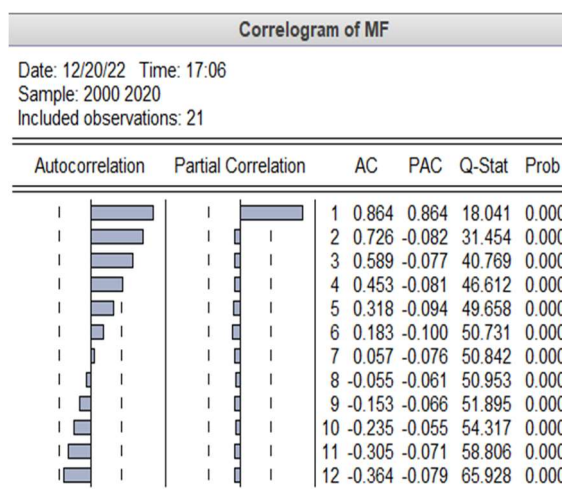


Fig. 4 Correlogram of MF

It is not difficult to see that the autocorrelation diagrams of the two sequences did not decay to 0 very quickly, and the two sequences are non-stationary. But only using autocorrelation and partial autocorrelation graph to test the sequence stationarity is not very convincing. Therefore, the next step is to use the unit root test method to carry out a more rigorous and convincing test on whether the sequence is stable.

3.3.2. Unit Root Test

First, the unit root test is performed on the two original sequences of the model. According to the trend chart of the current situation analysis of the above two sequences, both of them have an obvious upward trend over time. The test results are as follows:

Null Hypothesis: MF has a unit root Exogenous: Constant, Linear Trend Lag Length: 0 (Automatic - based on SIC, maxlag=0)			Null Hypothesis: GDP has a unit root Exogenous: Constant, Linear Trend Lag Length: 0 (Automatic - based on SIC, maxlag=0)		
	t-Statistic	Prob.*		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.618201	0.2766	Augmented Dickey-Fuller test statistic	-2.696682	0.2477
Test critical values:			Test critical values:		
1% level	-4.498307		1% level	-4.498307	
5% level	-3.658446		5% level	-3.658446	
10% level	-3.268973		10% level	-3.268973	

Fig. 5 Unit root test of MF and GDP

For the MF and GDP series, their p values are 0.2766 and 0.2477 respectively, which accept the original assumption, indicating that the MF and GDP series have unit roots and are non-stationary series.

In the same way, using the above test method, the unit root of the first order difference and the second order difference of the sequence are tested respectively. The results show that the unit root still exists after the first order difference, and the sequence is stable after the second order difference.

The test results of the second-order difference are as follows:

Null Hypothesis: IIMF has a unit root Exogenous: None Lag Length: 0 (Automatic - based on SIC, maxlag=0)			Null Hypothesis: IIGDP has a unit root Exogenous: None Lag Length: 0 (Automatic - based on SIC, maxlag=0)		
	t-Statistic	Prob.*		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.321836	0.0000	Augmented Dickey-Fuller test statistic	-3.106779	0.0039
Test critical values:			Test critical values:		
1% level	-2.699769		1% level	-2.699769	
5% level	-1.961409		5% level	-1.961409	
10% level	-1.606610		10% level	-1.606610	

Fig. 6 Unit root test of IIMF and IIGDP

The results show that the second-order difference of the two sequences have no unit root and are stable.

The test results show that although the sequence is non-stationary, the two sequences are both second-order single-integer sequences with the same order. Therefore, the co-integration test is carried out next to prepare for modeling.

3.3.3. Cointegration Test

The sequence MF and GDP are both second-order single integration, and the cointegration test is carried out to determine whether there is a long-term stable and balanced cointegration relationship between them for the purpose of modeling.

First, use the variable MF to regress GDP, that is, $GDP_t = \alpha + \beta MF_t + \varepsilon_t$

The residual E1 of the model is obtained according to the regression. Next, carry out unit root test on E1.

