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Determinants of Military Expenditures in Developing Countries

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Previous Studies on the Determinants of Public Expenditures

Relatively few studies have examined the patterns of government spending policy in developing countries and, in particular, the amount of central government budgets allocated to defense.

In an early work, Martin and Lewis[1] analyzed the size and composition of public expenditures and revenues for 16 countries, 10 of which can be classified as developing. Public expenditures were divided into current and capital expenditures and for each group a functional classification was made. For current expenditures, it was found that the richer countries spent more than poorer countries relative to GNP on defense, public debt, social security programs, and food and agricultural subsidies. The relative importance of the remaining government expenditures (basic expenditures) was not related to per capita income.

The study by Martin and Lewis was one of the first empirical tests of 'Wagner's Law', which posits the existence of a positive relationship between the size of the public sector and the level of economic development. Wagner[2] argued that public expenditure could be divided into two categories, security and welfare, and that security expenditures were bound to increase with the growth of the 'progressive' state as armies became larger and more capital-intensive and as, in addition, the increased intrastate conflict between individuals that was generated by industrialization necessitated expanded police services. In a similar manner, welfare expenditures would also increase with the level of economic development as the state gradually took on many of the private sector's former responsibilities such as education and public health.

Cross-section Analysis of Military Expenditure Patterns

Workers using cross-section analysis, such as those testing Wagner's Law, have not considered explicitly the manner in which government spending decisions were subject to revenue constraints and, in parti-

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cular, the role played by external financing. That such constraints exist for developing countries has been emphasized by Peacock and Wiseman,[3] and for developing countries, Heller has stressed that:

> In a highly developed country, tax policy tends to accept the level of expenditures as its revenue goal ... The sequence of decision tends to run from expenditures to tax. But in underdeveloped countries, the level of expenditures depends much more heavily on the ability of the tax system to place required revenues at the disposal of the government ... in this sense the sequence tends to run from taxation to expenditure.[4]

In the following section, an attempt will be made to gain some understanding of the effects of revenue constraint and external sources of funding on the patterns of military expenditure in our sample of developing countries.

The data base used for cross-section analysis differs from those used in previous expenditure studies in two respects. First the sample is much larger – the initial data base includes 96 countries. Second, the data base comprises both economic and socio-political variables. Economic variables were taken from the World Bank data base,[5] the International Monetary Fund,[6] and the Yale Data Base on Political and Social Indicators.[7] Military expenditure variables were taken from the U.S. Arms Control and Disarmament Agency.[8]

Previous Studies

A more complete formulation of Wagner's law can be stated as follows: in industrializing countries, public sector activities and expenditures grow in relative importance as real per capita income increases. According to Wagner, there are essentially three reasons to expect expanding state activity and expenditures. First, the state has to expand its administrative and protective functions because of the increasing complexity of legal relationships and communications. Second, the state has to expand its activities due to the increase in general public services required by an increasingly affluent society. Third, increases in population and urbanization require higher public expenditures on law and order and economic regulation to maintain the efficient operation of an increasingly complex economy amidst the rising frictions of urban life.

Wagner also predicted a substantial expansion of public expenditure on education and distribution of income. Although his reasons for the expansion of these public activities were unclear in his exposition, Wagner appears to have assumed that they constituted 'superior

goods'. In other words, the income elasticity of demand for public services such as education and income redistribution is greater than unity.

A final element in the Wagner framework is the concept that, as industrialization progresses, technological change and large-scale investment expenditures require larger amounts of capital than the private sector can supply. Therefore, the state has to provide the necessary capital to finance large-scale investment projects.

Naturally, the 'Law' of expanding state activity has been severely criticized by commentators who argue, for example, that it is wrong to regard the development process as a unique linear trend common to all nations.[9] However, taking the 'Law' at face value and applying it to the present subject matter, we should anticipate a positive correlation between the level of economic development (measured by, for example, per capita income) and the relative size of the defense sector (that is: the defense burden or defense expenditure as a proportion of the national income).

A major test of Wagner's Law was undertaken by Lotz,[10] who investigated several components of public expenditures, of which defense was one. A factor analysis of 37 developing countries (using mid-1960s cross-section data) resulted in Lotz's conclusion that defense spending was not closely related to the particular stage of development.

In order to isolate the determinants of the defense burden (D/Y) Lotz performed a regression analysis on the data and included as independent variables GNP per head (Y/P), mineral and oil exports (MX) which were a proxy for natural resource endowments, the proportion of the population which was urbanized (U) and the total government budget as a share of income (B/Y). The result was as follows:

$$D/Y = 0.26 - \underset{(-3.51)}{0.006Y/P} + \underset{(1.80)}{0.020MX} + \underset{(2.64)}{0.048U} + \underset{(2.19)}{0.081B/Y}$$

$$r^2 = 0.366$$

The final coefficient is exactly in line with the predictions of Wagner's Law: the total budget and the defense budget appear to be positively associated. Furthermore, if we take urbanization as a proxy for the level of economic development, the predicted result is again confirmed. A slightly less statistically sound relationship is observed between defense and natural endowments, although we should expect a close relationship for the obvious reason that nations with abundant natural resources can afford to spend on defense and will also be anxious to protect their wealth from external aggression or internal secessionist movements.

In spite of these significant results, the anticipated relationship between defense and income does not appear; rather, the relationship is inverse, a result that is confirmed by the value of the correlation coefficient between D/Y and Y/P estimated at –0.16. Lotz explains this result by the hypothesis that there exists a certain minimum size for a military establishment, determined by technical factors, which implies a fixed expenditure level irrespective of the size of national income. Smaller, poorer nations have, therefore, been obliged to spend more than their fair share on defense owing to their fears of the mobilization of other more affluent states.

