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MILITARY KEYNESIANISM IN THE THIRD WORLD: AN ASSESSMENT OF NON-MILITARY MOTIVATIONS FOR ARMS PRODUCTION

ROBERT E. LOONEY
Naval Postgraduate School
Monterey, California

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The purpose of this paper is to attempt to integrate several strands of the literature on third world arms production/military expenditures and, in the process, demonstrate the manner in which these two elements are interrelated. More specifically, we are interested in developing a framework that merges several elements of the Classical (high opportunity cost), Keynesian (source of employment and output), and Marxist (falling productivity of capital) approaches to the analysis of third world arms production/military expenditures.

Using the resulting "Military Keynesianism" model, the main finding of the study was 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.

INTRODUCTION

One of the more disturbing trends in developing countries in recent years has been the rapid growth in defense spending. While the decade 1975-85 was marked by more than a thirty percent increase in world-wide defense spending in real terms, third world countries as a whole showed an even greater propensity to spend on armaments and security — an increase of over 50 percent in defense spending during the same period.

Despite this expansion in expenditures there has been very little investigation by development analysts of the causes of this phenomenon:

> The decisions with respect to military expenditures and arms imports were generally viewed as being governed by exogenous factors, outside the considerations bearing on allocation of public resources for development and civilian government services, and presented as a kind of budgetary "Hobson's choice" (Deger and West, 1987 p. xii).

Recently, however, the magnitude of budgetary allocations to national defense and the austerity imposed by severe constraints on the resources available to third world governments have stimulated a new interest in accounting for the purposes and consequences military expenditures.

> There is, however, little evidence as yet of a consensus with respect to the appropriate weighing of factors in an explanation of the allocation of resources to national defense or in a generally applicable model of the interactions between security and economic performance (Deger and West, 1987, p. xii).

Finally, despite the heated debate over the presumed high opportunity cost associated with domestic production of armaments in Third World countries, remarkably little empirical attention has been devoted to the motivations underlying the decision to produce armaments in the third world. The literature is increasing rapidly, with a number of relatively recent studies (Vayrynen, 1983; Katz, 1984, 1986; Brzoska and Ohlson, 1986; Evans, 1986; Deger and Sen, 1985; Wulf, 1985 Tuomi and Vayrynen, 1982; Wulfetal, 1980; Harkavy, 1975; and Peleg, 1980) examining political and power relationships associated with Third World arms production.

Few generalizations, however, come out of this work. Reading this literature, one gathers that sociological attitudes towards conflict, local circumstances, politics, personalities, and historical setting largely determine on a case by case basis whether or not a developing country will opt to produce some of its own armaments.

The purpose of this paper is to attempt to integrate several strands of the literature on third world arms production/military expenditures, and in the process demonstrate how these two elements are interrelated. More specifically, we are interested in developing a framework that merges several elements of the Classical (high opportunity cost), Keynesian (source of employment and output), and Marxist (falling productivity of capital) approaches to the analysis of third world arms production/military expenditures.

Hopefully, what is termed here a "Military Keynesian" framework, together with its empirical estimation, will provide insights not only to the likely economic impacts associated with third world military expenditures but, perhaps more importantly, a partial understanding of the motivations underlying these expenditures and their interrelationship with arms production.

Does the production of armaments in the third world largely take place in certain structural environments? Does this production in conjunction with the military expenditures hinder or aid over-all economic growth, investment, and industrial output? Are three serious side effects in terms of inflation or falling productivity? Is the distribution of income affected and, if so, in what manner?

ENVIRONMENTS CONDUCIVE TO ARMS PRODUCTION

As a first step, it is of some interest to determine whether and to what extent third world arms producers possess structural and/or performance similarities. More specifically, is there a unique set of characteristics that distinguish Third World arms producers from non-producers? Stephanie Neuman (1984) has asked "why for example do some states produce arms while others do not?" Neuman is, in fact, one of the few researchers who has attempted to determine the critical characteristics that set Third World arms producers apart from those countries who have not developed a domestic arms industry.

Her general hypothesis and regression results indicate that (Neuman, 1984:173):

> What emerges within the Third World from these data is a hierarchically-shaped arms production system based largely on factors of scale. In each region, the largest defense producers are generally those countries with the

biggest militaries and GNPs which dwarf quantitatively, if not always qualitatively, the capabilities of their smaller, poorer neighbors.

