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Impact of Arms Production on Income Distribution and Growth in the Third World

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Introduction

While common sense suggests that increased defense expenditures are likely to harm a less developed country's (LDC's) development efforts, economic theory does not provide any clear prediction of how the net impact of an increase in the military burden would influence growth, development, or welfare.[1] Classical theory, for example, would predict on the basis of resource allocation that increases in defense will decrease investment and/or civilian consumption and thus reduce growth or welfare. Keynesian theory, on the other hand, implies that in the presence of inadequate effective demand the operation of the income multiplier would imply an increase in national product, resulting from additional defense expenditures. Thus, there are purely economic rationales for increased military spending. More specifically, for economies operating with substantial excess capacity, additional demand and output from expanded military expenditure will increase capacity utilization, thereby increasing the rate of profit and possibly accelerating investment. Whether in the short and long run the former or latter effect dominates will determine the final outcome of defense on growth.[2]

While a seemingly straightforward exercise, to date empirical tests of the defense-growth relationship have not yielded any general conclusions as to the net impact of increased allocations to defense, with some indicating negative effects and several others finding positive associations.[3] Clearly part of the problem here lies in the fact that Third World countries are far from homogeneous—one would expect the impact of increased defense expenditures on the Brazilian economy to be somewhat different than that experienced in Chad. Similarly, countries with an indigenous arms industry should experience ceteris paribus somewhat different defense/income multipliers than those

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found in nonproducing nations where ceteris paribus a larger proportion of increased military expenditures is likely to wind up in imported weapons.

The purpose of this article is, therefore, to examine the defense-growth debate from a new perspective. An attempt will be made to determine the possible role indigenous arms production may play in affecting the manner in which defense expenditures have an impact on the local economy. Does the possession of a domestic arms industry result in a significantly different pattern of economic impacts stemming from increased allocations to defense?[4]

Impact of Military Expenditures on Consumption and Investment

Without excess capacity, increased military expenditures will reduce either civilian consumption or else capital formation and thus growth. A priori the impact of the military burden on private consumption after controlling for savings, government revenues, and the resource balance could either be positive or negative.[5] However, taxes and savings should reduce the share of private consumption in GDP, with larger deficits in the balance of payments facilitating increases in the share of consumption in GDP:

$$\text{PRB} = f[\text{AS}(-), \text{RBB}(-), \text{RTCRYB}(-), \text{MEP}(?)],$$

where:

PRB = share of private consumption in GDP 1982;
AS = average savings rate 1970–81;
RBB = resource balance as a percentage of GDP 1982;
RTCRYB = government resource as a percentage of GDP 1982;
GETYB = government resource as a percentage of GDP 1981;
MEP = per capita military expenditures, 1981.

For the nonproducers:

$$\underset{}{\text{PRB}} = -\underset{(-2.44)}{.49\ \text{AS}} - \underset{(-3.27)}{.33\ \text{RBB}} - \underset{(-2.58)}{.41\ \text{RTCRYB}} + \underset{(3.47)}{.56\ \text{MEP}} \qquad (1)$$
$$\text{df} = 30;\ R^2 = .751;\ F = 19.04.$$

For the producers:

$$\text{PRB} = -\underset{(-5.38)}{.77\ \text{AS}} - \underset{(-1.46)}{.18\ \text{RBB}} - \underset{(-1.02)}{.03\ \text{RTCRYB}} - \underset{(-5.26)}{.75\ \text{MEP}} \qquad (2)$$
$$\text{df} = 17;\ R^2 = .768;\ F = 18.48.$$

An interesting pattern therefore exists whereby the military burden appears to be associated with higher consumption in the non-arms-

producing countries. In sharp contrast, increases in the military burden appear to come at the expense of consumption in the arms-producing nations.

In contrast, the impact of the military burden on the share of investment in GDP (GDIB) is reversed; that is, the military burden is associated with increased levels of investment in the arms-producing countries and decreased levels of investment in the nonproducing countries. More specifically, for nonproducers:

$$\begin{array}{lcccccc} \text{GDIB} = & .88\ \text{AS} & - & .61\ \text{RBB} & + & .48\ \text{GETYB} & - & .41\ \text{MEP} \\ & (6.47) & & (-4.57) & & (4.31) & & (-3.59) \end{array} \quad (3)$$

$$\text{df} = 29;\ R^2 = .775;\ F = 20.08;$$

for producers:

$$\begin{array}{lcccccc} \text{GDIB} = & .98\ \text{AS} & - & .74\ \text{RBB} & - & .42\ \text{GETYB} & + & .55\ \text{MEP} \\ & (6.05) & & (-4.34) & & (-1.35) & & (2.86) \end{array} \quad (4)$$

$$\text{df} = 17;\ R^2 = .762;\ F = 10.41,$$

where GDIB = the share of investment in GDP, 1982; and GETYB = the share of government expenditure in GDP, 1981.