In an update of the Lotz study, Whynes,[11] using IISS[12] data (around 1977) for 83 nations – 30 developed (excluding USA and USSR) and 53 developing nations – obtained the following correlation coefficients:

	Full Sample	DCs Only	LDCs Only
Defense Expenditure and GDP	0.889	0.831	0.461
Defense Burden and Per Capita GDP	–0.149	–0.430	–0.240

The first set of correlations suggests that the richer the nation, the more resources it devotes to defense, both being expressed in absolute terms. This relationship is particularly strong for the developed countries and, according to Whynes, is to be expected on an intuitive level – the richer the nation, the more the economy can afford to divert resources away from civil production. The slightly weaker LDC relationship is also consistent with the above but might, too, support the Lotz thesis that a number of the poorer states are obliged to overspend for strategic reasons.

As far as the defense burden is concerned, the DC sample displays quite a strong negative correlation – high burdens are associated with lower, rather than higher, incomes. This apparent reversal of that which was predicted can be explained by considering countries included in the DC sample. First, according to Whynes, many of the medium-to-high income states are members of alliances and this factor is significant. As defense exhibits public goods properties (i.e., if any amount is provided to one member of the group, than it is provided equally to all), defensive alliances are regarded as being efficient in that partners can agree on the provision of the appropriate amount of defense which each may consume and they may then share the costs among themselves. However, once an alliance has been established, it will be in the interests of the members to 'free ride', by contributing as small a share of the resources as possible, in the hope that a more risk-

adverse or wealthier partner will subsidize them. This is certainly the case in NATO and WTO, where most of the medium-income members contribute less than the average burden of 5 percent and 11 percent, respectively; they are, in fact, heavily subsidized by the extra expenditure undertaken by the USA and USSR (which were not included in Whynes's sample and whose defense burdens exceeded the alliance averages, while their individual strategies dictated that defense escalation must continue).

Second, according to Whynes, several high income states such as Switzerland, Sweden and Japan remain outside the defensive alliances and have not become involved in the arms race, which has to some extent been forced upon NATO and WTO by the superpowers. The requirements of the alliances, which oblige most NATO and WTO members to attempt to 'follow the leaders', mean that the average defense burden in the allied countries is about twice that of unaligned countries (3.5 percent to 1.7 percent).

Third, Whynes noted that several of the low income developing countries possess high defense burdens for a variety of reasons: Israel for obvious reasons, while Greece and Turkey spend relatively large amounts on defense in response to internal turmoil. Others have found it necessary to spend on defense as a result of their exclusion from alliances – Albania, for instance, left WTO in 1968 and now prefers to defend itself in isolation. Both it and Yugoslavia find themselves in a strategically dangerous position on the interface between East and West confrontation. In such cases, isolationism has posed security problems and necessitated correspondingly high levels of defense provision.

In general, Whynes's study found a positive association, as originally hypothesized by Wagner's Law. The relationship is not particularly strong, however, and clearly a number of other factors must be included for a thorough explanation of the observed patterns of defense expenditures.

In a major International Monetary Fund study,[13] it was found that the share of defense expenditures in the total government budget was not associated with per capita income. In general, the study found that the same variables as those influencing general administrative expenses proved to be significant for defense. The most striking difference was that, whereas urbanization had a negative impact on the share in GDP of general administrative expenditures, it has a positive relationship with defense. Defense expenditure, according to this study, could be expected to be higher in a more urbanized country, with a larger proportion of children of 14 years and younger, and a larger public sector (net of defense spending). The study concludes:[14]

> While numerous influences not tested in this study (and indeed impossible to test) must influence defense spending, and while the low correlation coefficient (.15) suggests a large amount of "unexplained" defense expenditure, the significant variables mentioned above are interesting. It seems reasonable to consider that urbanized societies must spend more on defense and are willing to do so. Likewise, it is reasonable to expect that many authorities who are prepared to run a large public sector are also likely to accept the idea that a substantial part of the national budget is being spent on defense.

It should be noted that the IMF study is heavily weighted with advanced industrial countries.

Implications for the Current Study

Based on the literature cited above, a main thesis of the current study is that, while Wagner's Law provides useful insights into the relationship between per capita income and defense expenditures, per capita income is likely to be only one of several factors ultimately determining the level of defense expenditures and their relative share in government budgets. In other words, the determinants of defense expenditures are multidimensional.

The central problem of the cross-section studies is the lack of any historical dimension. While it might certainly be true that there exist certain tendencies toward public sector expansion with development, each country will be following its own particular path through time, encountering its own peculiar economic, political and strategic problems. Countries at a similar stage of development (even assuming that this can be defined) might, therefore, possess completely different sizes of public sector and defense budgets. Examples are Israel and New Zealand, both with per capita incomes of around $3500 but with defense burdens of 33.9 percent and 1.7 percent, respectively. Again, Afghanistan and Bangladesh are, in many ways, similar countries (including an almost identical level of per capita income), yet the former's defense burden is nearly four times that of the latter.

The thesis developed below is that previous attempts to explain defense expenditure patterns using cross-section data have failed because they did not systematically incorporate various factors that determine either government budgets or the constraints on financing additional expenditures. By incorporating the financing of government expenditures, the cross-section analysis presented in the following sections is able to capture the historical–environmental dimension lacking in previous studies.

Discriminant Analysis

As noted above, several studies[15] have indicated that developing countries may lack homogeneity with regard to either the factors surrounding the decision to increase defense expenditures or the impact that defense expenditures have on the overall economic growth of the country (and thereby feed back to affect their allocation in a later time period). With regard to the impact of defense expenditures on economic growth, Frederiksen and Looney contend that:[16]

> One can argue that under certain circumstances defense spending can help growth while under a different set of circumstances, it can hinder growth. Indeed, both propositions are likely to be true for the same country at different points in time.
>
> On the positive side, defense spending may contribute to the growth of the civilian economy 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 – roads, dams, river improvements, airports, communication networks, etc. – that may in part serve civilian uses, and (4) engaging in scientific and technical specialities which would otherwise have to be performed by civilian personnel.

They add that on the negative side:[17]

> There are at least three different types of possible effects. The first, named the "income shift" by Benoit, is that increases in defense expenditures will reduce the civilian GDP and will thus tend to decrease growth proportionately. Second, it is possible that defense spending adversely affects growth since the government sector for the most part exhibits "negligible rates of measurable productivity increases." Finally, growth can suffer since increased spending on defense uses resources which could have been better employed as civilian investment.