Clearly, however, Neuman's results and conclusions apply only in a general sort of way, given numerous smaller countries — Ecuador, Peru, Chile and Dominican Republic, for example — whose arms industries would not be anticipated in light of their small economic size and relatively limited level of military expenditures.

The data set used for the analysis below contained a variety of economic, demographic, and political indicators for fifty four countries. Of these, twenty were classified as military producers by Neuman (1984) i.e., countries producing at least one major weapons system in the 1979-80 period (Table A1).

Unfortunately data on civilian production levels, employment, and the like do not exist on a comparable basis for the third world arms producers. Therefore it is difficult to make more than a subjective assessment as to major and lessor producers. Establishing a scale for the relative development of arms producers is impossible.

One alternative is to use the simple dichotomy of arms and non-arms producers (Looney, 1988). On this basis a number of significant structural differences have been found to exist between the producing and non-producing countries (Looney and Frederiksen, 1986a). These differences can be used to provide insights into how military expenditures affect each environment.

To determine the extent to which structural similarities exist between producers and non-producers, several sets of variables were first examined to see if the mean values of these variables for each group of countries were markedly different and, if so, in what way. The variables selected were representative of broad structural, performance, and defense-related differences between developing countries:

1. External balance of payments variables;
2. External debt variables;
3. Fiscal savings variables;
4. Composition of gross domestic product variables;
5. Defense variables;
6. Performance variables; and
7. Size variables.

An examination of the means (Table 1) of the arms and non-arms producers indicates that:

1. As noted by Neuman, arms producers do in fact tend to have larger geographic areas, higher gross domestic products, larger populations, armed forces, and military expenditures.

2. Interestingly enough, the arms and non-arms producers have nearly the same per capita incomes.

3. Arms producers tend to have less export instability, a stronger growth in imports, a higher percentage of exports in GNP and, in recent years, a better export performance.

4. The arms producers, due to their larger size, have undoubtedly accumulated higher volumes of external indebtedness, but lower overall debt burdens (in terms of debt as a percent of GNP) than the non-producers.

5. The savings performance of the arms producers is distinctly superior to that of the non-producers.

6. The arms producers, as might be expected, tend to have a much higher share of manufactures in GNP than the non-arms producers.

TABLE 1 STRUCTURAL, PERFORMANCE AND DEFENSE EXPENDITURE DIFFERENCES:

THIRD WORLD MILITARY/NON-MILITARY PRODUCERS

(means)

Symbol/Variable	Arms Producers	Non-producers
EXTERNAL/BALANCE OF PAYMENTS		
Resource balance	-4.7	-11.6
Growth in imports 1960-70	5.4	6.0
Growth in imports 1970-80	5.8	3.2
Growth in exports 1960-70	5.7	9.6
Growth in exports 1970-80	4.9	-0.7
Current account balance	-2,593	791.5
EXTERNAL DEBT		
Outstanding external debt	11,987	154.8
Debt as share of GDP	18.2	35.1
External borrowing commitment	2975.4	381.6
Net inflow public capital	1463.9	98.7
FISCAL/SAVINGS (%GDP)		
Average national savings	20.7	15.2
Average marginal savings	19.5	8.6
Government consumption	16.7	14.5
Gross domestic investment	14.8	17.3
COMPOSITION OF GDP		
Share of agriculture	18.5	29.4
Share of Manufacturing	18.1	10.2
Share of Exports	32.8	24.9
DEFENSE EXPENDITURES		
Military expenditures	1,597.9	936.7
Armed forces	220.3	68.3
ME share of GNP	4.1	5.5
ME per capita	110.5	147.2
PERFORMANCE VARIABLES		
Export instability (1967/71)	8.6	10.8
Growth GDP, 1960-70	5.8	5.4
Growth GDP, 1970-80	5.2	3.7
Gross international Reserves	476.3	122.6
Per capita income	1,749.6	1,795.0
SIZE VARIABLES		
Area	1,280.2	502.8
Gross Domestic Product	47,835.9	,529.8
Population	67.9	10.9

Note: Unless otherwise specified, figures are average values for the 1970-80 period.

