The Influence of Arms Imports on Third World Debt

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The debt crisis facing many developing countries has attracted much attention in recent years. In large part, most of the analysis of Third World debt has focused on the methods used to finance the rapid rate of increase in external debt and the capacity of the developing countries to service the debt.[1] Few studies, however, have attempted to define the motives for debt accumulation, other than, for example, to point to the obvious need to finance current account deficits resulting from the oil price shocks.[2] An increasing suspicion among some analysts is that a large proportion of existing Third World debt was contracted for the purpose of financing stepped-up levels of military expenditure, in general, and arms imports, in particular. Analysts stressing the link between arms imports and Third World debt note that these two patterns represent more than just a coincidence. Further substantiation of the link between arms transfers and public external debt is found in the fact that arms purchases grew in importance during the 1970s as the two major arms donors switched their policy from one of gifts to one of sales.

Despite the rather logical assertion that considerable amounts of Third World indebtedness have stemmed from arms imports, little empirical testing of the link between arms imports and Third World debt has been done. Nor has there been any empirical work determining whether the link between arms imports and external debt is universal throughout the Third World, or rather is confined to a smaller subgroup of Third World countries.

The main purpose of the analysis that follows is to determine the role played by military expenditures in general and arms imports in particular in affecting the level of Third World debt. A secondary objective is to determine which groups of developing countries were most inclined to finance arms imports with increased external indebtedness.

Patterns of Arms Transfers and External Indebtedness

According to SIPRI, weapons imports by LDCs rose from approximately US$1.56 billion in 1965 to about $10.45 billion in 1980—all in constant 1975 prices. This trend also coincided with the rapid overall

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buildup of Third World debt. On the other hand, arms imports declined to approximately $9.55 billion in 1983 and $7.82 billion in 1984, a period characterized by increased reluctance on the part of international lenders to increase their Third World exposures.[3]

Brzoska provides the only attempt to calculate the extent and contribution of LDC debt attributable to the military.[4] According to his estimates, by the late 1970s, the net transfer of debt would be about 20 to 30 percent less if debt-financed weapons imports had been absent.

Weapons purchased with scarce foreign exchange have an obvious allocation cost in terms of reduced resources available for the import of intermediate and investment goods essential for self-sustaining growth. It is, of course, true that a reduction in military imports would not necessarily imply an equivalent increase in investment, for some leakage in terms of consumption or other imports could occur. There can be little doubt, however, that lower defense imports would improve the situation in terms of foreign exchange scarcity.[5]

Clearly, whether or not Third World countries have reduced their borrowing proportionally to the amount spent on arms imports is quite conjectural. In fact, Sjaastad[6] has convincingly shown that, given the generally negative rates of interest prevailing throughout most of the 1970s, Third World countries had an incentive to borrow as much as banks were willing to lend:

> The great build-up of private international lending that occurred during the 1970s and early 1980s and was closely related to, if not a consequence of, the oil price increases produced a virtual explosion of liquidity in the international commercial banks. Perhaps because of unanticipated inflation, and in part due to the OPEC surpluses following the oil price increases of 1973–74, real rates of interest on dollar-denominated external debt were very low and, indeed, they were frequently negative, giving the developing countries a rather strong incentive to incur that debt. When real rates of interest are negative (and expected to remain so) it is clearly impossible to have "too much" external debt.[7]

While Brzoska has, therefore, made a convincing argument as to the potential reduction in Third World debt that a moratorium on arms transfers could have produced, it is by no means obvious that Third World debt would have been lower in the absence of arms imports.

The Economic Environment

As a first step in the analysis of Third World debt, countries were split into two groups based on their relative foreign exchange positions. There is a growing body of literature suggesting that a number of governmental budgetary patterns reflect the relative degree of foreign exchange scarcity faced by policymakers. Here foreign exchange scarcity is seen as a multidimensional factor, not easily characterized by one simple index such as a country's holdings of international reserves.[8] Research on the impact of military expenditures on growth has indicated that general groupings of countries on the basis of their overall degree of resource scarcity can be useful in identifying contrasting governmental expenditure patterns in the Third World.[9]

Presumably, all things being equal, those countries having either more domestic resources (savings and investment) or greater access to foreign

those countries with a lower level of domestic resources or less access to international capital will not have as high a level of arms imports.

