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Military expenditure and economic growth: A meta-analysis

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ABSTRACT

Meta analysis is conducted to review 32 empirical studies with 169 estimates of the effect of military expenditure on economic growth. We formulate four hypotheses to examine the empirical evidence and to provide overall conclusions while controlling for systematic heterogeneity in the studies reviewed. The hypotheses are: (H1) Military expenditure reduces economic growth; (H2) Military expenditure is detrimental to economic growth in less developed countries (LDCs); (H3) The effect of military expenditure on economic growth is positive and (H4) The effect of military expenditure on economic growth is non-linear. We find that the hypothesis of a negative military expenditure–growth relationship is not supported for both LDCs and in general, while a positive effect of military expenditure on economic growth is supported for developed countries. The hypothesis of a non-linear military expenditure–growth relationship is confirmed. The main sources of study-to-study variation in the findings of military expenditure and economic growth literature are attributable to the sample, time periods, and functional forms.

1. Introduction

The effect of military expenditure on the economy is a controversial area of research among economists. There are several channels defined through which military expenditure may affect economic growth. Conceptually, each channel may lead to different conclusions and thus the net effect is ambiguous. The issue then is an empirical one. However, the empirical findings have not produced a conclusive result either: their conclusions are that the effect may be negative or positive or insignificant.

Since late 1970s there has been a substantial research in this area. Arguably, the general view has been that even if there are positive effects, these effects would be offset by negative ones. Broadly defining, on the one hand there are security-related positive effects on economic factors and supply-side spillovers; on the other hand there is the negative effect of diverting resources away from the civilian economy.

This paper is the first to provide a substantial quantitative survey of military expenditure and economic growth literature by conducting a meta regression analysis. In a closely related study, Nijkamp and Poot (2004) apply a different meta-analysis technique (i.e. rough set analysis) to examine the effect of disaggregated government expenditure on economic growth, which also includes military expenditure. They look at the studies that are published between 1983 and 1998 in refereed journals. However, our study focuses only the military expenditure and economic growth literature to address between study variations and the possible causes of systematic heterogeneity.

Deger and Sen (1995), Ram (1995) and Dunne (1996) offer a detailed survey of the military expenditure–economic growth literature and conclude that the effect of military expenditure on economic growth varies depending on the design of empirical strategy. Nevertheless, these reviews are not able to statistically identify what type of research designs lead to systematic

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heterogeneity among reported findings. For instance, Ram (1995) suggests that there may be some structural heterogeneity across the 1960s, the 1970s, and the 1980s, therefore using meta-analysis we can test if this is the case. Meta-analysis is a statistical tool that allows for a systematic analysis of diverse empirical findings, while accounting for differences among reported results of individual studies.

The following are the important hypotheses that have been developed and tested in the literature:

- H1: Military expenditure reduces economic growth — defence burden.
- H2: Military expenditure is detrimental to economic growth in less developed countries.
- H3: The effect of military expenditure on economic growth is positive.
- H4: The effect of military expenditure on economic growth is non-linear.

The first hypothesis is about crowding out effects. The literature suggests that there is a trade-off between productive (e.g. investment and education) and unproductive (defence outlays) government spending. The second implies that there are regional and country differences that play an important role in determining the effect of military expenditure on economic growth in least developed and developing countries. The third hypothesis is about supply-side spillovers and aggregate demand effect. The final one is due to the first three hypotheses. The existing empirical literature has extensively tested each of these hypotheses but it has not been possible to accept or reject any of these hypotheses. In this paper, a meta-analysis technique is conducted to find an overall, statistically valid conclusion among the reported results of the military expenditure–economic growth literature.

Thus, there are two important issues which are addressed in this survey: first, whether there exists a 'genuine' relationship (to be defined) between military expenditure (milexp henceforth) and economic growth. Second, to examine the sources of variations in the milexp-growth literature. One can define the sources of variations into three sub categories; firstly, the choice of theoretical models, which provide the basis of the empirical channel to be tested i.e. demand–supply side, supply side, ad hoc and so forth; secondly, the design of the empirical study, i.e. sample, time period and estimation technique; and finally the other control variables included. Thus, the aim is to account for all these study-to-study differences and quantify the net overall effect.

The paper is organised as follows. Section 2 provides an overview of conceptual considerations with the empirical specifications. This follows with a discussion of the primary studies included in the meta-regression in Section 3. Section 4 summarizes the meta-analysis methodology and uses fixed and random effects and meta-regression analysis to assess the military expenditure–growth literature. Finally, Section 5 presents some conclusions and suggestions for future research.

2. Main conceptual and econometric approaches

Since 1990s, there is much discussion about the composition of government expenditure and which components of government expenditure are growth-enhancing. In effect, the impact of disaggregated government spending on growth is commonly studied, which includes milexp, see Aschauer (1989), Easterly and Rebelo (1993), Devarajan et al. (1996), Mulas-Granados et al. (2002), Bose et al. (2007). However, each segment of government spending may have varying effects on the long-run economic growth. Arguably the emerging view from these studies is that education, infrastructure and capital expenditure are among those with positive effect. These are commonly referred as the *productive* component of government expenditure. By and large, theoretically and empirically, the effect of milexp is expected to be negative.

Nevertheless, as already noted, the economic effects of milexp are too complex to draw a general consensus; a *priori*, the effect can go either way. There are many factors contributing to this such as the theoretical frameworks underlying the empirical studies. To obtain insight, three commonly conducted empirical specifications together with the theoretical frameworks are briefly reviewed in this section: namely the neo-classical supply-side model of Feder–Ram; the Keynesian demand and supply model; and Barro-type growth regressions. We discuss these in turn.

2.1. The three approaches

Feder (1983) develops a model to evaluate effects of import and export sectors' on growth. This model is extended by Ram (1986) and Biswas and Ram (1986) to look at defence and non-defence sectors and their impact on growth. This approach is developed to investigate the claims related to the positive externality effect of milexp on growth.[1]

The model assumes that there are two sectors in the economy, civilian (C) and defence (M). The inputs in both industry are labour (L) and capital (K) which are allocated to each sector. The production functions for each sector are:

$$M = M(L_M, K_M) \qquad C = C(L_C, K_C, M)$$

[1] Although this is one of the main approaches used in this literature, the primary studies that apply this method are not included in the quantitative analysis due to the reasons discussed later in the paper.