TABLE A-1 COUNTRY SAMPLE

Arms Producers	Non-Producers	
Israel	Nicaragua	Panama
India	Cameroon	Uruguay
Nigeria	Tanzania	Uganda
Indonesia	Sudan	Central African Rep
Egypt	Costa Rica	Ghana
South Korea	Bolivia	Burma
Singapore	Senegal	Jamaica
Venezuela	Somalia	Trinidad
Mexico	Togo	Papua New Guinea
Brazil	Tunisia	Zimbabwe
Philippines	Burundi	Honduras
Ecuador	Guatemala	Kenya
Colombia	Malawi	North Yemen
Thailand	Niger	Jordan
Malaysia	El Salvador	Liberia
Dominican Republic	Paraguay	Algeria
Chile	Haiti	Ivory Coast
Sri Lanka		
Turkey		
Peru		

Data Sources: Economic data was taken from the World Bank, **World Development Report**, (New York: Oxford University Press, various issues. Military expenditure data was taken from the United States Arms Control and Disarmament Agency, **World Military Expenditures** (Washington: United States Government Printing Office), various issues. The classification of countries as arms and non arms producers is from: Stephanie Neuman, "International Stratification in Third World Military Industries," **International Organization** (Winter 1984), pp. 167-198.

7. Although having larger armies and levels of military expenditures than their non-arms counterparts, the producing countries tend to devote less to defense as a share of GNP, or on a per capita basis.

8. While the overall economic performances of the arms and the non-arms producers are fairly similar (with the arms producers experiencing higher overall rates of growth), the level of international reserves accumulated by the defense producers considerably outweighed that of the non-arms producers.

In short, the arms producers are larger, more open to external trade, have more external debt, higher savings, and had more dynamic import and export performances than the non-producing countries.

Additional studies have shown that, in the case of Latin America, although size

and military expenditures were important in determining whether a country produced a major weapons system, the nature of arms production necessitated a certain environment in order for the process to be profitable.

> Given the nature of the import substitution process in the industry, our results indicate that access to foreign exchange is a necessary condition for a country to become a producer (Looney and Freeriksen, 1986b).

The relative importance of foreign exchange in affecting third world arms production probably stems from the fact that Third World arms producers are not yet completely self-sufficient in either the technical or material inputs required for arms production. Instead, the establishment of an indigenous arms industry places high and continuous demands on a country's foreign exchange reserves (Brzoska, 1983). Terhal (1982) estimates that in the late 1960s, military claims on foreign exchange in India was nearly half of India's civil imports of machinery and equipment.

Given the fact that few of the existing Third World arms producers are likely to develop completely integrated arms industries in the near future, we can expect relative access to foreign exchange to continue to play, at least in the foreseeable future, a major role in determining the patterns of arms production in this part of the world.

The above findings are consistent with and reinforce those obtained by Ayres (1983) in his analysis of the stages typically associated with domestic arms production. The first several listed below are heavily foreign exchange intensive.

A) Arms are imported, but are serviced and maintained domestically (Ayres, 1983:814):

B) A license to produce arms is acquired and production facilities are built requiring huge technical and personnel assistance from the supplier.

C) Production starts and, in the beginning, involves local assembly of imported sub-assemblies.

D) The sub-assemblies are assembled locally from imported components and sometimes re-exported to the licenser.

E) Components are manufactured locally from imported raw materials.

F) Raw materials are produced locally.

G. Complete, indigenous production including design, raw materials, and manufacture exists locally.

Ayres (1983:814) notes, however, that even those LDCs such as, India which have been pursuing military self-sufficiency for many years have not reached stages F and G.

While the above findings provide interesting insights and are suggestive as to conditions that *ceteris paribus* should facilitate arms production in the third world, they do not in and of themselves provide a framework for assessing the manner in which indigenous production of arms is likely to influence the impact of military expenditures on the economy as a whole.

LINKS TO MILITARY EXPENDITURES

Unfortunately, even at the conceptual level, economic theory does not provide an unambiguous prediction of the net impact of an increase in military expenditures (Taylor 1981). 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 result in an increase in national product. More specifically, Keynesians generally assume, at least in the case of the developed countries, that in situations of excess capacity, additional demand and output from expanded military expenditure will increase capacity utilization, thereby increasing the rate of profit and possibly accelerating investment (Treddenick, 1985). Clearly, whether Classical or Keynesian effects predominate will determine the net impact of defense expenditures on economic growth (Deger and Smith, 1985:49).

Because of the concentration of defense plants in the developed countries, most economists have tacitly assumed that if Keynesian defense related effects are operative, their impacts would most likely be felt in these economies. The developing countries being more supply constrained and generally lacking indigenous defense industries would be more logical places to find the classical mechanisms operative.

