

MILITARY EXPENDITURE AND ECONOMIC GROWTH*

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Most economists take the view that unproductive public expenditure generally slows down economic growth. When it comes to military spending, however, they have often argued the opposite – that public expenditure boosts economic growth. The objectivity of the economics profession in this matter is not entirely clear, if only because economists are among the major recipients of defence-related research funds (especially in the United States). Be that as it may, the relation between military expenditure and economic growth has received considerable empirical scrutiny, and while the debate is far from settled, the basic issues at least are somewhat clearer than they used to be. The following is a brief introduction to this literature, with special focus on developing countries.

Emile Benoit (1973; 1978) set the ball rolling with some surprising statistical findings, allegedly showing that military expenditure enhances economic growth in developing countries. The statistical techniques, however, left much to be desired, and prompted a number of devastating rejoinders (e.g. Lim, 1983; Deger, 1986; Grobar and Porter, 1989). To illustrate, Emile Benoit's interpretation of his 'chief regression results' involved some startling statistical reasoning, including the notion that the portion of R^2 ('the square of the statistical magnitude R ') not accounted for by the regression variables can be discounted when assessing the statistical significance of a particular variable – a convenient way of magnifying t-statistics.

On a more positive note, Benoit's work stimulated a great deal of further thinking and empirical work on the subject. A superficial view of this body of work suggests that it is largely inconclusive: some studies find no significant relation between military expenditure and economic growth, others a negative relation, and others still a positive one. On closer examination, however, the balance of evidence seems to support the hypothesis that military expenditure reduces economic growth.

The basic question addressed in most studies is whether a high 'military burden' (usually defined as the share of military expenditure in GDP) tends to lower economic growth in developing countries. How could this fail to be the case? One common but misleading answer is associated with what might be called 'military Keynesianism': the notion that military expenditure promotes growth by stimulating aggregate demand and reducing excess capacity. This thesis need not retain us here, since lack of demand is not a major constraint on medium-term growth in most developing countries. Even where demand needs to be stimulated, there is no reason to do it by building missiles rather than roads or schools. A fair evaluation of the opportunity cost of the military burden has to consider the *next best use* of

* Published (with minor corrections) in Clark, D.E. (ed.) (2006), The Elgar Companion to Development Studies (Cheltenham: Edward Elgar).

public resources (taking into account all the relevant constraints), not an arbitrary alternative (such as a corresponding reduction of total public expenditure) which makes little sense in the given context.

A more plausible argument is that military expenditure stimulates economic growth through various kinds of 'spillover effects' on civilian production, as argued in some detail in Benoit's original study. For instance, research and development (R&D) for military purposes often has civilian applications – even the internet is a revamped offspring of the Pentagon. The R&D argument has some relevance in industrialised countries, where sophisticated technology has extensive civilian applications. In developing countries, where advanced military technology has much less to contribute to basic civilian needs, military R&D is unlikely to give a major boost to technological innovation in the civilian sector. However, military expenditure in developing countries may have other types of spillover effects, such as civilian uses of military infrastructure (e.g. roads and satellites) and the role of the army in disaster relief.

Another possible spillover effect is the military influence on civilian attitudes and human capital. One version of this idea is that the military establishment contributes to the process of modernisation by fostering values such as efficiency, discipline and national unity (Benoit, 1978, pp. 277-8). The argument used to be popular among political scientists in the 1960s, but little empirical evidence has materialised in support of it. A more persuasive version is that military service contributes to the diffusion of skills. Weede (1992), in particular, has argued that military participation can be seen as 'a kind of school and an agency for human-capital formation' (p.227).

While some of these arguments are plausible, it should be noted that in order for spillover effects to boost economic growth they have to be strong enough to compensate for the expenditure involved. For instance, it is not enough to argue that military facilities such as roads and satellites provide some services to the civilian population. It also has to be shown that the 'indirect' provision of these services through military expenditure is *more efficient* than the direct provision of civilian facilities. Otherwise, civilian needs are better served through direct provision. This point is quite crucial in interpreting empirical findings on spillover effects.

On the other side, the most obvious reason why military expenditure might slow down economic growth is the 'crowding-out effect': military expenditure entails a diversion of productive resources (including human capital), potentially usable for civilian investments. In addition, there may be a 'distortion effect': aside from displacing other investments, military expenditure may reduce the efficiency of resource allocation in the economy, e.g. by distorting relative prices and fostering rent-seeking activities. Finally, the possibility of *negative spillover* effects (much neglected in the literature) is worth noting. Examples include the use of civilian facilities for military purposes and the environmental damage

caused by military training. Even in the formation of human capital, there may be negative spillovers: it is by no means obvious that military training and socialisation enhance a person's preparedness to contribute to civilian life. In some countries, demobilised soldiers are notoriously problematic citizens.

The net effect of military expenditure on economic growth is a matter of empirical investigation. Much of the empirical evidence (aptly reviewed in Ram, 1995) consists of statistical analyses of international cross-section data, focusing on the association between military burdens and economic growth. The standard regression equation is of the form:

$$g_{i,t} = X_{i,t} \cdot \beta + m_{i,t} \cdot \gamma + \varepsilon_{i,t} \quad (1)$$

where $g_{i,t}$ is the growth rate of per-capita GDP in country i and period t , $X_{i,t}$ gives the corresponding values of a vector of conditioning variables, $m_{i,t}$ is the military burden (or, in some models, the *growth* of the military burden) in country i and period t , and $\varepsilon_{i,t}$ is the error term. The choice of conditioning variables may be based either on a structural model of the relation between military expenditure and economic growth, or on *ad hoc* statistical tests. Typical components of X include human capital, regional dummies, and the savings or investment rate. In many studies, there is a single reference period, in which case (1) boils down to a simple cross-section equation. In other cases, there are two or three periods (e.g. successive five-year intervals); a few studies use annual time-series data. The parameter of primary interest is γ , interpreted as the effect of military expenditure on economic growth.