Using factor analysis on a large group of World Bank variables depicting government debt, export and import patterns, and capital flows,[10] the main trends in the data were identified and a discriminant analysis was then performed using as variables those with the highest loading on each of the individual factors.[11] The orthogonal rotation assures 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 on the basis of relative foreign exchange scarcity were as follows:

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 percentage of gross domestic product (GDP), 1982
5. Growth in imports, 1970–82
6. External debt service as a percentage of GDP, 1982
7. Public external debt as a percentage of GDP, 1970

The results of the discriminant analysis (see 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. The 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.[12] Group I countries, which are heavily weighted with African and poorer Latin American countries, in general seem to be the more impoverished, less economically dynamic nations.

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

1. The 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 averaged nearly 4.5 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, averaging nearly twice as much as Group II countries in both 1970 and 1982, and the Group I debt service ratio to exports is correspondingly higher;
5. The rate of growth of imports was nearly 10 times higher over the 1970–82 period for Group II countries.

In terms of other indices, the Group II countries are considerably larger, more affluent (in terms of per capita income), and less reliant on

TABLE 1
GROUPINGS OF THIRD WORLD COUNTRIES ON THE BASIS OF RESOURCE CONSTRAINTS

GROUP I		GROUP II	
Country	Probability of Correct Placement	Country	Probability of Correct Placement
Israel	69.3	Greece	57.8
Honduras	83.5	India	84.9
Cameroon	60.7	Nigeria	89.3
Sudan	66.5	Indonesia	90.6
Costa Rica	92.6	Egypt	68.2
Bolivia	86.3	Korea	89.9
Somalia	86.5	Rwanda	69.1
Tunisia	68.3	Turkey	66.9
Morocco	73.1	Spain	51.9
Guatemala	54.9	Venezuela	80.3
Malawi	91.4	Mexico	99.7
El Salvador	65.9	Brazil	99.0
Mali	97.1	Algeria	76.4
Pakistan	86.9	Philippines	55.8
Paraguay	60.0	Libya	75.7
Ecuador	56.6	Colombia	54.6
Dominican Rep.	74.1	Thailand	60.9
Liberia	94.8	Malayasia	65.1
Ivory Coast	84.4	Argentina	66.1
Mauritania	96.0	Saudi Arabia	94.7
Sierra Leone	86.1	Kuwait	81.3
Panama	94.4	Syria	63.9
Chile	70.1	Jordan	50.8
Chad	87.2		
Uruguay	67.9		
Tanzania	79.9		
Uganda	88.8		
Ethiopia	70.2		
CAR	76.9		
Ghana	78.7		
Burma	82.9		
Sri Lanka	75.4		
Jamaica	90.7		
Trinidad	77.6		
Zambia	95.9		
Peru	71.7		
Zimbabwe	85.7		
Kenya	86.6		

large amounts on military activities, but not necessarily a significantly greater amount of their overall budgets. Given fewer constraints, the Group II countries should have a relatively easier time in attaining some optimal balance between arms imports, total military expenditures, and the level of personnel (armed forces).

A Model of Military Expenditures, Arms Exports, and External Public Debt

Using the groupings of countries previously outlined, the three-equation model presented later attempts to extend Brzoska's analysis by focusing on the interrelationship between military expenditures, arms imports, and

residents, repayable in foreign currency, and having a maturity of over one year).[13]

Determinants of External Public Debt. In selecting variables responsible for the volume of public external debt, it is reasonable as a first step to assume that country size will have a direct relationship to both the amount of external indebtedness and the individual country's capacity to service this debt.