Frederiksen and Looney[18] note that while these arguments make intuitive sense, the crucial determinant of the impact of defense expenditures on economic growth is the country's financial resource constraint. According to them, a country which is severely resource constrained (i.e., faces some combination of lagging taxes, reduced private and government savings, reduced borrowing power overseas, export shortfalls, etc.) will probably face budget cuts. In order to maintain defense programs, the high growth development programs will be sacrificed:[19]

> This is likely for two reasons. First, it is usually more politically acceptable to curtail capital investment (on infrastructure, for example) than expenditures on the current account. Second, given that a well-established military establishment already exists, there will be the obvious pressure to maintain the status quo. These special interest groups might included high ranking officers, military contractors, and certain political groups. As budgets are reduced, the military share is frozen and the brunt of the deflationary policy is borne by development projects which we assume are relatively productive. In short, defense expenditures are likely to be asymmetric – difficult to cut back but easily expanded. Thus, for resource-constrained countries, we should expect a negative relationship between defense spending and economic growth.

The authors contend that the opposite is likely to hold for countries with a relative abundance of financial resources – an elastic supply of tax revenues, a high inflow of foreign exchange and the like:[20]

> These countries can more easily afford the capital investment programs necessary for economic growth while maintaining or even increasing defense programs.

They conclude that:[21]

> If this thesis is correct, one can see why previous authors have failed to find any consistency between economic growth and defense. Using a model based on resource constraints, however, it is easy to see why developing countries with identical levels of defense spending can experience very different growth levels: richer countries are apparently able to invest in development programs while, on the other hand, poorer countries have had to sacrifice these programs to pay for defense.

Since their hypothesized relationship between defense and economic growth depended on financial resource constraints, their sample of developing countries was separated into either resource-constrained or non resource-constrained groups by means of cluster analysis. While a large number of conceivable proxy measures could be used to indicate the relative abundance or scarcity of financial resources, the selection of those used in the cluster analysis was based on the ratios of gross domestic investment to GDP in 1960 and 1978 and the ratios of gross domestic savings to GDP in 1960 and 1978 (data taken from the 1980 World Bank *World Development Report*). The cluster analysis produced two distinct groups: one having high levels of savings and

investment to GDP, the other having low ratios of savings and investment to GDP.

Linear regression equations were estimated for each group.[22]

> The most striking result and one that supports our hypothesis, is that the coefficient of the defense variable was positive and statistically significant at the 99 percent level for the richer group. While the coefficient for the defense variables for the poorer group was negative (as hypothesized) it was not statistically different from zero.

Based on the above-cited results it makes sense to split the sample of developing countries into groups based on some measure of resource constraint. Presumably, those countries who have either more domestic resources (savings and investment) or more access to foreign capital (everything else equal, such as gross national product) will be able to support a higher level of defense expenditures. On the other hand, those countries with a lower level of domestic resources or less access to international capital will (everything else equal) not have as high a level of defense expenditures. Using factor analysis with a number of measures of debt and capital flows to measure the main trends in the data, a discriminant analysis[23] was performed using as variables those with the highest loading on each one of the individual factors. The orthogonal rotation asssures that each variable selected had a relatively low degree of correlation with the others in the sample. The variables thus selected for splitting the countries into two groups were:

1. Gross Inflow of Public Loans/Exports 1982
2. Total Public External Debt, 1982
3. Gross International Reserves, 1982
4. Public External Debt as a % of GDP, 1982
5. Growth in Imports, 1970–82
6. External Debt Service as a % of GDP, 1982
7. Public External Debt as a % of GDP, 1970.

The results of the discriminant analysis (Table 1) show a high degree of probability of correct placement in each group, i.e., the discriminating variables selected from the factor analysis are able to split the sample countries into two fairly distinct groupings based largely on the external debt situation facing each set of countries. Group II countries consist of several major oil exporters and several of the more dynamic newly industrializing nations such as Mexico, Greece, India, Korea, Spain, Algeria and Malaysia. Group I countries in general seem to be the poorer, less economically dynamic nations, this group being heavily weighted with African and poorer Latin American countries.

Further insight into the two groups can be gained by examining the means (Table 2) of the variables used in the discriminant analysis:

1. Group I countries resorted to a much higher (3.6 times) inflow of external public loans in 1982 relative to their exports that year.
2. On the other hand, the overall level of total public external debt in 1982 averages nearly four and one half times as much for Group II countries as is the case for Group I countries.
3. The level of international reserves is also much higher for Group II countries – nearly 10 times as much as the average for Group I countries.
4. With regard to shares of debt in gross domestic product, however, Group I countries have much higher levels of attainment, averaging nearly twice as much as Group II countries in both 1970 and 1982. The debt service ratio to exports is correspondingly higher for Group I countries.
5. The rate of growth of imports was nearly ten times higher over the 1970–82 period for Group II countries.

In terms of profiles, therefore, the Group II countries are considerably larger, more affluent, and less reliant on external debt as a percentage of gross domestic product. They tend to spend relatively large amounts on military activities, but not necessarily significantly greater amounts of their overall budgets.

Analysis of Total Military Expenditure

Based on the profiles of the countries in Group I and Group II, one might anticipate that public external debt and external capital flows have played a much greater role in facilitating military expenditures in the former group. The Group II countries appear to be less dependent on external debt and capital flows as a means of maintaining or increasing their military expenditures, i.e., they have more alternative means by which military expenditures can be financed.

To test this hypothesis, total military expenditure was analysed first by factor analysis, then by regression analysis. The factor analysis showed the general manner by which the Group I and Group II countries differ from one another (in terms of the loading of the various measures of military expenditures on economic factors), and how the groups differ individually from the total sample of countries. The regression analysis was undertaken to obtain a more precise delineation and qualification of the economic variables most responsible for the observed differences in military expenditures between countries.

The factor analysis began with the original set of economic variables.

