

DETERMINANTS OF MILITARY EXPENDITURE IN CHINA: EVIDENCE FROM 1994 TO 2008

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Abstract: Based on the data from the year of 1994 to 2008, an empirical model is applied to research the main determinants of military expenditures in China in this paper. There are three finds. Firstly, the main determinants focus on three elements: the demand of arms import, the development of economy, and the level of exports of goods and services. Secondly, public financial capability can promote the military spending, but it shows slight influence and cannot show statistical significance. In addition, the degree of reliance on metal imports and metal imports do not show any statistical significance on the military spending.

Keywords: Determinants, Military Expenditure, China

1. INTRODUCTION

Since the original research of Lotz in 1970, researchers have paid more and more attention to the positive analysis about the determinants of military expenditures. China, as a potential great power with large population and area, attracts much interest from researchers(2006) used new classic growth model and found out that there was positive relationship among military expenditures of China, that of USA, Soviet, Taiwan and the GDP of China. Hao and Sun(2007) concluded that there was Grange relationship among military expenditures of China and that of USA, Japan and India, in addition to the GDP of China by using an empirical model. However, Jiang and Luo's research(2007) revealed that military expenditures of China was just influenced by GDP and the military expenditures of the former year. In general, most existent positive researches about China covered two kinds of variables. One kind is about the general economic development, and the other kind is about the degree of threat from outside. Because of the limitation of variables referred to, there may be some important independencies left out in analysis of Chinese military expenditure determinants.

Lotz(1970), Tait(1982), Maizels(1995) discussed the factors of military expenditures in a larger field, including GDP per capita, the level of urbanization, the size of metal exports, the balance of payments and other economic structure indicators. We get illuminance from Lotz's and others' paper related with the discussion structure factors. This paper tries to explore that whether there are economic or military structural factors influence the military expenditure in China.

2. DESIGN OF RESEARCH

2.1 Theory and Empirical Model. Factors influencing the level of military expenditures concentrate in politics, military affairs and economic fields.

Political factors Political factors include domestic and international affairs.

Researches mainly investigate the following domestic factors:

- (a) the degree of democracy, such as autarchy or democratic regime,
- (b) the degree of militarization in the government,
- (c) the degree of militarization of a nation,
- (d) the legitimacy of the governance,

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(e) the stability of regime.

In addition, international political affairs cause variation of military expenditures, such as the broken diplomacy with some nations.

Military factors Military factors contain defense strategy, military strategy, requires of military development, military alliance, the degree of defense safety and so on.

Military alliance can induce spillover effect, which makes less requirement of military expenditures for leaguer. In the long run, the development of military technology promotes the military expenditures, because advanced weapons cost large amount of money.

Ultimately, the degree of defense safety depends on the comparison with the opponent military power. Researchers usually use the military expenditure to measure the military threat from opponents.

The higher the hostile military expenditure is, the greater the threat is, and the less the domestic safety is.

Economic factors Some economic factors constitute the demand of military expenditures. One of those factors is the gross property of the nation. Combination of the realism politics and the utile economics helps to explain the model of wealth predation (Grossman, 1995). Based on the model of predation, Liu and Hu (2007) developed a long term growth model of a country in Hobbes environment filled up with international conflicts, where national defense is the only way to prevent exterior predation.

From the model, the equilibrium economic growth path has seen three phases, which are subjected equilibrium, tolerated equilibrium and full-defense equilibrium in succession.

Different defense strategies result in different growth prospects, but sustaining growth will endogenously induce the changes of optimal defense strategy.

The conclusion of the predation model seems too theoretical. After all, there is not any country intends to be subjected to aggression because of poverty.

However, the model reveals that there is a close relationship between defense and wealth development, which is meaningful in Hobbes international environment.

From the model of Liu and Hu (2007), in such an international environment, the optimal defense spending increases with the growth of national wealth in order to satisfy the requirement of defending the growing property.

The other kind of factor demanding military expenditures is the structural characteristic of economy. For example, the degree of economy reliance on the international trade influences the need of defense from two different directions.

When the economy depends on international trade to a large extent, the country needs great defence capacity to guard the economic interest and the growing property. At the same time, the country does not need much defence power to confront with its trade partners at least, because all the trade partners may recognize the probability of both wins with non-violent solution to the conflicts between each other.

However, some economic factors constitute bounds to defense spending, which mainly lie in the public fiscal, such as the capability of fiscal, the structural of physical expenditures and so on. Musgrave and Rostow concluded the rules of public expenditures. At the beginning of economic development, infrastructures investment and productive investment use up large part of public fiscal revenue. While when economy develops to higher level, individuals pursue more social welfare. Thus, public expenditures on education, health care, social security increase rapidly. In those situations, defense spending may be crowded out.

2.2 Empirical Model. It is difficult to make a theoretical model to cover all the factors in political, military and economic fields (Hartley and Sandler, 1986). Thus, based on those theoretical explain, with the reference to research way in papers of Lotz (1970), Tait and Heller (1982), Deger and Sen (1986), Heller and Diamond (1990), Maizels and Nissanke (1987), we make an empirical model to identify the determinants of Chinese military expenditures as following:

$$MES = F(ARMS, ECO, ECOSTR_n, PE)$$

MES is the proportion of Chinese military expenditures to the world military expenditures.

ARMS is the demand of military technology development. ECO measures the level of economy development.

ECOSTRn is the characteristic of economic structure. PE is the capacity of public finance.

We think MES can cover the reaction to all opponent threat from outside.

Because assuming that each country is rational, the equilibrium situation is such a state that the relative military expenditure is stable.

Then, when the MES changes, we can find out other military or economic reasons besides the opponents' military expenditures by regression analysis.