Clearly, a large country as measured by gross national product (GNP) will, *ceteris paribus*, have more financial and commercial relations with the rest of the world economy and, therefore, will be more likely to accumulate a larger debt volume than a small country. At the same time, due to the diversity of output and resource base, the debt-servicing capacity of a large country is apt to be greater than that of a small country (and, consequently, a larger external debt can be accumulated). In general, we postulate that the larger the LDC economy as measured by its GNP, the greater its demand for external indebtedness.

Second, a country's external debt should, in general, be related to its general volume of merchandise imports. For LDCs, the volume of merchandise imports often tends to have a direct relationship to the country's GNP, thus providing an additional source of demand for debt. Since in a growing economy a share of imports will have to be financed, a country's indebtedness will be higher as total imports increase.

Third, an LDC with a greater export volume will be able to service a larger amount of foreign debt. As is well known, export volume is often used by lending institutions as a key indicator of debt-service capacity. For practical purposes, it is safe to assume that a lender's willingness to supply debt varies directly with a country's exports. This relationship is particularly important as it relates directly to the export financing of the country. For most developing countries, export financing is done in foreign currency since most of the exports are denominated in foreign currency as well. In short, we would expect a positive relationship between country debt and volume of merchandise exports.

Fourth, international reserve holdings may be another important factor in affecting the volume of a country's external debt. Here the relationship is likely to be more complex. Logically, as a country's reserves increase, its ability to service a growing external debt and, hence, its creditworthiness should also increase. On the other hand, all else being equal, one might expect that the larger a country's external revenues, the less pressing the need for additional debt to finance imports. Therefore, possession of a large volume of international reserves may result in a larger or smaller volume of external debt.

Finally, three types of governmental expenditures—military, health, and education—are introduced as independent variables in the demand for external debt, i.e., for political or social reasons these expenditures have a high import component and, therefore, may be major elements in accounting for the volume of external public debt over and above the other demand variables noted earlier.[14]

Clearly, because of the high correlation between the independent variables previously defined, it is not possible to determine through regres-

military expenditures. Given this constraint, the following analysis attempts to answer the question of whether military expenditures (after controlling for GDP, imports, reserves, etc.) have significantly contributed to LDC external indebtedness and, if so, what type of environments have been most conducive to external borrowing for the purpose of increasing military expenditures.

The next step in the analysis is to isolate the main supply and demand influences on Third World indebtedness by deriving an equation that is capable of measuring the influence of all independent variables simultaneously.

In the specification, gross national product (*GNP*), the principal demand variable, is followed by total imports (*TI*) and the individual public sector expenditures—military expenditures (*ME*), health (*H*), and education (*E*).[15]

On the supply side, the main variables are foreign reserves (*GIRB*) and total exports (*TE*). Notationally:

a) Total debt (*PDB*) supply = $f1$ (reserves), and
b) Total debt (*PDB*) demand = $f2$ (GNP, imports, military expenditures, education expenditures, health expenditures)
c) Total debt (supply) = total debt (demand) and, dividing equations (*a*) and (*b*) by the equilibrium level of total debt as specified in equation (*c*), we obtain equation (*d*)
d) $f1$ (total debt) = $f2$ (total debt); expressing equation (*d*), we can write
e) $x1$ [$f1$ (total debt), $f2$ (total debt)] = 0 or
f) $x2$ (total debt, GDP, imports, reserves, military expenditures, educational expenditures, health expenditures, imports) = 0, or:
g) Public External Debt (*PDB*)

$$PDB = [GNP\,(+),\ TI\,(+),\ GIRB\,(-c,\ ?uc),\ ME\,(+c,\ ?uc),\ H\,(?),\ E\,(?)] \qquad (1)$$

where c = constrained and
uc = unconstrained

Factors Affecting Arms Imports. Logically, arms imports should be related to the overall ability of the country to purchase weapons. This effective demand for weapons can be proxied by either military expenditures (*ME*) or the general level of central government expenditures (*GEC*). The composition of military forces as between equipment and troops (*AF*) together with the ability to substitute one for the other will also condition the incentive to import additional weapons—especially during times of severe foreign exchange scarcity.