How can these differential impacts of the defense burden—increased investment and reduced consumption—associated with increased defense burdens in the arms-producing countries and vice versa for nonproducers, be explained?

Interestingly enough, these results are consistent with those likely to be found as a result of economic disarticulation.[6] Particularly in the case of semi-industrialized LDCs, there is likely to be a group of dynamic leading industries specializing in production of automobiles, machinery, consumer durables, and military equipment. Higher arms spending selectively stimulates demand for products from precisely these sectors. The resulting output increases require employment of relatively skilled and managerial workers at high incomes; their "modern" tastes as consumers give rise to a second round of leading sector demand. If extra demand were met by diversion of capacity from industries producing commodities favored by less skilled workers and the poor, then the stage would be set for a growth process supported by a squeeze on wage goods. Investment would be stimulated by the increase in output in leading sectors, adding still more demand pressure. There would be additional generation of high income consumer purchases and so on. The whole process operates under a resource constraint, but it is evaded by diversion of capacity from sectors producing wage goods in the process; only the poor lose by slow growth of production in commodities suited to their needs.[7]

The net effect might also be to lower the overall output to capital

ratio, as observed above for the arms producers, due to the fact that wage goods tend to be more labor intensive than arms production or consumer durables. This sort of mechanism can support faster growth when there are significant differences in consumption patterns between poor and rich, for example, in demands for food and consumer durables.

The net effect in the arms-producing countries would be a more likely increase (than in the case of nonproducers) in investment (due to direct linkages) and declines in overall private consumption (since lower income groups consume a higher proportion of their incomes) associated with increases in the military burden. While the same investment and consumption could conceivably occur in the arms-producing countries, the likelihood is that there would be much less. In fact, these countries might experience a more direct positive relationship between added personnel and consumption with increased military burdens and reduced levels of investment due to few direct linkages associated with an increased military burden. These are precisely the patterns for arms and non-arms producers identified by the empirical analysis above.

Impact of Military Expenditures on Public Consumption

If the above interpretation of the impact of military expenditures on investment and private consumption is correct, we would also expect certain impacts to exist between the military burden and public consumption. In particular, the arms producers would experience a positive relationship between the military burden and public consumption—due to on-going local expenditures, salaries, and so on.

As D. K. Whynes notes, in countries with defense industries, a substantial portion of military expenditures is oriented toward longer term investments in these industries.[8] The military officials are, therefore, under constant pressure to ensure a continual supply of funds over the projects' lives. Clearly, this problem is particularly prevalent in cases where the initial project costs are low and, therefore, more attractive to the treasury. Once committed to defense production, additional expenditure will usually be granted over and above the previous estimates to prevent resource wastage (the stoppage of production and/or noncompletion of projects), although at extra cost.

In addition, stability between public consumption and the military burden exists in arms-producing countries because the military sector often has the potential to serve as an effective fiscal regulator as it is related to the civil economy. The government, for example, often places weapons production contracts with private manufacturing firms to expand demand during recessionary periods. Furthermore, and more significant, the military sector is the one major area of the modern

economy that is under the direct control of the central government. Economic expansion, therefore, can be affected immediately by, say, the ordering of a new weapons system; in contrast, indirect policies, such as a marginal tax change, would take a much longer period to produce noticeable multiplier effects. Such control is also useful in the possible event of excessive expansion of the economy as weapons systems can be immediately cancelled or contracted to help deflate the system.[9]

If this interpretation of the linkages existing between military industries and the budgetary process is correct, we would expect the linkages between public consumption and the military burden to be weak or nonexistent in the non-arms-producing countries (compared with those in the arms-producing countries).

In arms-producing countries, therefore, increases in the military burden should increase the share of public consumption (PCB) in GDP. Due to the special demand shift profiles outlined above, however, increases in public consumption per se would not necessarily occur at the expense of overall rates of investment or consumption. Empirically, tests of this hypothesis yielded for the nonproducers:

$$\begin{array}{ccccccccc} PCB = & - & .28\ RBB & - & .38\ AS & + & .80\ RTCRYB & - & .16\ MEP \\ & & (-1.63) & & (-1.77) & & (3.21) & & (-.57) \end{array} \quad (5)$$

$$df = 28;\ R^2 = .459;\ F = 5.21;$$

for producers:

$$\begin{array}{ccccccccc} PCB = & & .15\ RBB & - & .20\ AS & + & .02\ RTCRYB & + & .87\ MEP \\ & & (.87) & & (-.92) & & (.41) & & (6.03) \end{array} \quad (6)$$

$$df = 16;\ R^2 = .814;\ F = 15.63.$$

The results obtained in examining the impact of the military burden on public consumption are in conformity with the linkages postulated above, that is, strong positive linkages occurring between the military burden and the share of public consumption (PCB) in GDP for arms producers, and insignificant linkages between the military burden and public consumption for the nonproducers.