Gross domestic product and gross national product per capita were added, along with a measure of military expenditure. The first measure of military expenditure examined was total military expenditure:

1. For the total sample of countries, military expenditure (Table 3) loads highest at 43 on Factor 3. This particular factor represents the level of gross national reserves and gross national product. As discussed above, the pattern was not particularly clear for the sample as a whole.
2. For the Group I countries, total military expenditure (Table 4) has a loading of 100 on Factor 1. This particular factor represents most of the major debt measures – total public debt for 1982, total public debt for 1970 and so on.
3. For Group II countries, total military expenditures loaded highest at 59 on the public debt measures for 1970 (Table 5), with a smaller loading of 51 on export growth and a negative loading of –44 on factors affecting public external debt/exports for 1982.

In sum, the factor analysis of the separate groups of countries produced by the discriminant analysis provided significantly different pictures from those of the sample as a whole of the economic variables associated with total military expenditures. The factor analysis for the total sample of countries indicates that gross national product per capita and international reserves play a large role in affecting military expenditures, while separate analysis of Group I countries indicates a strong association between military expenditure and debt. The Group II countries appear to have more diverse (yet significantly different) patterns linking underlying economic forces to expenditure on defense-related activities.

Based on the results of the factor analysis, the number of variables for regression analysis was expanded by adding the main factors upon which military expenditures loaded heavily in the data set. Step-wise forward regressions indicated that the most important variable affecting total military expenditure for the total sample countries was the share of military expenditure (1981) in total government budget (GEDB), followed by the gross domestic product (GDPB) and then the public external debt in 1970 (PDA). Gross national product per capita (GNPPER) was also significant in the regression equations. Debt service as a percent of exports in 1982 (DEEB) was significant but had a negative sign, as did public external borrowing commitments/exports in 1982 (PBCB). The most satisfactory equation estimating military expenditures (Equation 9, Table 6) explains nearly 79 percent of the fluctuations in military expenditures. A comparison of predicted versus actual values estimated by Equation 9, Table 7, however,

indicates that only one country – the Philippines – had a predicted value within 5 percent of the actual level of military expenditure.

Regressions on military expenditure for the Group I countries (Table 8) produced, as might be expected, a highly positive correlation between the public debt in 1982 (PDB) and total military expenditures (total public debt in 1982 was not statistically significant in explaining military expenditures for the total sample). As with the total sample, the share of defense expenditures in the total government budget (GEDB) was also statistically significant; however, the size of the standardized coefficient was about twice as large for the total sample as for the Group I countries. Population (POP) is also positively correlated with military expenditures in the Group I countries, as is the net inflow of external loans in 1970 (ECNIA). As with the total sample, the debt service as a proportion of exports in 1982 (DSEB) was statistically significant and negative. Interestingly, the public debt in 1970 (PDA), so important in explaining the pattern of military expenditures for the total sample, is not statistically significant when the regression equation includes population (POP) and net external capital inflows for 1979 (ECNIA).

Regression equations for total military expenditure for the Group II countries (Table 9) found, as with the two previous sample groups, a positive and statistically significant relationship with the share of military expenditures in the total government budget (GEDB). The standardized coefficient for this variable averages around .55 or slightly higher than that for the total sample, but about twice that for Group I countries. Gross domestic product (GDPB) is also statistically significant as is the total public debt in 1970 (PDA), which was not statistically significant for Group I countries. In sharp contrast to Group I, the public debt in 1982 (PDB) is highly significant and negative for Group II, as are population (POP), public external borrowing commitments in 1982 (PBCB), and gross capital inflows/exports in 1982 (ECIBE).

Group II countries, then, present a picture of countries that borrowed fairly heavily in the early 1970s in order to facilitate military expenditures but who, by the early 1980s, were finding that the debt accumulated at that point in time was, for one reason or another, a hindrance to further expansion in the military budget. Group I countries, however, appear to have used external capital inflows toward the end of the 1970s and early 1980s as a means of increasing the amount of funds allocated to the military sector. Group I countries might also be using military expenditure as an employment device – evidenced by the positive sign for population; while Group II countries might be finding that the demands of non-military expenditures

(represented by a negative sign for population) caused a reduction in military spending.

The regression equations for Group II (Table 10), in contrast with those for the total sample, explain well over 95 percent of the fluctuations in military expenditures for the group as a whole.

Summary–Conclusions

In summary, the basic regression equation for total military expenditures shows the following differences by sample group:

	GEDB	PDB	PDA	POP	GDPB	GNPPER
Total	+	0	+	0	+	+
Group I	+	+	0	+	0	0
Group II	+	−	+	−	+	0

Where GEDB = share of military expenditures in total government budget; PDB = total public external debt, 1982; PDA = public debt, 1970; POP = population, 1982; GDPB = gross domestic product, 1982; and GNNPER = gross national product per capita for 1982. + = statistically significant and positive sign at 95% level. − = statistically significant and negative sign at 95% level. 0 = statistically insignificant.

The results therefore appear to lend strong support to the idea of treating military expenditures in developing countries as being affected by a set of common factors specific to groups of countries, rather than by a set of factors common to developing countries as a whole. It should be noted that the results of the regression presented above for the total sample, Group I, Group II were not significantly affected by the exclusion of the Middle East countries.

