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Another Look at the Defense Spending and Development Hypothesis

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INTRODUCTION

With the increasing pressure for developing countries to grow more rapidly, there is often a concomitant call for cuts in defense expenditures to finance new projects. Recently it has been suggested that defense spending may play a positive role rather than the usually perceived negative role in economic development. The link between defense and development is not clear, however. As was recently noted, while military spending has risen 63% between 1970 and 1979, ". . . no clear agreement has emerged about the nature and extent of their economic impact."[1]

As we have suggested earlier,[2] it is possible for defense spending to have both positive and negative effects on growth. Furthermore, both effects are likely to be true at different points in time. On the positive side, defense spending may contribute to growth by:

> . . . (1) feeding, clothing and housing a number of people who would otherwise have to be fed, housed, and clothed by the civilian economy; (2). . . providing education and medical care as well as vocational and technical training; . . . (3) engaging in a variety of public works; . . . (4) engaging in scientific and technical specialities. . . which would otherwise have to be performed by civilian personnel.[3]

On the negative side, Benoit identified three types of possible effects.[4] The first effect, the income shift, suggests that defense spending reduces the civilian Gross Domestic Product (GDP) and decreases growth proportionately. Secondly, defense spending as a component of government spending may hurt growth since the government sector generally exhibits "negligible rates of productivity increases."[5] Thirdly, growth may suffer as the opportunity cost of funds is proportionately higher in defense.

While these arguments make intuitive sense, we hypothesize that a crucial determinant left out of the argument is the country's financial resource constraint. A severely resource constrained country facing budget reductions is likely to sacrifice development projects to maintain defense budgets. Not only will this tend to reduce economic growth *per se*, it is also likely to lead to a simultaneous decrease

in private investment. The reverse is true for countries relatively resource unconstrained — they can easily afford growth oriented projects while maintaining (or even increasing) defense programs.

In this article we briefly review some of the major contributions to the literature.[6] Using our model based on resource constraints, we then test the defense and economic growth thesis using a form of the model recently suggested by Lim.[7] This is done in two steps: (a) the countries are split into two groups and (b) regression equations are estimated for each group. The results generally confirm our predicted relationship of the positive effect that defense spending may play in the economies of some developing countries.

REVIEW OF THE LITERATURE

One of the earliest works in the field was completed by Benoit.[8] He estimated a multiple regression equation in the following form:

$$CIVGDP = f\,(INV,\ AID,\ DEFN),$$

where *CIVGDP* is the real growth in GDP minus real growth in defense expenditures,[9] *INV* is the gross capital formulation as a percent of GDP, *AID* is the receipts of bilateral aid as a percent of GDP, and *DEFN* is defense expenditure as a percent of GDP. He concluded that "Contrary to my expectations, countries with a heavy defense burden generally had the most rapid rate of growth, and those with the lowest defense burdens tended to show the lowest growth rates."[10]

In addition Benoit questioned the direction of causality between defense and growth. While recognizing that countries which are growing fast might "indulge themselves in the luxury of defense" he concluded that growth was a weak determinant of defense and that "the direct interaction . . . seems to run primarily from defense burdens to growth rather than vice versa."[11]

Benoit's findings were confirmed by Kennedy.[12] Kaldor found a strong association between industrialization and arms expenditures based on an interpretation of data provided by the US Arms Control and Disarmament Agency.[13] Amsden, in a critical review of Kaldor's work, suggested that the analysis of the data did not reveal any positive association between the military burden and GDP growth rates.[14] McKinley and Cohen's study[15] found no statistical relationship between military regimes and growth. Dabelko and McCormick grouped countries by the type of government[16] and found that centrist regimes have lowered the opportunity costs for education and health while the opposite is true for polyarchic regimes.

As an initial test of the resource constraint thesis, Frederiksen and Looney reestimated Benoit's equations for two subsets of the original sample of countries in the Benoit paper.[17] The coefficient of *DEFN* was positive and statistically significant for the relatively unconstrained group and negative and statistically significant for the constrained group. Benoit's methodology, especially the inclusion of an aid variable in the model, has recently come under criticism from

Ball.[18] Enlarging the sample to 90 countries and using a later time period, Frederiksen and Looney reexamined the resource constrained hypothesis.[19] In this analysis, it was found that the coefficient of the defense variable was not statistically significant for the entire group, was significant for the unconstrained group, and negative but not statistically significant for the constrained group.