Perhaps for these same reasons, Marxists have also focused their analysis of the causes and consequences of military expenditures largely on the advanced countries:

> In sum, the historical record suggests that the prosperity of the United States economy has been closely linked to military expenditures for the past forty years. To the extent that the government has been successful in getting the surplus absorbed it has had to rely largely on military spending to do so (Weisskopf, 1972:23).

On the other hand, Marxists have a hard time explaining why, given the relative capital intensive nature of defense industries, the rate of return on these activities does not fall over time (Gottheil, 1986). One way to get around the apparent contradictions in Marxist analysis is to assume that capitalist governments purchase military production at negotiated prices. They tax civilian incomes and profit and redistribute the revenue in such a manner that the favored military producers receive a disproportionately higher return on their investment. This explanation is still somewhat unsatisfactory, however:

> Still, such a government intervention cannot overcome the decline in the average rate of profit. Rather than buttressing modern capitalism as contemporary Marxist economists would have it, military production hastens the fall in the rate of profit and, therefore, can serve only to identify the internal contradictions Marx had forecast (Gottheil 1986:568).

Despite the potential fall in the rate of profit stemming from high-capital intensive technologies associated with arms production, several recent studies

(Looney and Frederiksen, 1986b; Frederiksen and Looney, 1983), have indicated that in a more dynamic context, more or less resource unconstrained developing countries have been able to obtain positive impacts on growth from increased levels of defense expenditures. The reverse is true for the more relatively resource constrained countries.

A partial explanation of this phenomenon may result from the manner in which the budgetary process varies between arms and non-arms producers. Does the mere possession of industrial capacity in arms industry affect the manner in which budgetary priorities and tradeoffs are decided?

Recent analysis (Looney 1986a; Looney 1989) of sub-groupings of developing countries has provided some insight in the manner in which defense expenditures tend to interact with socio-economic allocations (Looney 1986b). Using the dichotomy between arms producers and non-producers adopted here, significant differences have been found to occur in the manner in which expenditures interact with non-defense budgetary categories.

In general, non-producers tend to cut a disproportionate number of growth enhancing allocations (general economic expenditures, transport, communications, etc.) to accommodate expansion in the military share of the budget. On the other hand, social allocations (health, education, social security, etc) in this group of countries appear to be largely protected from budgetary cuts during times of increased allocation to the military (Looney 1987b, 1988b).

Apparantly, the mere possession of a domestic arms industry places constraints on the budgetary process in arms producing countries that are not present in non-arms producing countries: economic considerations along Keynesian lines apparantly effect allocations to economic activities in these countries to a degree not found in the non-producing nations.

In summing up, there are sufficient differences in the structural environments of arms producing and non-producing states, so as to possibly affect the manner in which military expenditures affect overall economic performance. One implication of this phenomena is that military expenditures are less likely to decline (through preempting foreign exchange) in the arms producing countries. Budgetary patterns in the arms and non-arms producing countries appear to reinforce these results.

Clearly for the arms producing countries these two effects mean that the usual guns verses butter dilemma may not be operative to nearly the extent it is in the non-producing countries. In any event, a logical case can be made based on the above that the economic constraints on military expenditures in the arms producing countries are likely to be somewhat less severe than in the case of the non-producers. In addition the above discussion suggests that the "Military Keynesianism" argument often used in the advanced countries to justify military expenditures might be applicable to the arms producing countries as well.

A MILITARY KEYNESIANISM FRAMEWORK

One of the major attractions of the military Keynesian approach to the analysis of the ramifications of third world military expenditures is that it provides a framework from which to examine the interaction between military expenditures and economic growth. Most studies of third world defense expenditures implicitly

assume that defense expenditures are undertaken exogenously — they are seen as a function of externally driven events that increase security needs.

In contrast, the "Military Keynesianism" approach focuses on the demand generating aspect of military expenditures. In this regard higher military spending may have significant multiplier effects, particularly if concentrated on the acquisition of domestic equipment and supplies. It is also possible, with excess industrial capacity, that positive industrial linkages to the non-military private sector exist. It follows that the demand generation emanating from the military may, through increased capacity utilization, expand output and thus increase the rate of return on capital, investment, and possibly growth (Deger and Smith 1985:50).

