

# Financing Defence: The Influence of Technology and Defence Budget on National Economics in Indonesian Case

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# Financing Defence: The Influence of Technology and Defence Budget on National Economics in Indonesian Case

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## Abstract

In our hypothesis, the defense budget that including manpower and all high technology weaponry, must reduce the traditional threat and influence the economic growth. This research would like to see if the defense spending will influence the national economics through economic growth by demand side approach. By assuming the natural balance of power, the traditional threat come not only from military capabilities but also balanced by their economic power. The equation model formed to capture the influence of defense spending to economics growth. The regression describes that military spending had an impact on economic growth. Increase in the level of traditional threat is not reduce economic growth. The Indonesian defense budget give impact on the national economics, and the traditional threat is in small variation. But, the national defense budget still needs to be increased. This makes production could be stable, and the economic actors still feel safe doing the business.

Keywords: Defense Economics, Defence budget, Traditional Threats, Economic Growth

## 1. Introduction

Defense budget and economy are two variables that mutually reciprocal. Without defense it would appear threat, so the economy can not run properly. But, defense budget can only be improved if the national income increasing.

The budget for national defense and technology is the important government's policy. There are two arguments for the impact of defense spending. The government spending can give a negative or positive effect on the economy. Although the relation of government spending on defense with economic has been studied with a wide range of economic model, but the result is still contradictory for certain, whether military spending support or depress the economy.

This study will analyze the influence of government spending on defense to national economics toward economic growth. The results will be analyzed and could be developed for better national defense planning policy.

## 2. Literature Review

Adam Smith (1776) said, first obligation of the state is protecting the public needs. Good protection from the government will harmonizing the conflict between private and social interests, prevention of exploitation by foreign, and stimulate an increase in production.

This security transformed in public goods, that must be prepared by the state impersonal and can not be private-right. Security is a classic functions of the state in addition to the function of affluence. A void from threats coming from the outside is the main function of the state in the classic concept. In the traditional concepts, security is the absence of physical threats that comes from outside, or an free atmosphere from all forms of danger, anxiety, and fear.[1]

One approach that to see the relationship between defense spending and economic growth is from the supply side. This makes the production function of neoclassical approach, by reviewing of the supply side through aggregate output changes. Another approach, that explain the effect of military spending on the output of the economy is through the demand side. It is through the level and composition of expenditure that give the multiplier effect of increasing demand. This will increase the utility and reduce unemployment. According Benoit (1973, 1978), military expenditures from demand side have positive influence on economic growth. He explained that this effect comes from the multiplier Keynesian model, based on mechanisms for countries that underutilized.[2][3]

This paper focused on the effect of military to economy by demand side approach. West & Thompson (1990) the effects in the economy that have impact on aggregate output from the demand side, can be explained by the Keynes's theory approach, namely:[4]

- If it appears in the effect of the allocation of resources (resource-allocation effect), it will cause investment to crowd-out. Keynes model explained that growth will slowed in subsequent years.
- The emergence effect of the mobilization of resources (resource-mobilization effect) will have an impact on the decline of household savings. According to the Keynesian model, the low level of savings ratio was the cause of the low growth rate movements.
- If there is a positive spin-off from military spending, according to the model Keynes, there will be an increase in growth.
- Aggregate demand effect that arises, can be explained by the Keynesian model is based on the multiplier mechanism. The multiplier effect will be static, but could have a dynamic effect in the long term.
- In case of debt accumulation effect, it will suppress the growth of capital. In the Keynesian model, these effects lead to a reduction of resources for foreign exchange.

Hartley (2005) identified the positive effects of defense spending. Defense provide direct benefit from the high technology in military and its impact on other sectors, where the spin-off used by the civilian sector could boost economic growth. In developing countries, defense spending could boost growth if some part of the expenditure is used for the provision of social infrastructure. Defense expenditure that provide protection for citizens, in which internal and external security, will increase the exchange market.[5]

The threat level in this study focused on a traditional threats from external, where the actor are states. Although Indonesia did not have traditional enemies, but the unwary or careless against traditional/external threats can be very dangerous. Weak defense could be the entrance of internal conflicts as a result of foreign influence. With a weak defense, will also lead to the reduction of state authority in international affairs. Diplomacy of the country does not have power for a strong press. Additionally, domination, violation, foreign infiltration and others can easily into the country because of the lack of power dread. To face all the threat, the state should not expect from other state aid, but should be based on its own strength, which ultimately impact on increasing defense spending.