Lim has also recently questioned Benoit's results by suggesting that they were obtained "with the use of functional relationships that were inconsistent with the hypothesis to be tested and with the use of variables that were incorrectly measured."[20] He suggested that the correct functional relationship should be in the following Harrod-Domar forms:

$$Yg = f\,(IOCR,\ D/Y,\ F/S)$$
$$Yg = f\,(IOCR,\ D/GE,\ F/S),$$

where Yg is the growth of real GDP, $IOCR$ is the incremental output–capital ratio, D/Y and D/GE the defense expenditure to GDP and to total government current and capital expenditure ratios, respectively, and F/S the deficit on current account to gross national savings ratio.

His results "show that defense spending is detrimental to economic growth in LDC's, a conclusion that is diametrically opposite to that reached by Benoit."[21] Furthermore, by estimating the equations for different regions of the world, he concluded that:

> Our results also show marked interregional differences in the relationship between defense and growth. Economic growth in the African and western Hemisphere LDCs in the sample seemed to be adversely affected by defense spending. On the other hand, there is no relationship between defense and growth in the other two groups of LDCs (Asia and Middle East and Southern Europe).[22]

No theoretical explanation was offered by Lim as to why the hemisphere would make any difference in the argument as to the role of defense on growth.

This paper assumes the Lim formulation of the model and tests this functional form in the context of resource constraints as outlined above.

EMPIRICAL RESULTS

Using Lim's form, the equation to be estimated can be expressed in the following manner:

$$GY = f\,(ICOR,\ FS,\ DEFN),$$

where GY is the average annual growth rate of GDP between 1965 and 1973, $ICOR$ is the incremental capital–output ratio averaged between 1968 and 1973, FS is the average deficit to national savings ratio for 1965, 1970, and 1973, and $DEFN$ is the average of 1970 and 1973 defense expenditures as a percent of GDP.[23] The sign of the coefficient for $ICOR$ and FS is hypothesized to be negative. The sign of the

coefficient for *DEFN* will depend on the country's resource constraint: positive for the richer countries and negative for the poorer countries.

As an initial step, the equation was estimated for the entire sample of 95 countries to see if any overall relationship existed. The result was as follows:[24]

$$GY = 6.4 - \underset{(-2.5)^{***}}{0.24ICOR} - \underset{(-4.3)^{**}}{0.83FS} + \underset{(0.8)}{0.08DEFN};\ R^2 = 0.24$$

The signs of the coefficients are as hypothesized and are significantly different from zero at the 90% level for *ICOR* and *FS*. The coefficient of *DEFN* is not statistically significant.

Since we hypothesize that the relationship between defense and growth will depend on the relative financial constraints faced by countries, we separated the sample into groups by means of a cluster analysis. Two variables were used to separate: the average national savings to gross domestic investment ratios for 1970–1977 and the average balance of payments to gross domestic investment ratio for 1970–1977. While any number of conceivable proxy indicators could have been used in the cluster analysis, the selection of these two was based largely on the availability of the data and the comparability of data across countries. The results of the analysis are shown in Table 1.[25]

Table 1. Mean values, national savings and balance of payments to gross domestic investment, 1970–1977

Group	National savings as a % of gross domestic investment	Balance of payments as a % of gross domestic investment
Group I (n = 42)	39.7	−61.7
Group II (n = 49)	90.6	− 9.9
Group III Saudi Arabia	313.3	213.3
Group IV Kuwait	732.0	632.6

Group I, the resource constrained group, is characterized by a very low savings rate and a high deficit ratio. This indicates a high external dependence and relatively little foreign exchange earnings. Groups II, III, and IV (combined in this analysis) exhibit exactly the opposite. By and large this grouping seems intuitively satisfactory.

The within group regressions were then estimated and the results are as follows:

$$\text{Group I: } GY = 5.9 - \underset{(-1.0)}{0.13}ICOR - \underset{(-2.6)^{***}}{0.06}FS - \underset{(-0.7)}{0.06}DEFN;\ R^2 = 0.29$$

$$\text{Group II: } GY = 7.6 - \underset{(-4.2)^{***}}{0.61}ICOR - \underset{(-0.6)}{0.8}FS + \underset{(2.2)^{**}}{0.25}DEFN;\ R^2 = 0.48$$

The most striking result is that the coefficient for *DEFN* in Group II is positive and statistically significant at the 95% level. This result supports our original hypothesis. While the coefficient for *DEFN* in the poorer group is negative, it is not statistically significant at the 90% level. As suggested earlier,[26] this tentative rejection of the relationship is likely due to increasing complexity of defense spending in developing countries. Over time, we suggest that there has been a shift in the make up of defense budget toward items of increasing sophistication and technological advancement. Had the same money been spent on operations and maintenance for example, growth would have been hindered to a much larger degree in these countries.

The results for the other two variables are mixed. While all the signs are as expected, only the coefficient for *FS* in Group I and *ICOR* in Group II are statistically significant.