TABLE 1

DISCRIMINANT ANALYSIS TOTAL SAMPLE COUNTRIES
BASED ON ECONOMIC FACTOR ANALYSIS HIGH LOADINGS

Group I		Group II	
Country	Probability of Correct Placement	Country	Probability of Correct Placement
1. Israel	69.34	1. Greece	57.78
2. Honduras	83.48	2. India	84.91
3. Cameroon	60.73	3. Nigeria	89.07
4. Sudan	66.47	4. Indonesia	90.67
5. Costa Rica	92.64	5. Egypt	68.20
6. Bolivia	86.27	6. Korea	89.95
7. Somalia	86.46	7. Rwanda	69.08
8. Tunisia	68.31	8. Turkey	66.95
9. Morocco	73.06	9. Spain	51.89
10. Guatemala	54.91	10. Venezuela	80.26
11. Malawi	91.40	11. Mexico	99.69
12. El Salvador	65.90	12. Brazil	99.02
13. Mali	97.12	13. Algeria	76.44
14. Pakistan	86.98	14. Philippines	55.78
15. Paraguay	60.02	15. Libya	75.69
16. Ecuador	56.61	16. Colombia	54.63
17. Dominican Republic	74.12	17. Thailand	60.95
18. Liberia	94.77	18. Malayasia	65.16
19. Ivory Coast	84.42	19. Argentina	66.09
20. Mauritania	96.04	20. Saudi Arabia	94.65
21. Sierra Leone	86.05	21. Kuwait	81.31
22. Panama	94.37	22. Syria	63.95
23. Chile	70.09	23. Jordan	50.81
24. Chad	87.18		
25. Uruguay	67.87		
26. Tanzania	79.87		
27. Uganda	88.76		
28. Ethiopia	70.24		
29. Cen. African Rep.	76.89		
30. Ghana	78.72		
31. Burma	82.91		
32. Sri Lanka	75.39		
33. Jamaica	90.66		
34. Trinidad	77.62		
35. Zambia	95.88		
36. Peru	71.67		
37. Zimbabwe	85.68		
38. Kenya	86.61		

TABLE 2

Means of Discriminant Analysis Variables

Variable	Total Sample	Group I	Group II	Latin America	Non Latin America
Discriminating Variables					
ECIBE	0.70	0.94	0.26	0.46	0.80
PDB	5932.00	2629.30	11786.90	8041.90	3860.10
GIRB	2587.20	583.80	6138.80	2024.30	2411.70
PDPB	35.30	44.30	19.20	35.90	37.47
ZB	4.10	1.09	9.50	2.10	5.10
DSEB	14.10	15.00	12.50	18.30	10.60
PDPA	17.30	21.20	10.40	14.70	38.40
Discriminating Variables					
MEY	4.20	3.60	5.10	2.12	6.31
GNPPER	1793.20	1066.70	3048.20	1861.40	1971.60
MEP	117.90	57.70	223.30	39.70	179.20
GEDB	14.10	13.40	15.30	9.90	18.10
ME	1318.10	389.10	2943.90	571.20	1541.90

ECIBE = Gross Inflow of Public Loans 1982 Divided by Exports 1982
PDB = External Public Debt 1982
GIRB = Gross International Reserves 1982
PDPB = External Public Debt as a Percentage of Gross Domestic Product 1982
ZB = Average Annual Growth in Imports 1970-82
DSEB = Debt Service as a Percentage of Exports 1982
PDPA = External Public Debt as a Percentage of Gross Domestic Product 1970

MEY = Military Expenditure as a Percentage of Gross National Product 1981
GNPPER = Per Capita Gross National Product 1982
MEP = Military Expenditure Per Capita 1981
GEDB = Defense Expenditures as a Percentage of Total Government Expenditure
ME = Total Military Expenditure 1981

TABLE 3

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Repayment of Principal on Public External Loans 1970	100*	-4	-4	0	-27	8	0
Payment of Interest on External Public Debt 1970	97*	-9	-1	6	-24	3	9
Total Public External Debt 1982	95*	1	-2	4	11	14	6
Gross Inflow Public Loans 1982	94*	2	-4	2	15	11	-13
Payment of Interest on External Public Debt 1982	89*	0	-2	0	12	23	-15
Public External Borrowing Commitments 1982	88*	-4	-4	7	27	3	-5
Gross Inflow Public Loans 1970	86*	-2	3	3	-8	7	41
Total Public External Debt 1970	70*	-7	0	6	-10	-8	53
Repayent of Principal on Public External Debt 1982	61*	2	14	-4	26	37	12
Gross Domestic Product 1982	52*	-15	44	0	7	-24	-7
Growth in Exports 1970-82	46*	23	4	-37	-18	-22	-12
Current Account Balance 1970	-87*	-11	17	5	-10	6	-5
Growth in Exports 1960-70	14	85*	-13	-7	5	-45	-8

TABLE 3 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Gross Inflow Public Loans 1982/GDP 1982	9	87*	1	26	-4	0	-10
Public Consumption as % GDP 1982	-2	82*	18	1	-19	7	12
Public External Debt % GDP 1982	4	78*	-13	14	-11	16	8
Exports as % GDP 1982	-7	75*	21	-10	6	21	-6
Public Consumption % GDP 1960	-15	71*	-7	-11	14	-3	11
Resource balance % GDP 1982	24	-53*	13	-26	-10	55	0
Gross International Reserves 1982	-13	-12	89*	0	13	-11	11
Gross National Product per Capita 1982	-7	10	86*	0	-13	15	19
Gross International Reserves 1970	12	-2	83*	-9	-12	-15	-14
Total Military Expenditures 1981	37	16	43*	-14	-1	-26	26
Current Account Balance 1982	-19	4	-50*	5	-14	30	28
Private Consumption % GDP 1960	23	-12	-63*	-3	9	-37	0
Average Maturity of External Public Debt 1982	-8	4	-69*	-9	0	-21	35

TABLE 3 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Public External Loan Commitments/ Exports 1982	3	0	-3	95*	4	-20	-8
Gross Inflow Public Loans/ Exports 1982	8	13	11	88*	-7	0	-12
Public External Debt/Exports 1982	4	2	-8	88*	-2	-4	11
Growth in Private Consumption 1970-82	-11	-10	6	20	86*	8	14
Growth in Imports 1970-82	11	-7	-2	-8	82*	-24	-6
Growth in Public Consumption 1970-82	2	4	-23	-19	68*	-1	-5
Terms of Trade 1982	20	21	26	5	46*	13	22
Debt Service External Public Debt % Exports 1982	24	3	-7	-6	-4	74*	18
Private Consumption % GDP 1987	-12	-38	-37	-6	-21	-41*	-9
Net Inflow Public External Loans 1970	60	0	8	4	7	5	65*
Public External Debt % GDP 1970	0	12	-31	-6	5	36	58*