The magnitude of the threat is very sensitive to the presence of the power of each country relative to the strength of its neighboring countries. The asymmetric capability distribution among the countries can make up threats and pressures between them. Chatterjee (1972) describes, in a classic balance of power distribution are influenced most by the military forces of a country, by a good number of soldiers, the number of weapons or technology that are reflected in its military budget.[6]

However Virmani (2004) stated that since the completion of World War II, the world has changed dramatically, so the concept of "balance of power" gradually transformed into "natural balance of power" in which the economic scale was based on. Balance of power is also called "stable balance" if it shows natural balance. Natural balance of power is the nation's ideals of peace in the world that still continue to be commercialized realization. Natural balance of power is defined as the responsible attitude of a country in enhancing the potential strength in proportion to the relative attention to internationalization and global rights. The system built is expected to create a peaceful economic competition between countries. Within their own country does not happen the competition between dimensions, both economic and military.[7] Differences in the balance of power between countries could give the perception of threat to the weaker ones. Lebovic & Ishaq (1987) defines a threatening situation is the asymmetric distribution of power between countries that creates a threatening condition and tension or escalation between them. Thus threatening situation can be expressed as the concept of relative strength. However, this strength asymmetrical shape seen from different angles depending on what the underlying motives of this condition. From this perception, the country makes their defense spending policies.[8]

### 3. Methodology

Economic growth depends on the supply of production factors. Deger (1985, 1986) developed a model to explain the growth rate of its formal model, use Harrod-Domar framework that assume constant elasticity. The production function consist of labor, capital (physical capital), human capital, and technology. There are technology ( $A, B, C$ ) that attached to the labor force ( $L$ ), physical capital ( $K$ ) and human capital ( $Q$ ). In addition, it is assumed there is a proprietary technology ( $T$ ) that is not attached to both, but through military technology develops. The equation is formed based on the following:[9][10]

$$Y = F(AL, BK, CQ, T) \quad (1)$$

With partial derive from the production and mathematical functions manipulation, the equation becomes:

$$\frac{\Delta Y}{Y} = (ALF_1/Y) \frac{\Delta L}{L} + (BK F_2/Y) \frac{\Delta K}{K} + (CQ F_3/Y) \frac{\Delta Q}{Q} + (T F_4/Y) \frac{\Delta T}{T} \quad (2)$$

If :

$$a_1 = (ALF_1/Y); a_2 = (BK F_2/Y); a_3 = (CQ F_3/Y); a_4 = (T F_4/Y) \quad (3)$$

Then the rate of growth of output,  $g$ , is given by the following equation:

$$g = a_1 \left( \frac{\Delta L}{L} \right) + a_2 \left( \frac{\Delta K}{K} \right) + a_3 \left( \frac{\Delta Q}{Q} \right) + a_4 \left( \frac{\Delta T}{T} \right) \quad (4)$$

where  $Y$  is output,  $L$  is labor input,  $K$  and  $Q$  are the input of physical capital and human capital, and  $T$  is the amount of technology.

The growth of labor very closely on population growth. The absolute number of the population can be described as people who are ready to do the job. The growth of the population excluded from the model because it has a very small variation.

The role of investment to economic growth occurs through the formation of capital. Investment in physical capital is very important influence on economic growth. However, investment in human resources which is a much less in public investment, is often debated efficiency. Public investment in human resources despite initially inefficient, but in the long run will be efficient.

To see the growth rate of the capital stock is by assuming the proportional depreciation amounted  $\delta$ . It can be established:

$$\left( \frac{\Delta K}{K} \right) = \left( \frac{I_c}{K} \right) - \left( \frac{\delta_1 K}{K} \right) = \left( \frac{I_c}{Y} \right) \left( \frac{Y}{K} \right) - \delta_1 = i.v - \delta_1 \quad (5)$$

Where  $I_c$  is the gross investment in physical capital,  $v$  is the capital output ratio, and  $i$  was part of the investment in the output.