Apparently, therefore, once this regulation system linking production to the budget in arms-producing countries is in place, several groups of people will find it economically advantageous to maintain the status quo. These groups include senior soldiers, the owners and managers of private industries (with which the government places defense contracts), and politicians whose careers are tied to the defense sector. Together, these groups clearly wield considerable economic and political power—enough to establish a stable and predictable relationship

between military expenditures and overall public-sector expenditures.[10]

Inflationary Impacts of Defense Expenditures

It is possible that the linkages between the defense burden and consumption observed for the arms-producing countries could be caused by inflation, instead of the mechanisms outlined above, and by the resulting forced savings impact on private consumption (together with a stimulating impact on overall investment). According to this line of reasoning, one might also expect the inflationary impact of increased defense expenditures to be greater for the arms producers (due to capacity constraints and policies of domestic absorption), whereas non–arms producers could, in part, meet added military burdens through constant price imports.

In fact, one can easily argue that defense spending raises demand without increasing supply and, therefore, that it does not contribute to current or future standards of living. Moreover, because more of this spending goes to the procurement of capital goods than do other forms of government spending, it is more inflationary. It is also less resistant to price and wage increases as military procurement from domestic suppliers is often negotiated on a cost-plus basis. Thus, defense spending may be disproportionately a cause of cost push inflation.

Finally, because officials are usually reluctant either to raise taxes or to cut back other spending in order to finance additional defense expenditures, their resort to budget deficits and public debt tends to generate further inflationary pressure.[11]

According to this line of reasoning, the inflationary impacts of increased military burdens might be expected to be higher in the arms-producing countries. To test for the inflationary impact of increased defense burdens, a simple model was developed whereby inflation between 1970 and 1982 (INFB) was postulated to be influenced positively by: (1) inflation in the 1960–70 period (INFA)—to control for high or low inflation countries; (2) the average military burden (MEYA) as a percent of GDP 1970–82; and (3) the average share of public consumption in GDP 1970–82 (PCB). Public consumption was introduced to correct for any biases that might occur from high correlations between overall public-sector consumption and the military burden, that is, the higher the share of public consumption in GDP, ceteris paribus, the greater the aggregate consumption demand and the fewer the private-sector consumer goods available to meet that demand.

The results for the producing countries were:

$$\begin{aligned} \text{INFB} = {} & .62\,\text{PCB} + .80\,\text{INFA} - 2.19\,\text{MEYA} \\ & (3.09) \qquad (7.71) \qquad (-2.19) \qquad (7) \\ & \text{df} = 17;\ R^2 = .854;\ F = 27.49; \end{aligned}$$

while for the nonproducers:

$$\begin{array}{rl} \text{INFB} = & .21\ \text{PCB} + .76\ \text{INFA} + .02\ \text{MEYA} \\ & (-2.14) \quad (7.79) \quad (0.24) \\ & \text{df} = 28;\ R^2 = .614;\ F = 12.36. \end{array} \tag{8}$$

The negative impact of the military burden in the producing countries clearly invalidates the forced savings explanation of falling private consumption and increased investment found with increased military burdens. The income distributional demand profile alternation and resource shift mechanism outlined above (in the discussion of private consumption) tends to be supported, or at least not invalidated, by the observed patterns of military burden and inflation.

With regard to the impact of defense expenditures on growth, while E. Benoit's suggestion that defense spending could encourage fuller utilization of the existing productive facilities may be particularly relevant for the defense producers, it has much less relevance for the nonproducers.[12] The latter countries are likely to be more constrained by supply. The supposed benefits of defense spending may simply impose additional burdens on the economy through expanded salaries and so forth, producing excess demand for goods and services in general. The net result might well be slower, rather than faster, economic growth.

The Impact of Military Expenditures on Overall Growth

The analysis in the previous sections suggests several mechanisms through which increased military burdens may have an impact on the growth process, depending on whether the country is an arms producer. As shown above, arms producers are characterized by a shift in income from households to the public sector associated with increases in the military burden. While this shift does not appear to be inflationary in itself, there is reason to believe the net impact on income distribution may be regressive. In sharp contrast, non–arms producers appear to shift resources toward the private sector (in the form of increased consumption) as the military burden increases.

A priori one can argue that the net impact of these income distributional shifts might be one of increased or decreased growth. A logical case could also be that, given the many other factors impinging on Third World growth rates, the overall impact of increased military burdens is likely to be rather insignificant.