To test the hypothesis that the constrained (Group I) countries financed a large proportion of their military expenditures with public external indebtedness, we hypothesize that for the constrained countries public external debt (*PDB*) would have a positive sign when regressed on arms imports, while unconstrained countries, given alternative sources of funding, should not experience a particularly strong link between arms imports and public external debt.

Several other structural factors were also considered significant in affecting arms imports. Everything else equal, whether or not the country

arms imports. For purposes of analysis producer and nonproducer countries were classified according to Neuman's definition of arms producers as countries capable of producing at least one major weapon system.[16] Arms producers should have higher levels of technical and industrial capabilities relative to those countries lacking an indigenous arms industry. Furthermore, the linkages between military expenditures and the economy, together with the import component of military equipment associated with a given level of military expenditures, should be considerably different for arms and nonarms producers. In general, we would imagine the nonarms producers to be much more reliant on imports of military equipment to meet a given level of defense expenditures and, furthermore, given the high cost of sophisticated imported weaponry, we would expect a high proportion of it (everything else equal) to be financed by external debt. Given their relative flexibility to expand weapons production, countries that are both arms producers and resource unconstrained should experience over time the greatest reduction in arms imports. Finally, to the extent that Third World countries produce their own weapons systems, we would expect a looser relationship to exist between arms imports and overall public external indebtedness; that is, equipment can be obtained from local sources in addition to imports, with added domestic inputs occurring when the country's creditworthiness might be placed in jeopardy by additional external borrowing to finance arms acquisitions.

Since data on the actual value of arms output in Third World countries is not available, the affect of arms production on arms imports was estimated by creating a dummy variable (*PRODUCE*) with values of 0 for the countries not having an indigenous arms industry and 1 for those possessing such an industry. The expected sign of this variable is negative in the regression equation, that is, everything else equal, indigenous arms production should reduce the need for imported arms.

Political/security factors were introduced by utilizing Rothstein's classification of countries based on political/security and resource-constraint considerations.[17] Those countries having a high level of internal and/or external threat combined with a low level of governmental legitimacy and effectiveness were assigned a value of 1 (*CONFLICT* = 1) and those having a high level of governmental legitimacy and facing relatively low internal and/or external threats were assigned a value of 0 (*CONFLICT* = 0). Rothstein has shown that countries with a high level of conflict tend to spend a much higher proportion of their budgets on defense. Clearly, everything else being equal, we would expect the high-threat countries to import more arms than their low-threat counterparts.[18] In sum, the "need" for weapons (*CONFLICT*), together with the ability to purchase and/or substitute local resources, will determine the general range of arms imports.

Arms Imports (*AI*)

$$AI = [ME\,(+),\ PDB\,(+c,\ ?uc),\ PRODUCE\,(?uc,\ +c),\ AF\,(-c,\ ?uc),\ CONFLICT\,(+)] \qquad (2)$$

where c = resource-constrained countries and
uc = resource-unconstrained countries

are assumed to be largely a function of the level of armed forces personnel (*AF*), the overall size of the economy (*GNP*), and the ability of countries to finance added expenditures in the short run (proxied by the level of gross international reserves—*GIRB*). Since military expenditures have a high priority in most countries, we would expect some relationship between past external debt and levels of allocation to the military. This pattern is likely to be more pronounced in the resource-constrained countries given their lack of alternative financing.