The "Military Keynesianism" approach stresses the need to distinguish between the first order and second order effects of military spending. The immediate direct impact of a rise in military spending is likely to be higher demand, production, and employment. These favorable effects, however, may be offset significantly by the indirect effects of military expenditures in reducing priate savings and investment which, will in turn, hurt longer run increases in productivity and growth. Therefore, both the direct and indirect effects of these expenditures must be considered in a net assessment of their economic impact. At the risk of oversimplification, there are four main perspectives that might affect this assessment (Chan, 1985:415). The first, the "modernization" model, is most closely associated with Benoit (1973, 1972, 1978). Benoit acknowledged that military expenditures can have three unfavorable consequences:

1. Income shift (increased military spending necessarily reduces the civilian domestic product),
2. Military productivity effect (compared with the civilian sector, the government sector is characterized by slower productivity increases),
3. Investment effect (military spending crowds out civilian investment).

However, given his finding of a positive relationship between the defense burden and economic growth in the third world, Benoit stressed some compensating favorable factors:

1. The military helps to introduce modern skills and attitudes,
2. The military's capital expenditures (e.g., roads, bridges, airports) have alternative civilian uses and help to strengthen a country's economic infrastructure,
3. Defense spending leads to mild inflation which, in turn, encourages fuller utilization of production facilities. In Benoit's view, these indirect positive effects of defense spending outweigh its direct or indirect negative effects on economic growth.

Part of the problem in applying a Military Keynesian approach to third world defense issues stems from the fact that developing countries are far from homogenous — one would expect the impact of increased defense expenditures on the Brazilian economy to vary somewhat from that experienced in Chad. Similarly, countries with an indigenous arms industry (Looney and Frederiksen 1986) should experience *ceteris paribus* somewhat different defense/income multipliers than those found in non producing nations (where *ceteris paribus* a

larger proportion of increased military expenditures is likely to wind up in imported weapons).

How governments allocate expenditures can have a significant impact on the relative incomes of the middle- and high-income groups. A major middle-income group is made up of professionals and administrators employed by the public sector. By raising the salaries of these employees, the government can easily improve the position of the middle class (Looney 1986). On the other hand, an increase in purchases of military hardware would increase the relative incomes of influential middlemen and contractors.

A recent study of Saudi Arabian public sector expenditures illustrates this phenomenon (Kavoussi, 1983:345-361).

> In the aftermath of the oil price increases of 1973, government expenditure clearly shifted from wage and salary payments to purchases of military goods and investment in machinery and construction. By 1979, the share of wages and salaries in total government expenditure has been reduced to one half of the 1973 level. In contrast, during the same period, the share of investment increased twenty percentage points to about one-half of all public sector outlays. Immediately after the oil price increased, the proportion of government expenditure spent on military purchases increased from 25 to 35 percent and remained at that level until 1977. The slowdown in the growth of military expenditures in 1978 caused a larger increase in the share of investment than in the share of wages and salaries.

Due to the lack of reliable data on income distribution, we assume below that changes in the share of consumption in GDP are reflective of income distributional changes, i.e., since the lower income groups consume a large portion of their incomes, a reduction in the share of private consumption in gross domestic product is indicative of a deterioration in the distribution of income.

In short, if the Military Keynesian approach toward third world military expenditures is correct, we should expect significantly different patterns of growth and distribution associated with military expenditures in arms producing and non-producing countries.

Impact of Military Expenditures on Consumption and Investment. Without excess capacity, increased military expenditures will either reduce civilian consumptiuon 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 (exports - imports) could either be positive or negative. 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:

PRB = f[AS(-), RBB(-), RTCRYB (-), MEY (?)].

Where:

PRB = share of private consumption in GDP 1982.
AS = average savings rate 1970-81.
RBB = resource balance as a % of GDP in 1982.

RTCRYB = government revenues as a % of GDP 1982.
GETYB = government expenditures as a % of GDP, 1982.
MEY = per capita military expenditures, 1981.

For the non-producers:[1]

(1) PRB = - 0.45 - 0.37 RBB - 0.39 RTCRYB + 0.62 MEY
(-2.30)(-4.01) (-2.35) (3.98)

r2 = 0.768; F = 22.37

For the producers:[1]

(1) PRB = - 0.71 - 0.15 RBB - 0.04 RTCRYB + 0.68 MEY
(-5.46)(-1.31) (-1.22) (-4.31)

r2 = 0.773; F = 21.29

Therefore, an interesting pattern 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.

For non-producers these results are consistent with those of Weede (1986), who concluded that because the military teaches discipline and some other useful skills, it does contribute to human capital formation and ultimately to economic growth. As mass armies effect the balance of power between social classes for the benefit of the less privileged ones, high military participation ratios contribute to income equalization (and thus a higher share of consumption in GDP, since the propensity to consume is higher or lower income groups).