TABLE 4

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, 1981, GROUP I COUNTRIES

	Factors						
Variables	Determinants of Total Military Expenditures	Factors Facilitating Share of Public Consumption	Debt Servicing	External Debt to Exports 1982	Growth in Public Consumption	Growth in Private Consumpton	Public External Debt Share of GDP 1970
Total Military Expenditures 1981	100*	4	-20	-2	-13	0	1
Net Inflow Public External Loans 1970	97*	8	6	2	-9	-1	27
Total Public Debt 1982	95*	-3	-9	14	10	11	2
Gross International Reserves 1982	92*	-4	3	-11	-13	6	9
GNP Per Capita 1982	88*	-11	-11	14	6	-4	1
Total Public Debt 1970	87*	4	31	-3	-10	-5	25
Gross Inflow Public Loans 1970	85*	8	37	2	-7	-1	27
Interest Payments External Debt 1982	82*	-3	4	1	34	6	-2
Repayment of Principal on Public External Loans 1982	79*	-4	1	0	28	12	-22
Gross International Reserves 1970	77*	-9	10	-18	0	-12	-29
Gross Inflow Public Loans 1982	73*	2	23	12	15	5	-24
Public External Borrowing Commitment 1982	71*	0	21	10	9	9	-32

TABLE 4 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, 1981, GROUP I COUNTRIES

	Factors						
Variables	Determinants of Total Military Expenditures	Factors Facilitating Share of Public Consumption	Debt Servicing	External Debt to Exports 1982	Growth in Public Consumption	Growth in Private Consumpton	Public External Debt Share of GDP 1970
Average Maturity of External Debt 1982	-9	10	-49*	-26	-24	0	11
Public External Debt/ Exports 1982	4	1	0	94*	-16	9	22
Public External Borrowing Commitments/Exports 1982	2	6	5	93*	-26	11	-19
Gross Inflow Public External Loans/Export 1982	-1	9	13	89*	1	-4	-3
Growth in Exports 1970-82	36	16	24	-41*	-15	19	-7
Growth in Public Consumption 1970-82	-33	2	-0	-21	69*	24	8
External Debt Service % of Exports 1982	18	-4	14	-16	69*	21	-5
Private Consumption % of GDP 1982	-12	-30	1	-2	-79*	-3	-9
Growth in Imports 1970-82	-1	5	16	-9	14	86*	24
Growth in Private Consumption 1970-82	12	-14	-20	30	15	81*	22
Terms of Trade 1982	7	48	-14	-4	27	47*	3
Private Consumption % of GDP 1960	-34	-18	22	9	3	24	72*
Public External Debt % of GDP 1970	39	7	0	-5	15	24	58*

TABLE 4 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, 1981, GROUP I COUNTRIES

	Factors						
Variables	Determinants of Total Military Expenditures	Factors Facilitating Share of Public Consumption	Debt Servicing	External Debt to Exports 1982	Growth in Public Consumption	Growth in Private Consumpton	Public External Debt Share of GDP 1970
GDP 1982	55*	-33	24	-6	-7	-14	-2
Current Account, Balance of Payments 1982	-72*	0	-25	5	7	-8	14
Current Account, Balance of Payments 1970	-84*	-6	51	3	2	14	-18
Growth of Exports 1960-70	-22	95*	8	-4	-6	1	3
Gross Inflow Public Loans/ GDP 1982	-14	85*	20	19	16	-5	-16
Public External Debt % of GDP 1982	-13	83*	7	10	26	-5	7
Public Consumption % of GDP 1960	11	81*	-14	-19	-23	20	-2
Public Consumption % of GDP 1982	42	68*	-13	4	15	-21	-2
Exports % of GDP 1982	5	65*	3	0	49	-20	1
Resource Balance % of GDP	-1	-70*	13	-5	53	-12	16
Repayments of Principal on Public Loans 1970	20	5	97*	1	1	0	15
Interest Payments on External Debt 1982	24	2	92*	-1	-3	-6	14

TABLE 5

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Repayment of Principal on Public External Loans 1970	100*	-4	-4	0	-27	8	0
Payment of Interest on External Public Debt 1970	97*	-9	-1	6	-24	3	9
Total Public External Debt 1982	95*	1	-2	4	11	14	6
Gross Inflow Public Loans 1982	94*	2	-4	2	15	11	-13
Payment of Interest on External Public Debt 1982	89*	0	-2	0	12	23	-15
Public External Borrowing Commitments 1982	88*	-4	-4	7	27	3	-5
Gross Inflow Public Loans 1970	86*	-2	3	3	-8	7	41
Total Public External Debt 1970	70*	-7	0	6	-10	-8	53
Repayment of Principal on Public External Debt 1982	61*	2	14	-4	26	37	12
Gross Domestic Product 1982	52*	-15	44	0	7	-24	-7
Growth in Exports 1970-82	46*	23	4	-37	-18	-22	-12
Current Account Balance 1970	-87*	-11	17	5	-10	6	-5

TABLE 5 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Growth in Exports 1960-70	14	85*	13	-7	5	-45	-8
Gross Inflow Public Loans 1982/ GDP 1982	9	87*	1	26	-4	0	-10
Public Consumption as % GDP 1982	-2	82*	18	1	-19	7	12
Public External Debt % GDP 1982	4	78*	-13	14	-11	16	8
Exports as % GDP 1982	-7	75*	21	-10	6	21	-6
Public Consumption % GDP 1960	-15	71*	-7	-11	14	-3	31
Resource Balance % GDP 1982	24	-53*	13	-26	-10	55	0
Gross International Reserves 1982	-13	-12	89*	0	13	-11	11
Gross National Product per Capita 1982	-7	10	86*	0	-13	15	19
Gross International Reserves 1970	12	-2	83*	-9	-12	-15	-14
Total Military Expenditures 1981	37	16	43*	-14	-1	-26	26
Current Account Balance 1982	-19	4	-50*	5	-14	30	28
Private Consumption % GDP 1960	23	-12	-63*	-3	9	-37	0

TABLE 5 (cont'd)