To capture the military spending, developments in military technology should be included. In terms of modernization and resource mobilization, military spending involves in the output section,  $m$ . Deger & Smith (1983) explains that the technology absorption capacity of a country depends on the level of income per capita ( $k$ ). Countries with low income levels have fewer resources to absorb, control, or using technology. Thus it can be established technology equation as follows:[11]

$$\left( \frac{\Delta T}{T} \right) = a_5 + a_6 m - a_7 k \quad (6)$$

Combine all the elements, resulting in:

$$g = a_1(n) + a_2(i.v - \delta_1) + a_4(a_5 + a_6 m - a_7 k) \quad (7)$$

By collecting constants and variables, then:

$$g = (-a_2 \delta_1 + a_4 a_5) + a_2 v_i + a_4 a_6 m - a_4 a_7 k \quad (8)$$

To enter the threat ( $h$ ) into the model, we used Aizenman & Glick (2003, 2006) [22] del. The model begins with the conjecture as follows: "The impact of military spending on growth is in the form of a nonlinear function of threat for effective military forces." The assumption can be expressed as follows: "The threat without military spending on security will reduce growth, military spending without the threat will reduced growth. When the existence of military expenditures in accord [13] with the magnitude of the threat will increase growth." The direct effects of military spending and external threats to growth are assumed negative when the interaction effect is positive. [12][13]

Thus the threat model are shown in the following equation: [12][13]

$$g = z_1 m + z_2 (m)(h) + z_3 h \quad \text{where } z_1 < 0, z_2 < 0, z_3 > 0 \quad (9)$$

By adopting the equation above and incorporated into the economic growth model, we capture the presence of military spending. It is in accordance with the magnitude of the threat. Interaction threats that affect the economic growth seen as a threat in the previous period. The economic agents' expectations assumed in determining the threat by looking at all the period situation.

Combine all the elements, resulting in:

$$g = (-a_2 \delta_1 + a_4 a_5) + (a_2 v_i) - a_4 a_7 k + a_4 a_6 (-z_1 m + z_2 (m_1)(h_1) - z_3 h_1) \quad (10)$$

If the symbol simplified constants, the equation becomes:

$$g = \alpha_0 + \alpha_1 i - \alpha_2 m + \alpha_3 (m_1)(h_1) - \alpha_4 h_1 - \alpha_5 k + u_1 \quad (11)$$

Or:

$$growth = \alpha_0 + \alpha_1 imvy + \alpha_2 mily + \alpha_3 (mily_{t-1})(sni_{t-1}) + \alpha_4 sni_{t-1} + \alpha_5 cgdp + u_1 \quad (12)$$

Where *growth* is economic growth, *imvy* is investment/gdp, *mily* is a military expenditure/gdp, *sni* is a threat index, and *cgdp* is per capita national income.

Before looking at the defense budget and its influence on the economic growth, we must know the level of traditional/external threats faced by Indonesia. The suitable model of Indonesian traditional threat is to treat the variables threat as a potential or laten threat. This threat is not just associated with military power, but also of the economic strength that can be physically counted. Lebovick & Ishaq (1987) describes a suitable model for analyzing these threats, by looking at the relative military capability of a country to another country that weighted with the physical quality of the macro indicators of a country. Countries with good economy will be able to buy modern weapons, improve human resources and develop cutting-edge technology. [8]

Inspired by Lebovick & Ishaq (1987), that states the fundamental threat comes from external basic security needs of a country. So, to translate the threat, we create the need for security index or security need index (SNI). Potential threats or SNI of state- $i$  is a function of the relative capability of his country. The same perception of potential threats to the security needs are reflected in its security needs. The relative capability of a country referred as relative capability index (RCI). It is a function of military capabilities (*cap*) relative to countries opponent (*state j*), namely: [8]

$$RC_i = \left( \frac{cap_i}{\sum (cap_j / geog_{ij})} \right) \quad (13)$$

Thus SNI (security needs index) can be proxied by:

$$SNI_i = \left( \frac{\sum (RC_j / geog_{ij})}{n-1} \right) \quad (14)$$

In this study, a strategic environmental threat facing Indonesia is limited by counting them against neighboring countries at the border. Where *geog* is the distance between the capital of two states, ( $n-1$ ) is the number of countries in the strategic environment, and military capabilities is reflected in the magnitude of its *Global Military Index*.

The main data sources for the study materials are taken from the World Development Indicator (WDI) of the World Bank [14], the International Institute and Strategic Studies (IISS) [15], the State Budget (APBN) of the Ministry of Finance [16].