In the short run some increases in military expenditures can be financed from government deficits (*GDB*—revenues minus expenditures). Again, for reasons noted earlier the resource-constrained countries are more likely to be forced to resort to this type of financing for increased levels of defense expenditures:

Military Expenditures (*ME*)

$$ME = [AF\,(+),\ GNP\,(+),\ GIRB\,(+),\ PDBL\,(+c,\ ?,\ uc),\ GDB\,(-c,\ ?uc)] \tag{3}$$

Results

The regression coefficients[19] are in standardized form to facilitate a direct comparison of the relative strength of each variable.[20] The two-stage least squares estimates with standardized coefficients are as follows:

Public External Debt (*PDB*)

Total sample

$$PDB = \underset{(3.41)}{0.64\,GNP} + \underset{(5.54)}{0.54\,TI} - \underset{(-2.60)}{0.20\,GIRB} - \underset{(-0.65)}{0.04\,ME} - \underset{(-0.35)}{0.08\,E} + \underset{(1.07)}{0.11\,H} \tag{4}$$

$r^2 = 0.947$; $F = 77.9$

Resource-constrained countries

$$\text{(4a)}\ PDB = \underset{(1.16)}{0.07\,GNP} + \underset{(2.63)}{0.48\,TI} - \underset{(-1.31)}{0.12\,GIRB} + \underset{(3.64)}{0.40\,ME} + \underset{(4.58)}{0.67\,E} - \underset{(-4.48)}{0.61\,H}$$

$r^2 = 0.968$; $F = 76.0$

Resource-unconstrained countries

$$\text{(4b)}\ PDB = \underset{(6.58)}{1.04\,GNP} + \underset{(7.75)}{0.44\,TI} - \underset{(-0.24)}{0.01\,GIRB} - \underset{(-2.94)}{0.14\,ME} - \underset{(-2.25)}{0.41\,E} + \underset{(0.22)}{0.02\,H}$$

$r^2 = 0.993$; $F = 99.4$

Arms Imports (*AI*)

Total sample

$$AI = \underset{(-1.47)}{-0.24\,PRODUCE} + \underset{(5.11)}{1.12\,ME} - \underset{(-1.33)}{0.19\,PDB} - \underset{(-0.95)}{0.19\,AF} - \underset{(-1.24)}{0.5\,CONFLICT} \tag{5}$$

$r^2 = 0.648$; $F = 9.92$

Resource-constrained countries

$$\text{(5a)}\ AI = \underset{(-2.06)}{-0.05\,PRODUCE} + \underset{(15.69)}{0.81\,ME} + \underset{(6.31)}{0.35\,PDB} - \underset{(-6.34)}{0.21\,AF} + \underset{(0.61)}{0.01\,CONFLICT}$$

$r^2 = 0.993$; $F = 426.8$

Resource-unconstrained countries

$$\text{(5b)}\ AI = -0.76\,PRODUCE + 0.44\,ME - 0.28\,PDB + 0.25\,AF - 0.21\,CONFLICT$$

Total Military Expenditures (*ME*)

Total sample

$$ME = \underset{(1.73)}{0.47\,PDBL} + \underset{(2.87)}{0.34\,GIRB} + \underset{(6.59)}{0.70\,AF} - \underset{(-2.64)}{0.23\,GNP} - \underset{(-1.92)}{0.53\,GDB} \tag{6}$$

$r^2 = 0.801$; $F = 21.7$

Resource-constrained countries

$$\text{(6a)}\ ME = \underset{(2.93)}{0.53\,PDBL} + \underset{(3.76)}{0.42\,GIRB} + \underset{(1.01)}{0.19\,AF} - \underset{(-0.59)}{0.07\,GNP} - \underset{(-2.25)}{0.26\,GDB}$$

$r^2 = 0.912$; $F = 33.9$

Resource-unconstrained countries

$$\text{(6b)}\ ME = \underset{(0.01)}{0.01\,PDBL} + \underset{(0.17)}{0.04\,GIRB} + \underset{(3.53)}{0.89\,AF} - \underset{(-0.13)}{0.11\,GNP} - \underset{(-0.33)}{0.09\,GDB}$$

$r^2 = 0.735$; $F = 2.8$

Interpretation of the Results

The results show several interesting patterns. We note the following in particular:

1. The regression results for the sample as a whole indicate, as expected, the relative importance of gross national product, imports, and international reserves. The negative sign on international reserves (*GIRB*) indicates that countries with high reserves tend to receive less external funds. This suggests that a country in a relatively comfortable financial position, as evidenced by high reserve holdings, is less likely to have to incur external indebtedness.
2. On the other hand, military expenditures (*ME*), education (*E*), and health expenditures (*H*) all appear to have had an insignificant impact on Third World debt.
3. The results change dramatically when resource-constrained and -unconstrained countries are examined as subgroupings. Here military expenditures have been a factor in contributing to the overall debt position of the constrained countries, but not the unconstrained.
4. Both constrained and unconstrained countries were, *ceteris paribus*, able to reduce their overall level of arms imports through the indigenous production of arms, but perhaps because of their relative access to foreign exchange, the unconstrained countries were able to expand domestic production to a greater extent, thus replacing a larger volume of imports.
5. The high statistical significance and negative sign for armed forces in the resource-constrained countries (but not in the unconstrained countries—5a vs. 5b) suggests that foreign exchange shortage has forced large groups of countries to substitute personnel for imported equipment.
6. As might be anticipated, unconstrained countries are more able to reach an optimal mix between armed forces and total military expenditures (as evidenced by the positive statistical significance of *AF* in equation 6b, but not in 6a).

Conclusions

debt. In general, the results presented above indicate that the answer is no, but that for certain LDCs it is likely that a high percentage of the external public debt accumulated by 1982 was the result of expanded arms imports in the 1970s and early 1980s.

What is the best characterization of LDCs that have relied on public external indebtedness to finance arms imports? Based on the regression results, it appears that the resource-constrained LDCs best characterize Third World countries whose external public debt has been used in large part to fund increased military spending. This fact, together with the generally "unproductive" nature of military expenditures, makes it unlikely that this group of countries as a whole will be in a position to significantly expand military expenditures. At best, this group of countries will be lucky to be able to service their existing public debt.

Finally, it appears likely that arms imports will not soon again reach levels attained in the late 1970s. This situation will result not so much from a general spirit of restraint on the part of suppliers and recipients, but more from a lack of foreign exchange on the part of many of the Third World countries, and the development of indigenous production capabilities on the part of others.

NOTES

[1]See, for example, Bahram Nowzad and Richard C. Williams, *External Indebtedness of Developing Countries*, Occasional Paper no. 3 (Washington, DC: International Monetary Fund, May 1981); E. Brau and R. C. Williams, *Recent Multilateral Debt Restructuring with Official and Bank Creditors*, Occasional Paper no. 25 (Washington, DC: International Monetary Fund, December 1983); and K. Burke Dillon et al., *Recent Developments in External Debt Restructuring*, Occasional Paper no. 40 (Washington, DC: International Monetary Fund, October 1985).

[2]A notable exception is H. Robert Heller and Emmanuel Frenkel, "Determinants of LDC Indebtedness," *Columbia Journal of World Business* 17 (Spring 1982): 28–34.

[3]Figures are from *World Armaments and Disarmament SIPRI Yearbook* (Philadelphia, PA: Taylor and Frances, various issues).

[4]Michael Brzoska, "The Military-related External Debt of Third World Countries," *Journal of Peace Research* 20 (1983): 271–77.

[5]Saadet Deger and Ron Smith, "Military Expenditure and Development: The Economic Linkages," *IDA Bulletin* 16 (October 1985): 52.

[6]Larry Sjaastad, "International Debt Quagmire: To Whom Do We Owe It?" *The World Economy* 6 (September 1983): 305–24.

[7]Ibid., pp. 308–9.

[8]Robert E. Looney and Peter C. Frederiksen, "Defense Expenditures, External Public Debt, and Growth in Developing Countries," *Journal of Peace Research* 23 (December 1986); Robert E. Looney, "Impact of Military Expenditures on Third World Debt," *Canadian Journal of Development Studies* 8 (1987).