OBLIQUE ROTATED FACTOR PATTERN (STANDARD REGRESSION COEFFICIENTS): ECONOMIC VARIABLES, TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Variables	1 Factors Affecting Total External Debt 1982	2 Factors Facilitating Public Consumption Share	3 Factors Affecting Total Military Expenditure	4 External Debt/ Exports 1982	5 Growth In Consumption	6 Debt Service 1982	7 Public External Debt 1970
Average Maturity of External Public Debt 1982	-8	4	-69*	-9	0	-21	35
Public External Loan Commitments/Exports 1982	3	0	-3	95*	4	-20	-8
Gross Inflow Public Loans/ Exports 1982	8	13	11	88*	-7	0	-12
Public External Debt/Exports 1982	4	2	-8	88*	-2	-4	11
Growth in Private Consumption 1970-82	-11	-10	6	20	86*	8	14
Growth in Imports 1970-82	11	-7	-2	-8	82*	-24	-6
Growth in Public Consumption	2	4	-23	-19	68*	-1	-5
Terms of Trade 1982	20	21	26	5	46*	13	22
Debt Service External Public Debt % Exports 1982	24	3	-7	-1	-4	74*	18
Private Consumption % GDP 1982	-12	-38	-37	6	-21	-41*	-5
Net Inflow Public External Loans 1970	60	0	8	4	7	5	65*
Public External Debt % GDP 1970	0	12	-31	-1	5	36	59*

TABLE 6

DETERMINANTS OF MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE, ECONOMIC VARIABLES

(Standardized Estimates)

	Independent Variables									Statistics		
Equation	GEDB	GDPB	PDA	POP	PBCB	GNPPER	ECNTA	PDB	DSEB	r^2	F	DF
ME81=	0.46	0.47	0.33									
	(4.88)	(3.97)	(2.84)							.704	30.91	42
	0.47	0.46	0.31	0.06								
	(4.87)	(3.79)	(2.54)	(0.55)						.706	22.85	42
	0.46	0.72	0.40		-0.37							
	(5.28)	(5.09)	(3.63)		(-2.78)					.754	29.13	42
	0.46	0.62	0.46		-0.33	0.18						
	(5.70)	(4.44)	(4.17)		(-2.57)	(2.35)				.789	27.00	41
	0.47	0.40	0.40			0.21						
	(5.13)	(3.83)	(3.46)			(2.58)				.750	27.84	41
	0.47	0.50	0.43				-0.13					
	(4.86)	(3.81)	(2.19)				(-0.61)			.706	22.90	42
	0.45	0.71	0.39		-0.50			0.67				
	(5.14)	(4.91)	(3.27)		(-1.52)			(0.41)		.755	22.83	42
	0.47	0.50	0.33						-0.17			
	(5.09)	(4.31)	(2.94)						(-2.0)	.732	25.29	41
	0.46	0.61	0.44		-0.45			0.13	-0.18			
	(5.56)	(4.27)	(3.86)		(-1.42)			(0.42)	(-2.29)	.790	22.01	41

NOTES: See text for definition of variables
( ) = t statistic
r^2 = correlation coefficient
F = F statistic
DF = degrees of freedom

TABLE 7

TOTAL MILITARY EXPENDITURES, TOTAL COUNTRY SAMPLE

Country	Actual	Predicted	Actual/ Predicted	Placement
1. Uganda	97	1739	.0558	Below
2. Rwanda	21	251	.0835	Below
3. Senegal	55	426	.1288	Below
4. Bolivia	196	1187	.1651	Below
5. Liberia	36	207	.1737	Below
6. Paraguay	78	425	.1832	Below
7. El Salvador	116	556	.2085	Below
8. Burma	204	812	.2510	Below
9. Trinidad	42	162	.2583	Below
10. Ghana	141	317	.4435	Below
11. Zimbab	419	795	.5270	Below
12. Dominican Rep.	104	183	.5657	Below
13. Uruguay	363	603	.6012	Below
14. Brazil	1837	2965	.6196	Below
15. Ecuador	296	453	.6528	Below
16. Kuwait	1254	1876	.6684	Below
17. Sudan	289	417	.6921	Below
18. Mexico	1196	1713	.6982	Below
19. Jordon	874	1213	.7205	Below
20. Tunisia	228	261	.8720	Below
21. Chile	1175	1331	.8828	Below
22. India	5151	5787	.8901	Below
23. Kenya	198	222	.8906	Below
24. Philippines	848	824	1.0291	
25. Tanzania	277	257	1.0748	Above
26. Syria	2437	2252	1.0821	Above
27. Thailand	1335	1089	1.2259	Above
28. Venezuela	1059	842	1.2565	Above
29. Spain	3655	2817	1.2975	Above
30. Israel	4374	3242	1.3492	Above
31. Korea	4157	2943	1.4125	Above
32. Car	14	9	1.5078	Above
33. Morocco	1080	698	1.5460	Above
34. Argentina	3186	1921	1.6585	Above
35. Indonesia	2867	1611	1.7796	Above
36. Peru	1026	569	1.8018	Above
37. Malaysia	1446	536	2.6941	Above

NOTES: Based on regresson equation:

ME81 = 0.46GEDB + 0.62GDP + 0.45PDA - 0.33PBCB + 0.19GNPPER
(5.70) (4.44) (4.17) (-2.57) (2.35)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

TABLE 8

DETERMINANTS OF MILITARY EXPENDITURES,
GROUP 1 COUNTRIES' ECONOMIC VARIABLES

(Standardized Estimates)

Equation	Independent Variables								Statistics		
	GEDB	PDB	GDP	PDA	POP	ECNIA	DSEB	GIRBY	r^2	F	DW
ME = 81	0.25	0.77									
	(2.99)	(8.29)							.862	77.78	27
	0.27	0.72	0.09								
	(3,16)	(7.58)	(1.14)						.868	52.92	27
	0.24	0.49	-0.07	0.54							
	(3.13)	(4.19)	(-0.77)	(3.14)					.909	44.36	27
	0.25	0.49		0.47	0.28						
	(3.34)	(4.22)		(3.25)	(2.90)				.907	56.92	27
	0.20	0.36			0.26	0.60					
	(2.96)	(3.01)			(3.29)	(4.14)			.922	68.44	27
	0.20	0.36		0.05	0.27	0.55					
	(2.88)	(2.96)		(0.22)	(3.00)	(2.09)			.923	52.15	27
	0.22	0.56			0.27	0.45	-0.19				
	(3.69)	(4.50)			(4.00)	(3.36)	(-3.01)		.945	72.91	26
	0.22	0.38			0.36	0.53		0.17			
	(3.43)	(3.36)			(4.15)	(3.83)		(2.17)	.936	64.55	27