## 4. Findings

### 4.1. Security Need Index of Indonesia

Indonesia has a strategic environment where the border area with 10 country, namely India, Malaysia, Singapore, Thailand, Vietnam, Philippines, Republic of Palau, Australia, East Timor and Papua New Guinea. Indonesian sea border area are generally the form of outer islands that amounts to 92 islands, with 12 outer islands that directly adjacent neighbors. These islands are affecting the outermost point of the Indonesian territorial, and potential to become a territorial conflict of neighbors.

Based on the Lebovick & Isaac (1987) method of the relative capabilities calculation, we established a relative capability index (RC) of each country that bordering Indonesia. Global Military Index (GMI) can be used to look at this situation. GMI is an index that describes the capacity of the power level of weapons or militarization. This index is published by Bonn International Center for Conversion (BICC, Germany). In this study, GMI is used as a military capability to calculate the traditional threats from other countries. Global Military Index (GMI) serve as military capabilities variable as the natural balance in power concept. [17]

From the relative capabilities of each country, we can form a country threat index or security need index (SNI). Security need index for Indonesia can be seen in the following figure below: [18]

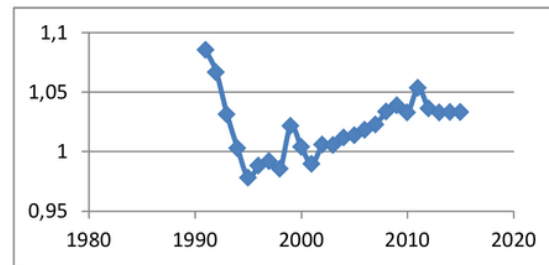


Fig.1. Threats Faced by Indonesia (Security Need Index)  
Source: International Institute for Strategic Studies (IISS), has been reprocessed.

From the picture, since 2002, the potential threat from strategic environment increased slightly bigger than Indonesian military forces. This illustrates that countries in the strategic environment of Indonesia has increased the militarization level.

## 4.2. Empirical Result

The result of single regression are shown in the following equation:

$growth = 0.0319 + 1.3369 inv_{t-1} + 3.4736 mib_{t-1} - 23.3130 (mib_{t-1})(smi_{t-1}) + 2.7013 smi_{t-1} + 0.92973cgd_{t-1}$						
SE	0.0978	1.7072	9.5504	0.6166	0.3518	0.0397
t-stat	0.3264	2.0346	-2.4410	4.3811	3.8003	23.413
Prob	0.7451	0.0458	0.0173	0.0000	0.0003	0.0000
		(sig 0,05)	(sig 0,05)	(sig 0,01)	(sig 0,01)	(sig 0,01)
Adjusted R <sup>2</sup> =0.95			Prob F=0.0000		DW=2.023	

The equation above passed the classic assumptions test. From the regressions, the military spending had a positive impact on economic growth, and the level of traditional threat was not reduce economic growth in last period lag. But interaction of defense budget and the threat give negative impact on economic growth in last period lag. From the result, we can illustrate that the Indonesian defense budget give impact on the national economics through economic growth.

## 5. Conclusions

Defense spending not depress economic growth and the traditional threat did not leave a negative effect on growth. This means the defense budget is not big enough that can effect the mobilization and allocation of resources. The traditional threat is not in great variation, so production could be increased, the process of supply and demand is not disturbed, and the economic actors still feel safe. Investment is still going well and give positive impact on economic growth. Investors still feel that the policy in the defense sector still guarantee the security to invest in Indonesia. With the mutual relations, increasing the defense budget influenced by improving the economy, and the economic improvement is affected by the safe atmosphere of business. This is because of arising of the function of the defense budget, so the budget still needs to be increased. From these findings, it can be concluded that the strength of the existing national defense, overall can improve the utilization of domestic resources. As a comparison, Deger & Smith (1983) analyzed 50 developing countries using data from 1965 to 1973. It was found that the military budget gives little influence positively to economic growth and a greater negative effect on investment.[11] The former study by Kennedy (2016), was conducted to examine whether the defense budget effected on the economy by indirect effect through investment individually. [19] The empirical results indicate that, the effect of the increase in the defense budget and the change in non-defense, led to the crowding out effect on investment. All these empirical result are complementary.

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