For producing countries, other factors may offset this pattern. In particular, the impact of military expenditures on investment appears critical. In fact, and in contrast to consumption, the impact of the military burden on the share of investment in GDP (GDIB) is reversed, i.e., the military burden is associated with increase levels of investment in the arms producing countries and decreased levels of investment in the non-producing countries.

More specifically:

Non-producers:

(3) GDIB = 0.85 AS - 0.67 RBB + 0.43 GETYB — O.49 MEY
(6.77) (-4.67) (4.44) (-3.66)

r2 = 0.784; F = 21.19

Producers:

(4) GDIB = 0.95 AS - 0.76 RBB - 0.46 GETYB — O.62 MEY
(5.89) (-4.37) (-1.44) (3.04)

r2 = 0.801; F = 24.97

1. The equations below were estimated by a two-stage least squares estimation procedure to reduce the bias in estimators. The coefficients are presented in standardized form so that their relative magnitudes of importance in affecting the dependent variable can be compared directly. There is no intercept for equations estimated with this procedure. The "t" statistic for significance appears below each of the independent variables.

Where:

GDIB = the share of investment in GDP, 1982.
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 non-producers, be explained?

Interestingly enough, these results are consistent with those likely to be found as a result of economic disarticulation (Taylor and Bacha, 1976). 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 these leading industries. The resulting increases of output 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 genertion of high-income consumer purchaser 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 (Taylor, 1981: 4).

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 more likely be an increase (than in the case of non-producers) 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 patterns could conceivably occur in the arms producing countries, the likelihood is 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 indentified by the empirical analysis above.

Inflationary Impacts of Military Expenditures. It is possible that the linkages between the defense burden and consumption observed for the arms producing countries could, instead of the mechanisms outlined above, be caused by inflation and the resulting forced savings would 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, a number of writers have argued that defense spending raises demand without increasing supply, and, therefore, does not contribute to current or future standards of living. Moreover, because more of this spending goes to the procurement of capital goods than other forms of government spending, it is more inflationary. It is also less resistant to price and wage increases since military procurement from domestic suppliers is often negotiated on a cost-plus basis. Thus, defense spending may be disproportional and 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 (Chan, 1985:418).

According to this line of reasoning, the inflationary impacts of increased military budgets 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 chance high or low inflation countries.

(2) the average military burden (MEYA) as a % of GDP 1970-82.

(3) the average share of public consumption in GDP 1970-82 (PCB)½

Public consumption was introduced to correct for any biases that might occur from high correlations between overall public sector consumption and the military burden, i.e., 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 the demand.

The results for the producing countries were:

$$\underset{(3.18)}{0.65\,PCB} + \underset{(7.87)}{0.83\,INFA} - \underset{(-2.31)}{2.27\,MEYA} \quad (5)\ INFB =$$

$$r2 = .869;\ F = 30.02$$

The results for the producing countries were:

$$\underset{(3.18)}{0.22\,PCB} + \underset{(7.87)}{0.75\,INFA} - \underset{(-2.31)}{2.37\,MEYA} \quad (6)\ INFB =$$

$$r2 = .639;\ F = 16.27$$

The negative impact on inflation of increased military burdens in producer countries is consistent with the "Military Keynesianism" thesis that governments increase military expenditures to offset downturns in the business cycle. More specifically, during economic downturns excess capacity develops in a wide spec-

trum of industrial plants. If during these periods the government increases locally procured military equipment as a means of combating economic recession, output could expand without creating economic recession, output could expand without creating inflationary pressures. In this circumstance we would see the result obtained for the producing countries (equation 5), but not non-producing cases (equation 6) whereby increased military burdens tend to occur during low inflationary periods.

Apparently, non-producers lacking defense industries are constrained in using consumption PCB (equation 6) to offset economic fluctuations i.e., for these countries public consumption and inflation are inversely correlated.

In short, there appears to be evidence supporting the argument that defense spending could encourage fuller utilization of existing productive facilities, and thus lending credence to the use of military expenditures as a tool for stabilization. In this context, defense expenditures have the potential of impacting positively on overall growth. While this argument may be particularly relevant for the arms producers, it obviously has much less relevance for the non-producers. The latter countries are forced by necessity to search for alternative expenditure outlets for stabilization purposes.

