The Impact of Defense Investment on Economic Growth in the Perspective of Time Series: A Case Study of China

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ABSTRACT

By considering the demand and supply effects of defense investment and the uncertainty of the stochastic process of the production and defense investment, this study proposes a stochastic endogenous growth model to explore the impact of defense investment on economic growth. The results suggest that the relationship between defense investment and economic growth rate is nonlinear and obtains the optimal percentage of defense investment to maximize economic growth. Moreover, the impact of defense investment volatility on economic growth rate is subject to production and defense investment interference term's covariance and representative private investment risk preference. Finally, the empirical data are used to illustrate the applicability of the proposed model.

Keywords: Defense Investment, Economic Growth, Investment Risk Preference, Stochastic Endogenous Growth Model, Stochastic Process

1. INTRODUCTION

There are many empirical studies on the impact of the defense investment on economic growth. For example, Landau (1993, 1996) and DeRouen (1995) found that the relationship between defense investment and economic growth is non-linear. In other words, when the proportion of defense investment is not high, defense investment and economic growth are positively correlated. On the contrary, the defense investment proportion is above a certain level, defense investment and economic growth are negatively correlated. In developing countries, the percentage of defense expenditure against the budget of the central government has been relatively high.

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In recent years, the defense expenditure proportion has been declining due to the implementation of the streamlining program of national army of Taiwan. It remains at 15% of the total budget of the central government. Therefore, the impact of defense investment on economic growth is self-evident. In general, defense investment is not a productive governmental investment. From the perspective of resource allocation, an increase in defense investment will crowd out other economic activities, such as private consumption, private investment, public construction, education, medical service, and social security investment.

Therefore, defense investment may not be conducive to economic development. However, among the empirical studies on the relationship between defense investment and economic growth, from the pure economic viewpoints, Deger and Sen (1995) argued that national defense expenditure plays the role of army building and security, and is a governmental expenditure without productivity. Therefore, national military investment is expected to have an adverse impact on economic growth.

As mentioned above, the relationship between defense investment and economic growth may be complex. Benoit (1973, 1978) examined the data of 44 underdeveloped countries during the period of 1950 to 1965, and found that that defense investment has a positive incentive to national economic growth. Shieh et al. (2002a) termed the phenomenon of the positively correlated defense expenditure and economic growth as “Benoit hypothesis”. Scholars in support of the “Benoit hypothesis” include: Deger and Sen (1983, 1992), Stewart (1991), Landau (1993), Mueller and Atesoglu (1993), Macnair et al. (1995), Brumm (1997), Murdoch et al. (1997). However, some scholars have proposed the negative correlation between defense expenditure and economic growth, such as Deger and Smith (1983), Faini et al. (1984), Deger (1986), Mintz and Huang (1990), Ward and Davis (1992), Lipow and Antinori (1995), Yakovlev (2007), and Pieroni (2008). In addition, some scholars have argued that the relationship between defense investment and economic growth is debatable, such as Biswas and Ram (1986), Huand and Mintz (1990, 1991), Mintz and Stevenson (1995).

The theoretical studies on the impact of defense investment on economic growth are mainly conducted through the defense investment model. For example, Deger and Sen (1995) summarized the early literature and concluded that defense investment would affect economic growth through a number of channels in the demand and supply dimensions. For the demand dimension, increase in defense investment can enhance the protection of national security and the representative individual utility level, as well as increase the overall demand, thereby increasing the production utility rate of the idle assets and reducing the unemployment rate. For the supply dimension, the military may provide roads, public service airports, communication networks, transportation networks, and other public services to generate positive effects. Therefore, research models relating to defense investment can be summarized in two forms:

1. If the demand dimension effects are considered, the defense investment is input into the utility function;
2. If the supply dimension effects are considered, the defense investment is input into the production function.

Zou (1995) used a dynamic inter-temporal optimal exogenous model to consider the demand dimension effects of defense investment, and tested the long and short term effects of hostile country’s military threat to the national capital accumulation. The results confirmed that short term effects are subject to the utility functions of different forms. If the consumption and arms stock in the utility function are separated, two possible conclusions will be reached.

First, when the expected future military threat is to occur immediately, it will reduce the current level of investment, the expected military threat increase will stimulate the current investment level. Second, the current military threat will not decrease the short-term investment level. For the long-term effect, the
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