[9]See Peter C. Frederiksen and Robert E. Looney, "Defense Expenditures and Economic Growth in Developing Countries: Some Further Empirical Evidence," *Journal of Economic Development* 7 (July 1982): 113–25; idem, "Defense Expenditures and Economic Growth in Developing Countries," *Armed Forces and Society* 9 (Summer 1983): Economic Growth in Developing Countries: A Reply," *Armed Forces and Society* 11 (Winter 1985): 298–301; and Robert E. Looney and Peter C. Frederiksen, "Defense Expenditures, External Public Debt, and Growth in Developing Countries," *Journal of Peace Research* 23 (December 1986): 329–32.

[10]Data were taken from the World Bank, *World Development Report* (Washington, DC: World Bank, various issues).

[11]Cf. *SAS, User's Guide: Statistics* (Cary, NC: SAS Institute, 1982).

[12]In the regression analysis that follows, several Group I combinations were tested to determine if their exclusion significantly changed the results. In one set of runs Saudi Arabia and Kuwait (unusually rich oil exporters) as well as Egypt, Spain, and South Korea (U.S.-aid beneficiaries) were left out. Their exclusion did not significantly alter the results reported. In another run Israel was omitted from the Group I countries. Again no appreciable variation occurred.

[13]Data for both arms imports and total military expenditures are taken from United States, Arms Control and Disarmament Agency (ACDA), *World Military Expenditures and Arms Transfers* (Washington, DC: ACDA, various issues). This data is considered by most experts as the most accurate available in the open-source literature. There may be a systematic bias in the figures, however, as ACDA data is in large part compiled from data supplied by other United States government agencies, especially the Central Intelligence Agency (CIA) and the Defense Intelligence Agency (DIA). To the extent that the CIA and DIA concentrate on the larger "more important" countries from the perspective of U.S. security, underreporting of smaller "less important" countries undoubtedly occurs. Since our Group I countries are somewhat smaller on average than Group II countries, the figures used here may underestimate their total military expenditures and arms imports. Given the nature of the results reported for Group I countries, however, underreporting if it occurs would not fundamentally change the conclusions drawn from the regression analysis. The model is based on that developed by Heller and Frenkel, "Determinants of LDC Indebtedness."

[14]Government expenditures are taken from Ruth Sivard, *World Military and Social Expenditures, 1983* (Washington, DC: World Priorities, 1983).

[15]Cf. Heller and Frenkel, "Determinants of LDC Indebtedness."

[16]Stephanie Neuman, "International Stratification and Third World Military Industries," *International Organization* 38 (Winter 1984): 167–97.

[17]Cf. Robert Rothstein, "The 'Security Dilemma' and the 'Poverty Trap' in the Third World," *Jerusalem Journal of International Relations* 8 (December 1986): 1–38; and Robert L. Rothstein, "National Security, Domestic Resource Constraints, and Elite Choices in the Third World," in *Defense, Security, and Development*, ed. Saadet Deger and Robert West (London: Frances Pinter, 1987), pp. 140–58.

[18]For a listing of the countries in table 1 by group see the Rothstein references, n. 17.

[19]Where: *PRODUCE* = arms producer (1), nonproducer (0); *GIRB* = gross international reserves 1981; *GNP* = gross national product, 1981; *GDB* = government deficit, 1981; conflict = conflict states (1), nonconflict states (0); *AF* = armed forces, 1981; *PDB* = public external debt, 1981; *PDBL* = public external debt, 1980; *AI* = arms imports, 1981; *H* = health expenditures, 1981; *E* = education expenditures, 1981; *TI* = total imports, 1981; *ME* = military expenditures, 1981.

[20]Analysis is for the year 1981. This period roughly coincides with the classification schemes of Neuman and Rothstein. This period was also selected because it came at the end of a decade of rapidly increased Third World borrowing in external markets. It is clear that external financial markets changed fundamentally after the *de facto* Mexican default in 1982. Also 1981 marks the end of the worldwide boom in exports and imports. It is too early for the post-1982 events to be incorporated systematically into analysis of the type attempted here. The results obtained in this paper, however, are suggestive of a number