The role of the military burden (MEY) in effecting overall growth in Third World countries was examined, as shown below, by determining its impact on the margin after other growth inducing and inhibiting factors had been accounted for.[13]

$$GDPGB = f[GDIGB(+),INFB(-),RBB(+),MEYA(?)],$$

where:

GDIGB = average rate of growth of real GDP, 1970–82;
GDIGB = the growth in investment, 1970–82;
INFB = the rate of inflation 1970–82;
RBB = the average resource balance as a percentage of GDP, 1970–82;
MEYA = average share of military expenditures in GNP, 1970–82.

The results for arms-producing countries:

$$GDPGB = \underset{(3.80)}{.74\ GDIGB} - \underset{(-1.62)}{.29\ INFB} + \underset{(2.62)}{.40\ RBB} + \underset{(2.09)}{.35\ MEYA}$$
$$df = 19;\ R^2 = .736;\ F = 10.50; \qquad (9)$$

for the nonproducers:

$$GDPGB = \underset{(7.24)}{.92\ GDIGB} - \underset{(-1.87)}{.15\ INFB} + \underset{(.52)}{.05\ RBB} - \underset{(-4.23)}{.59\ MEYA}$$
$$df = 45;\ R^2 = .639;\ F = 19.27. \qquad (10)$$

Again, a contrasting pattern appears, whereby the military burden tends to inhibit growth in the nonproducing countries and stimulate it in the producing countries.

Conclusions

The orthodox view of indigenous Third World arms industries is that, as an economic strategy, the benefits of industrialization through armament are questionable: arms production is expensive in terms of domestic resource costs, especially scarce scientific and technical skills.[14] It depends on extensive imports of components and technology with consequent reliance on arms manufacturers in the industrialized countries. Rapid obsolescence of technology and expensive high risk product development make the returns uncertain.

Much of the analysis underlying this conclusion is descriptive and anecdotal with little empirical analysis applied to the problem. The results presented here, while not necessarily contradicting the orthodox view, tend to place the indigenous arms industry in a different light; that is, it appears that the macro-linkages from the arms industry to the economy enable Third World arms producers to minimize most of the adverse impacts on the economy often associated with increased military burdens. The mechanism through which this process occurs, however, appears to worsen overall income distribution through the

shifting of resources from wage goods to investment and durables. Clearly, the political costs stemming from this process must be carefully assessed before advocating the establishment of an indigenous arms industry.

Notes

1. Lance Taylor, "Military Economics in the Third World" (MIT, Cambridge, Mass., October 1981, mimeographed), p. 1.

2. Saadet Deger and Ron Smith, "Military Expenditure and Development: The Economic Linkages," *Institute of Development Studies Bulletin* 16 (October 1985): 49.

3. Several excellent surveys of this literature have been recently completed by S. Chan. The interested reader should consult these sources for a critique and summary of the work to date. See Steve Chan, "The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems," *Orbis* 29 (Summer 1985): 471–77, and "Military Expenditures and Economic Performance," in United States Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1986* (Washington, D.C.: USACDA, 1987), pp. 29–38.

4. For purposes of this study, following S. Neuman, arms producers are defined as those countries producing at least one major weapons system. The countries for which comparable data exist are Israel, India, Nigeria, Indonesia, Egypt, South Korea, Singapore, Pakistan, Venezuela, Mexico, Brazil, Philippines, Ecuador, Colombia, Thailand, Malaysia, Dominican Republic, Chile, Sri Lanka, Argentina, Peru, and South Africa (see Stephanie Neuman, "International Stratification in Third World Military Industries," *International Organization* 34 [Winter 1984]: 167–98). Economic data used in the present analysis are from the World Bank, *World Development Report* (New York: Oxford University Press, various years). Military data are from U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers* (Washington, D.C.: USACDA, various years).

5. The resource is defined as the difference between exports of goods and nonfactor services and imports of goods and nonfactor services. RBB is the resource balance divided by gross domestic product (see World Bank, *World Development Report, 1986* [Washington, D.C.: World Bank, 1986], p. 245).

6. Models of economic disarticulation were originally developed in Lance Taylor and Edmar L. Bacha, "The Unequalizing Spiral: A First Growth Model for Belindia," *Quarterly Journal of Economics* 90 (1976): 197–218.

7. L. Taylor, "Military Expenditures in the Third World," MIT Economics Department Working Paper (October 1981), p. 4.

8. David K. Whynes, *The Economics of Third World Military Expenditure* (Austin: University of Texas Press, 1979), pp. 25–26.

9. Ibid.

10. Ibid., p. 39.

11. Chan, "The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems," p. 418.

12. Emile Benoit, "Growth and Defense in Developing Countries," *Economic Development and Cultural Change* 26 (1978): 271–80.

13. Thus following the general approach first developed by Benoit.

14. On the orthodox view of indigenous Third World arms industries, see Ron Ayres, "Arms Production as a Form of Import Substituting Industrialization: The Turkish Case," *World Development* 11 (1983): 814.