Note that this exercise resembles the proverbial search for a needle in a haystack. Indeed, in most countries military expenditure is small relative to total investment. Thus, variations in military expenditure are unlikely to account for much of the variation in growth rates, even if (say) there is one-to-one crowding out between military expenditure and investment and if the latter drives economic growth. The bulk of the variation in growth rates reflects other factors, only some of which can be expected to figure in the regression. If key variables are omitted (or misspecified), the coefficient of military expenditure is likely to be biased, or to have a high standard error, or both. The notoriously unreliable nature of military expenditure data (at least until recently) makes the exercise all the more heroic. Considering these limitations, it is interesting that econometric analysis has yielded reasonably consistent evidence of the negative effects of military expenditure on economic growth.

The main exception pertains to a class of models known as 'Feder-type models' (Ram, 1995). Econometric estimates based on these models typically suggest that the impact of military expenditure is either insignificant or positive. However, these models are fundamentally flawed, because the regression equation derived from Feder-type models (1) ignores crowding-out effects by construction (by including investment among the conditioning variables) and (2) involves a major simultaneity bias (because economic growth is regressed on the *growth* of military expenditure). It is worth noting that Gershon Feder is

not responsible for these flaws. The original model (Feder, 1983) made sense in the context for which it was built, i.e. the issue of how *export performance* affects economic growth. It is the transplantation of this model in a different context, without the required modifications, that seems to have failed.

If we exclude Feder-type models, and Benoit's unconvincing analysis, most of the studies surveyed by Ram (1995) find that the impact of military expenditure on economic growth is either negative or insignificant. The fact that several studies find no significant relation between the military burden and economic growth, even outside the Feder-type models, should not be read as strong evidence *against* the hypothesis of a negative effect of the former on the latter. Rather, it reflects the demanding nature of 'significance tests' based on a low tolerance for type-I errors.

The picture is aptly summarised by Sandler and Hartley (1995, p. 220), where Feder-type models are called 'supply-side models':

Models that include demand-side influences, where defense can crowd out investment, found that defense had a negative impact on growth. In contrast, almost every supply-side model either found a small positive defense impact or no impact at all. The findings are amazingly consistent despite differences in the sample of countries, the time periods, and econometric estimating procedures. Since we suspect that these supply-side models exclude some negative influences of defense on growth, we must conclude that the net impact of defense on growth is negative, but small.

One limitation of many of the studies surveyed by Ram (1995) concerns the possibility of 'feedback' effects: if economic growth influences the military burden, then regressing the latter on the former would lead to biased estimates of the impact of military expenditure on economic growth. In particular, if this feedback effect is positive, then the estimated coefficient of the military burden is likely to be biased *upwards*. In some studies, economic growth is regressed on *lagged* values of the military burden, but even then a bias may persist, in so far as lagged economic growth is likely to be correlated with economic growth in the reference period. A more credible answer is to estimate a simultaneous-equations model, where military expenditure is one of the dependent variables. This is the spirit of the 'Deger-type models', initially developed by Saadet Deger (see Deger, 1986; and Deger and Sen, 1995). These models consistently find that the military burden has a negative impact on growth.

Subsequent to the publication of Ram's (1995) survey, evidence of the negative effects of military expenditure on growth has been consolidated in a major way by Knight, Loayza and Villanueva (1996). This study involves a considerable refinement of earlier estimation techniques, which makes full use of the panel aspects of the data (the latter are available for three successive five-year periods and 79 countries). The model has two equations, one for the growth rate and one for the investment rate. The conditioning variables

are derived from a modified neoclassical growth model *à la* Solow-Swan. The results clearly indicate that military expenditure reduces growth, through both a ‘crowding-out effect’ and a ‘distortion effect’.

Even though the literature on this subject is already bloated in some respects, much potential remains for further research, especially in the light of recent improvements in data quality and econometric techniques. In particular, there is a case for investigating composition effects, i.e. how different *types* of military expenditure affect economic growth. It has been suggested, for instance, that the opportunity cost of military expenditure is low for ‘military investments’ (Brauer, 1991), and high for military imports (Looney, 1994). Another crucial compositional issue relates to the employment-intensity of military expenditure. Some studies suggest that a high level of ‘military participation’ is good for economic growth (Weede, 1983; 1992). This points to the need for joint estimation of the effects of military expenditure and military participation on economic growth.

To conclude, there is consistent evidence that high levels of military expenditure are detrimental to economic growth. However, one caveat is in order: it does not follow from these findings that a *reduction* in military expenditure can be expected to generate swift and tangible economic benefits. There is a possibility of ‘ratchet effects’ of various kinds in the process of expenditure reduction. The literature on disarmament, for instance, highlights the difficulties involved in the ‘conversion’ of military industries to civilian production. Similar issues arise with respect to the demobilisation of soldiers. In some countries, there is also a possibility that the haphazard reduction of military expenditure under pressure in the 1990s has contributed to a surge in internal violence, as underpaid or demobilised soldiers turned to looting, crime and other forms of ‘economic violence’ (Keen, 1998). Reaping ‘peace dividends’ seems to require broader measures than an indiscriminate reduction in military expenditure.

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