In this context, defense expenditures may be simply inflationary for some countries (although the military expenditures have a positive sign in equation 6, the coefficient is not statistically significant). For the non-producers, defense spending may simply impose additional burdens on the economy through expanded salaries, etc., and producing excess demand for goods and services in general. The net result might well be slower, rather than faster, economic growth.

Impact of Military Expenditures on Productivity. Military expenditures may have a more subtle effect on the economies of developing countries through their impact on absorptive capacity. If cooperating factors, such as technical personnel, infrastructure, vital intermediate imports, craft skills, and so forth are diverted to the military as a consequence of defense spending, then the productivity (or rate or return) of investment will drop. The result will be a reduction in the demand for a new productive capital formation and a deceleration in overall economic growth.

The counter-argument would claim that defense expenditure has a high-productivity enhancement effect, since it contributes to skill formation, technical and vocational training, and the creation of new infrastructure (Deger and Sen, 1985:50). In like fashion, skills imparted by military education and drill (knowing how to drive, functional numeracy and literacy, craft skills, etc.) remain with trainees for life. If soldiers are mostly conscripts, they may rapidly carry their acquired learning back to productive use in civilian life.

Regardless of which mechanism predominates, the net impact of increased military burden on the productivity of capital should (Lim, 1978) manifest itself in changes in the output capital ratio (ICOR) (here defined as the growth in real GDP 1979-82) divided by the growth in domestic capital formation over the same period).

If the net effect of an increase in the military burden is to reduce the productivity of capital (and presumably its rate of return) increased defense expenditures

should have a negative sign when regressed on ICOR. Several other factors could, however, simultaneously reduced overall productivity and must therefore be controlled for. These include:

1. The growth in public sector consumption (PCGB) i.e., an expansion in "unproductive" public sector consumption might divert resources from productive capital formation.

2. Inflation (INFB) might also reduce capital productivity and/or absorption through diversion of investment towards more speculative activity.

The model used to test for possible productivity effects of military expenditures was therefore specified as:

ICOR = *f[PCGB(-), INFB (-), MEYA (-)]*

Where:

ICOR = the growth in real Gross Domestic Product over the 1970-82 period divided in real GDP during the same period.

PCGB = the growth in real public consumption, 1970-82.

INFB = the rate of inflation 1970-82.

MEYA = the average military expenditure per capita, 1970-81).

The results for arms producers:

(9) ICOR = 0.17 PCGB + 0.44 INFB - 0.84 MEYA
(-1.05) (3.13) (-6.97)

r2 = 0.808; F = 20.73

For the non-producers:

(10) ICOR = 0.23 PCGB - 0.26 INFB - 0.10 MEYA
(1.31) (-1.52) (-0.66)

r2 = 0.127; F = 1.71

The results for the arms producers indicate that increased military burdens have a highly significant and negative impact on the productivity of investment. The non-arms producers, in sharp contrast, do not experience any statistically significant impacts of military expenditure in investment productivity. In sum, the empirical results tend to confirm one of the hypothesis outlined earlier: increased military expenditures in countries with an indigenous arms industry may result in that industry (due to government priorities on defense and defense related activities) preempting scarce managerial, scientific and technical inputs from the private sector, the net result being a reduced rate of return on overall productivity of investment.

The Impact of Military Expenditures on Overall Growth. The analysis in the previous sections suggested several mechanisms through which increased military burdens may, depending on whether or not the country is an arms producer, impact on the growth process.

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 and of 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 increased or decreased growth. A logical case could aiso be made that, given the many other factors impinging on Third World growth rates, the overall impact of increased military burdens is likely to be insignificant.

Operationally, the role of the military burden (MEY) in effecting overall growth in third world countries was examined by determining its impact on the margin after other growth inducing and inhibiting factors had been accounted for (Benoit, 1978).

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

Where:

GDPGB = the average growth of real GDP, 1972-82.
GDIB = the average share of investment in GDP, 1970-82.
INFB = the rate of inflation 1970-82.
RBB = the average resource balance as a % of GDP 1970-82.
MEYA = average share of military expenditures in GNP, 1979-82.