2.3 Sample and Data. Because of reform and opening, China saw great changes in military and economic affairs.

At the beginning of reform and opening, the guideline of military strategy is preparation for a large nuclear warfare as early as possible.

Along with the transfer to focus on economic development, China started to review the international circumstance and made new guideline of military strategy in 1985, which was preparation for winning of a partial war.

According to that, forces made some great adjustments including disbarment and cut of military expenditure.

Since 1990s, defense development has been focusing on how to win a highly technological partial war.

In the field of economy, some general institutional reforms happened in 1993 and 1994, which were the adoption of market economic system and the fiscal decentralization reform respectively.

Market economic system changes the way of social welfare growth, which invokes economy growing rapidly.

Fiscal decentralization reform promotes all government developing local economy in order to gather more local fiscal revenue, which increases the central fiscal revenue at the same time.

Moreover, with the fiscal decentralized system, central government occupies more than half of the whole fiscal revenue, which is helpful for increase of the military expenditure.

Based on those analysis above, political, military and economic affairs have come into stable period since 1994.

So, in theory the determination system has been stable since 1994.

Thus, we choose the data from 1994 to 2008 as the sample for empirical analysis.

In military field, because the share of military expenditure internalizes the influence resulted from the changes in military expenditure of other countries, the rest military demand for defense spending lies in the development military technology.

There is substantial lagged gap between China and the developed countries in military technology, which means that China has rather limited capability in research and production of advanced weapons, and China has to depend on import to improve armaments to some extent. In fact, China has seen a great amount of armaments import for several years. Thus, we may use the index of armaments import to measure the influence of technology development.

As to economic factors, firstly, we think GDP per capita is better to measure the economic development than GDP. Secondly, with reference to the economic structure, we mainly describe and measure it from four views as the following: the reliance on goods and service exports, the reliance on fuel imports, the reliance on fuel exports, the dependence on metal imports.

Table 1. Factors Description

Factor	Index and Calculation
Demand of military technology development	Quotiety of arms import (Armsims) =Import of arms/ world import of arms
Development of economy	Quotiety of GDP per capital(Pergdps) =GDP per capital/ GDP per capital of the world
The structure of economy	Quotiety of goods and service export(Exps) =Export of goods and service /world export of goods and service
	Quotiety of fuel export(Fuelexps) = Export of fuel/ world export of fuel
	Quotiety of fuel import(Fuelims) =Import of fuel/ world import of fuel
	Quotiety of metal import (Metalims) =Import of metal/ world import of metal
Public Fiscal capacity	Capacity of public fiscal expenditure(Pes) =Public expenditure/ GDP

Data come from database of China statistic bureau, SIPRI and World Bank.

In fact, no matter the degree of safety or the scale of wealth, relative index makes more sense than absolute index.

Thus, we choose the relative indexes to measure those factors above. Table 1 shows the calculation of those relative indexes respectively.

The public fiscal capacity is calculated based on data from China statistic bureau. The ratio of Chinese military expenditure to world military expenditure is calculated according to data from SIPRI database. Other indexes are calculated with data from World Bank database.

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3. RESULT

Using OLS, we get the regression results showing in Table 2. Comparing the results of all those models, model 2 fits the data to the greatest extent. Model 2 has the smallest AIC, SC, and the greatest F, which all shows that model 2 is the best regression among those models. According to White Heteroskedasticity test, there is no heteroskedasticity in model 2. DW of model 2 equals to 1.91467, lying in (du, 4-du), which means there is no auto correlation neither. We carried though root test on series of Mes, Armsims, Pergdps and Exports. We find they are all I(2). Then we made ADF test on residuals of Model 2.

Table 2. Regression results

Model	1	2	3	4
C	-0.0013	0.0002	-0.0008	0.0004
Armsims	0.0222 **	0.0195 **	0.0170 ***	0.0186 ***
Pergdps	0.1025	0.1062	0.0952	0.1243
Exports	0.3161 *	0.3113 *	0.3402 *	0.3412 *
Fuelims			0.0031	0.0033
Metalims				-0.0039
Pes	0.0001			
AIC	-9.8811	-9.9565	-9.8526	-9.9177
SC	-9.645	-9.7677	-9.6166	-9.6344
A.R ²	0.9891	0.9895	0.9888	0.9898
F	317.6048	439.4309	308.6246	271.3675

*, **, *** mean significant at 1%, 5% and 10% respectively.

As Table 3 shows, ADF test results show that residuals of Model 2 is stationary, so we can conclude that there are cointegrations among Mes, Armsims, Pergdps and Exports. In sum, we can accept model 2 technically.

Table 3. Tests on Model 2

White Heteroscedasticity Test				ADF Test	
F-statistic	0.431117	Probability	0.839426	ADF Test Statistic	Critical Value
Obs*R-squared	3.665026	Probability	0.721900	-3.464614	1% -4.0113
					5% -3.1003
					10% -2.6927

4. CONCLUSIONS

We find that China's military expenditure grew with the increase of the requirement of military technology advancement, the development of economy and exports of goods and service from 1994 to 2008, which means that China has reacted to some of the development of economy to some extent since 1994.

However, the empirical analysis shows no significant relationship between military expenditure and China's reliance on fuel and metal import. It may be not suitable for China.

Nowadays, it is resources that many diplomatic affairs and national security policies focus on for most countries.

China is one of the greatest producers and also the greatest demander for resources in the world, especially for the oil, natural gas and metal.

Although China is trying hard to transfer to a new innovation economy pattern, which makes China rely on resources less, it need a long time to realize it.

Moreover, there is not much possibility to find out new substitutes for fuel until now considering nowadays science development.

So it is vital to gain the conventional fuel, metal and other important resources for Chinese economic security and development.

For the security and sustainability of economy development, China should strengthen the navy and air forces, which might lead to increasing the amount of military expenditure.

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