The residual generally fluctuates around the 0 mean value, and the unit root test results are as follows by selecting the appropriate form:

Null Hypothesis: E1 has a unit root Exogenous: None Lag Length: 0 (Automatic - based on SIC, maxlag=0)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.993695	0.0048
Test critical values:		
1% level	-2.685718	
5% level	-1.959071	
10% level	-1.607456	

Fig. 7 Unit root test of residual

Obviously, the residual sequence of the model is stationary. Therefore, there is a long-term stable equilibrium relationship between the two variables. If the concern of "pseudo regression" is eliminated, the model can be directly established: $GDP_t = \alpha + \beta MF_t + \varepsilon_t$. The regression results are as follows:

Dependent Variable: GDP
 Method: Least Squares
 Date: 12/05/22 Time: 11:17
 Sample: 2000 2020
 Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-14698.27	6913.178	-2.126124	0.0468
MF	80.57493	0.979712	82.24346	0.0000

R-squared	0.997199	Mean dependent var	468617.7
Adjusted R-squared	0.997051	S.D. dependent var	307275.6
S.E. of regression	16685.25	Akaike info criterion	22.37283
Sum squared resid	5.29E+09	Schwarz criterion	22.47231
Log likelihood	-232.9147	Hannan-Quinn criter.	22.39442
F-statistic	6763.987	Durbin-Watson stat	1.176780
Prob(F-statistic)	0.000000		

Fig. 8 Model regression result

3.4. Result Analysis

From the unit root test to the cointegration test and then to the direct establishment of the model, there is a cointegration stable relationship between the two series studied in this paper. Based on this conclusion, the direct modeling will not have the problem of "pseudo regression". The regression results are shown in Figure 3.3. The results show that there is a long-term stable equilibrium relationship between defense expenditure and GDP, and the p value is less than the significance level ($\alpha=0.05$). Therefore, it is concluded that defense expenditure has a significant impact on GDP and the coefficient is positive.

Since the data used in this paper are from the 21st century, according to the establishment of the model, China's defense expenditure has a significant positive impact on GDP since the 21st century. On the basis of this conclusion, a reasonable increase in defense expenditure is conducive to promoting and promoting China's economic growth and development.

4. Policy Recommendations

4.1. Further Increase the Scale of Defense Expenditure

Because there are still many uncertain factors in the contemporary world political situation, there are security threats and dangers. It is important and necessary to increase defense expenditure. Moreover, compared with the United States and other major military powers, China's current national defense construction and military expenditure still have many gaps and are still at a low level. Although China is a developing country, its economy has been developing at a high speed. As the second largest economy in the world, it is justifiable to increase defense expenditure with economic strength. At present, China is still a developing country, so it is necessary to increase the scale of defense expenditure. However, as some scholars have said, if the national defense expenditure has been increased without keeping it within a reasonable range, the excessive national defense expenditure will restrict the economic development. Therefore, at this stage, China should maintain a reasonable range of sustained growth while increasing the scale of national defense.

4.2. Establish and Improve a Reasonable Defense Expenditure Mechanism

First of all, relevant laws and regulations should be improved and perfected according to the current situation of our country, so as to provide necessary legal protection for our national defense expenditure and construction. At the same time, we should establish and improve the national defense mechanism, not only the conventional mechanism, but also the emergency mechanism. For China at this stage, the emergency mechanism is very necessary. A country that is unprepared for emergency supplies will be in a hurry when faced with sudden national defense needs, and cannot afford the sudden huge national defense needs. Secondly, the establishment and improvement of a reasonable defense expenditure mechanism is also the

basis for maintaining a stable growth of China's defense expenditure in a reasonable and appropriate range.

4.3. Adhere to the Unity of a Rich Country and a Strong Military

In the new era, China is facing a particularly prominent problem of the unity of a rich country and a strong military. As a part of our government's financial expenditure, the national defense investment will take up a part of the investment in the civil economy with the increase of the national defense expenditure, thus restricting the economic growth. Therefore, we should adhere to the strategic starting point of "adhering to the unity of rich country and strong military". At the present stage of China in the new era, first of all, we need to solve the problem of resource constraints scientifically and reasonably, allocate resources more reasonably in the two major aspects of economic construction and defense construction expenditure, develop productivity, and strive to innovate the development model and path strategy under the constraints of limited resources, so as to promote the simultaneous improvement of national defense and economic strength, Improve the efficiency of resource allocation, improve the comprehensive transformation and upgrading of national defense economic management, and solve the contradiction between economic construction and national defense expenditure on resource demand to the maximum extent and ability, so as to unify the rich country and the strong military.

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