CONCLUSIONS

The purpose of this paper has been to reexamine the defense spending and economic growth relationship using a functional form recently suggested by Lim. This test has been conducted within the framework of our resource constraint hypothesis, which suggests that richer countries will experience a positive relationship between defense and growth, while poorer countries will experience the opposite. A cluster analysis was conducted to separate countries in richer and poorer groups.

Linear regressions were then estimated for each group and the estimated coefficient of the defense variable in the richer group was statistically significant. While the coefficient was negative for the poorer countries it was not statistically different from zero. We suggest that this result might reflect the changing composition of defense expenditures in some developing countries. By and large our results contradict earlier work that suggests that defense spending is detrimental to growth, or that the relationship depends on the geographical location of the country. A model based on resource constraints predicts that defense can and does play an important role in the growth process of many developing countries. For the remaining countries, the evidence would suggest a neutral role.

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NOTES

1. Shuja Nawaz, Economic impact of defense expenditures. *Finance and Development* **20**, 34 (1983).
2. P. C. Frederiksen and Robert Looney, Defense expenditures and economic growth in developing countries. *Armed Forces and Society* **9**, 633–645 (1983).

3. Emile Benoit, Growth and change in developing countries. *Economic Development and Cultural Change* **26,** 277 (1978). See also Emile Benoit, *Defense and Economic Growth in Developing Countries,* Lexington Books, Lexington, MA (1973). Emile Benoit, Growth effects of defense in developing countries. *International Development Review* **14,** 2–10 (1972).
4. For a more detailed discussion see David K. Whynes, *The Economics of Third World Military Expenditures,* The University of Texas Press, Austin (1979), Chapter 3. Also see Richard Jolly, ed., Objectives and means for linking disarmament to development. *Disarmament and World Development,* pp. 105–112. Pergamon Press, London (1978).
5. Benoit, "Growth effects in developing countries," p. 3.
6. For a more complete review of the literature see Frederiksen and Looney, "Defense expenditures . . . in developing countries."
7. David Lim, Another look at growth and defense in less developed countries. *Economic Development and Cultural Change* **31,** 377–384 (1983).
8. See note 3.
9. Expressed as a cumulative rate of annual growth between first and last years of available data.
10. Benoit, "Growth and defense in developing countries," p. 271.
11. *Ibid.*, p. 275. This assumption on the direction causality between defense and growth is adopted in this paper.
12. G. Kennedy, *The Military in the Third World.* Duckworth, London (1974).
13. Mary Kaldor, The military in development. *World Development* **4,** 459–482 (1976).
14. Alice Amsden, Kaldor's "The Military in Development" — a comment. *World Development* **5,** 757 (1977).
15. R. D. McKinley and A. S. Cohen, The economic performance of military regimes: a cross-national aggregate study. *The British Journal of Political Science,* pp. 291–310 (1976).
16. David Dabelko and James McCormick, Opportunity cost of defense: some cross-national evidence. *Journal of Peace Research* **14,** 145–154 (1977).
17. Frederiksen and Looney, Defense expenditures . . . in developing countries.
18. Nicole Ball, Defense expenditure and economic growth: a comment. *Armed Forces and Society* **11,** 291–297 (1985). See also P. C. Frederiksen and Robert Looney, Defense expenditures and economic growth in developing countries: a reply. *Armed Forces and Society* **11,** 298–301 (1985).
19. P. C. Frederiksen and Robert Looney, Defense expenditures and economic growth in developing countries: some further empirical evidence. *Journal of Economic Development* **7,** 113–125 (1982).
20. Lim, "Another look. . .", p. 383.
21. *Ibid.*, p. 379.
22. *Ibid.*
23. *DEFN* calculated from US Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers: 1969–1978,* U.S. ACDA, Washington, D.C. (1980), Table 1; remaining data from data from World Bank, *World Tables: 1976,* Johns Hopkins Press, Baltimore (1976). We recognize that the data for the *DEFN* variable does not include the 1960s. Since many countries in our sample did not report defense data for this period, our sample size would have been substantially reduced. Since the defense ratios change very little from decade to decade (if any) we chose to conduct the analysis with the later data and subsequent larger sample size.
24. The *t*-values appear in parentheses under the estimated coefficients. *** Significance at the 99% level and ** at the 95% level. Although there is little multi-collinearity between the independent variables, we purposefully entered *DEFN* as the last variable. Since our *t*-values are calculated incrementally, we can examine the marginal contribution of defense after the effects of *ICOR* and *FS* have been taken into account.
25. See Appendix Table 1 for a list of countries in each group.
26. Frederiksen and Looney, "Defense expenditures . . . some further empirical evidence," p.122.