NOTES: See text for definition of variables
( ) = t statistics
r^2 = correlation coefficient
F = F statistic
DF = degrees of freedom

TABLE 9

DETERMINANTS OF MILITARY EXPENDITURES, GROUP 2
COUNTRIES' ECONOMIC VARIABLES

(Standardized Estimates)

Equation	Independent Variables								Statistics		
	GEDB	GDPB	PDA	PDA	POP	PBCB	ECIBE	ECIB	r^2	F	DF
ME81 =	0.67 (2.85)	0.76 (3.21)							.507	6.18	14
	0.52 (2.57)	0.83 (2.90)	0.51 (2.38)	-0.61 (-2.41)					.736	6.98	14
	0.48 (3.70)	1.12 (5.61)	3.39 (4.49)	-1.90 (-5.13)	-2.48 (-3.88)				.901	16.45	14
	0.43 (3.95)	0.91 (4.93)	2.73 (4.05)	-1.44 (-4.04)	-1.86 (-3.17)	-0.25 (-2.35)			.941	21.55	14
	0.49 (4.71)	0.91 (5.04)	3.06 (4.96)	-1.46 (-4.24)	-2.18 (-4.12)		-0.29 (-2.44)		.944	22.32	14
	0.51 (6.06)	1.05 (6.67)	3.39 (6.54)	-2.49 (-4.77)	-2.38 (-5.49)		-0.26 (-2.72)	0.79 (2.31)	.968	30.40	14

NOTES: See text for definition of variables
( ) = t statistic
r^2 = correlation coefficient
F = F statistic
DF = degrees of freedom

TABLE 10

TOTAL MILITARY EXPENDITURES, GROUP 2 COUNTRIES

Country	Actual	Predicted	Actual/ Predicted	Placement
Rwanda	21	810	.2059	Below
Jordon	874	1695	.5156	Below
Brazil	1837	2367	.7760	Below
Syria	2437	2714	.8979	Below
India	5151	5266	.9782	
Venezuela	1059	1082	.9787	
Argentina	3186	3238	.9839	
Mexico	1196	1168	1.0289	
Spain	3655	3499	1.0445	
Korea	4157	3703	1.1226	Above
Kuwait	1254	1109	1.1307	Above
Indonesia	2867	2245	1.2771	Above
Philippines	848	632	1.3407	Above
Thailand	1335	901	1.4816	Above
Malaysia	1446	892	1.6196	Above

NOTES: Based on regression equation:

ME81 = 0.48GEDB + 1.12GDP - 1.90PDB + 3.39PDA - 2.49POP
(3.70) (5.61) (-5.13) (4.49) (-3.88)

Below = Countries whose Actual is less than 95% of Predicted value
Above = Countries whose Actual is greater than 105% of Predicted value

NOTES

1. A. Martin and W.A. Lewis, 'Patterns of Public Revenue and Expenditure', *Manchester School* (1956), pp.203–44.
2. Cf. Adolph Wagner, *Finanzwissenschaft, Part I* (Leipzig: C.F. Winter, 1887) and A. Wagner, *Finanzwissenschaft, Part II*, 2nd edition (Leipzig: C.F. Winter, 1890).
3. A. Peacock and Mack Wiseman, *The Growth of Public Expenditures in the United Kingdom* (National Bureau of Economic Research, Princeton University Press, 1961).
4. Walter Heller, United Nations Technical Assistance Administration, *Taxes and Fiscal Policy in Underdeveloped Countries* (New York: United Nations, 1954), p.6.
5. The World Bank data consists of the entire statistical supplement to its *World Development Report 1984* (New York: Oxford University Press, 1984), plus data for 1975 contained in its *World Development Report 1978* (New York: Oxford University Press, 1978).
6. The IMF data consists of government expenditures by type and is taken from the International Monetary Fund, *Government Finance Statistics Yearbook* (Washington: IMF, 1983).
7. Charles Taylor and David Jodice, *World Handbook of Political and Social Indicators, Third Edition, Volume I, Gross National Attributes and Rates* (New Haven: Yale University Press, 1983). The entire data base was put on-line for analysis.

8. U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers, 1975–82* (Washington, D.C.: ACDA, 1984).
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11. David Whynes, *The Economics of Third World Military Expenditure* (Austin: University of Texas Press, 1979).
12. Institute of International Strategic Studies, *The Military Balance* (London), various issues.
13. Alan Tait and Peter Heller, *International Comparisons of Government Expenditure* (Washington: International Monetary Fund, 1982).
14. Ibid., p.9.
15. See P.C. Frederiksen and R.E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries: Some Further Empirical Evidence', *Journal of Economic Development* (July 1982), pp.113–25; P.C. Frederiksen and R.E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries', *Armed Forces and Society* (Summer 1983) pp.633–45; P.C. Frederiksen and R.E. Looney, 'Another Look at Defense Spending and Economic Growth in Developing Countries', *Defense Analysis* (forthcoming 1985), and P.C. Frederiksen and R.E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries: A Reply', *Armed Forces and Society* (Winter 1985), pp.298–301.
16. P.C. Frederiksen and R.E. Looney, 'Defense Expenditures and Economic Growth in Developing Countries: Some Further Empirical Evidence', *op. cit.*, p.117.
17. Ibid.
18. Ibid., p.118.
19. Ibid.
20. Ibid.
21. Ibid., p.124.
22. Ibid.
23. Cf. SAS, *op. cit.*, for a description of this program. The sample countries were initially assigned an arbitrary one or zero so that placement could be made into two groups. A three-group division of countries did not produce a clear split between the means of the groups, i.e., there was not a high probability of correct placement for each country in one of the three groups.