The results for arms producing countries:

((11) GDPGB = 0.79 GDIB - 0.21 INFB + 0.42 RBB + 0.39 MEYA
(4.12) (-1.47) (2.68) (2.18)

r2 = 0 753; F = 12.39

The non-producers:

((12) GDPGB = 0.95 GDIB - 0.27 INFB + 0.04 RBB - 0.64 MEYA
(7.31) (-2.13) (0.47) (-4.59)

r2 = 0.663; F = 21.93

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

The Impact of Military Expenditures on Industrial Output. The direct "Military Keynesianism" effect was examined through the dterminants of the growth in industrial output. It is assumed that as a result of the linkages associated with local orders for armaments, arms producing governments will have a relatively stronger military expenditure multipliers at their disposal — *ceteris paribus* a larger proportion of military expenditure in non-producing countries will go into imports. As a result, military expenditures in arms producing countries should have a greater impact on industrial output than in non-producing countries.

The share of government expenditures in GNP is added to the regression equation as a control variable, i.e., to assure that any apparent correlation between military expenditure and industrial growth is not simply the result of military expenditure being correlated with government expenditure which in turn is correlated with industrial growth. The expected sign for this term could be

positive or negative depending on whether the demand effects associated with public expenditures are greater or less than its "crowding out" of private sector demand — higher government expenditures may compete for investment funds earmarked for capital formation in industrial activity or be associated with higher tax rates which reduce private demand for manufactured goods.

Another control variable, the growth in real Gross Domestic Product, was also added to the regression equation — industrial output utilization should expand with the overall increase in economic activity. Since the military share of GDP may also expand during prosperous periods, OPEC countries being a good example, the introduction of GDP growth should also eliminate the possibility of spurious correlation from this source.

In terms of expected signs:

IGB = [GDIB(+), GETYB (?), GDPGB (+), MEYA (+), producers (-) non-producers].

Where:

IGB = the growth of real industrial output, 1970-82.
GETYB = the average share of government expenditure in GNP, 1970-81.
GDPGB = the growth of real GDP, 1970-82.
GDIB = the average share of investment in GDP 1970-82.
MEYA = average share of military expenditures in GNP, 1970-82.

The results for the producers:

(11) IGB = 0.57 GDIB - 0.33 GETYB + 0.08 GDPGB + 0.30 MEYA
(2.97) (-2.75) (0.21) (2.46)

r2 = 0.857; F = 33.81

The Non-producers:

(12) IGB = 0.76 GDIB - 0.47 GETYB + 0.27 GDPGB - 0.42 MEYA
(3.15) (-3.01) (2.57) (2.91)

r2 = 0.912; F = 44.72

Arms producing countries do in fact appear to obtain a positive linkage between their defense burden and industrial output. This effect occurs over and above that produced by total government expenditures (GETYB) and the overall expansion of the economy (GDPGB). In fact, the defense expenditure term is considerably stronger than that of the overall rate of GDP. This may indicate that industrial output in arms producing countries is more responsive to specific public sector expenditures than to more general improvements in economic activity.

Again non-producing countries follow a somewhat different pattern. Industrial output in these countries appears responsive to the overall increase in economic activity, but military expenditures appear to either "crowd out" resources from industrial use, or, as is the case with general government expenditures, depress private sector demand for manufactured goods.

CONCLUSIONS

The present study has shown that a Keynesian approach to the defense growth debate provides a useful framework for extending Benoit's seminal work. In addition, this approach provides useful insights into the interaction between defense production and various economic aggregates.

The orthodox view of indigenous Third World arms industries is that, as an economic strategy, the benefits of industrialization through armament are highly questionable: arms production is expensive in terms of domestic resource costs, especially scarce scientific and technical skills. 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 indigenous arms industry in a different light, i.e., 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.

Several recent studies have examined the effects of military participation. Dixon and Moon (1987) concluded that military participation made a positive contribution to welfare performance. In contrast, military spending appears to inhibit welfare outcomes, but this result was obtained only when controlling for the size of the military establishment.

Weede (1986) found that because the military teaches discipline and some other useful skills, it does contribute to human capital formation and, ultimately, to economic growth. As mass armies affect the balance of power between social classes for the benefit of the less privileged, high military participation ratios contribute to income equalization. In an earlier study Weede (1983) had found that nations with higher skill levels, as indicated by school enrollment ratios, grew faster than others, and that nations with better social discipline, as indicated by military participation ratios, also grew faster than others.

The results presented here, while looking at a somewhat different aspect of military expenditures, are in broad agreement with these findings. The results do suggest however, that the patterns found by Dixon and Moon may be reinforced in arms producing countries. However, the income equalization process found by Weed is likely to be suppressed in arms producing countries.

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