Robert E. Looney

4

The Impact of Arms Imports and Economic Environments on Third World Debt

As is well known, the recycling of the flood of petro dollars that followed the 1973 increases in oil prices resulted in large amounts of money being lent by Western banking syndicates to the Third World in anticipation of relatively high rates of return. In retrospect, it is clear that while some of the money was used to finance development projects that presumably would generate sufficient income to repay the loans, much of it was used for increased consumption and capital flight. There is also the suspicion among many observers that a considerable amount of this funding was used to finance arms imports (Tullberg, 1986: 261).

Support for this position is largely based on two similar trends that developed in the 1970s and early 1980s. More specifically, government and government-guaranteed debts of the nonoil developing countries grew from U.S. $130 billion in 1973 to U.S. $729 billion in 1984, accounting for 85 percent of the external debts of developing countries. The value of arms transferred to nonoil developing countries more than doubled in real terms between 1972 and 1982; the share of total world arms transfers increased from 31 percent to 41 percent in the same period (Tullberg, 1986: 262). Analysts stressing the link between arms imports and Third World debt note that the existence of these two patterns are 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 (the U.S. and the Soviet Union) switched their policy from one of gifts to one of sales (Tullberg, 1986: 262).

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 the Third World's debt has been done. Nor has there been any empirical work to determine whether the link between arms imports and external debt is universal throughout the Third World or is confined to a smaller subgroup of Third World countries. The purpose of this chapter is to develop a simple model of Third World debt and use it to examine the issues raised above.

METHODOLOGY

Brzoska (1983) provides what is to date the only attempt to estimate the extent to which arms imports have been responsible for the acceleration in Third World debt (see related works: Terhal, 1982; Alexander, et al., 1981). His estimates are, however, indirect, using an opportunity cost assessment of the impact on Third World debt created by arms imports. Brzoska estimates that had the Third World countries that were importing debt capital in 1979 not also imported arms in 1979, the net transfers of debt could have been anywhere from 20 to 30 percent lower. The opportunity cost burden of accumulated debt over time is estimated by Brzoska to be about 20 percent of the total Third World debt for 1979. For 1979, the interest in amortization of the old debt added up to more than twice the cost of new-weapons imports for credit-importing countries, according to Brzoska's estimates.

Weapons purchased with scarce foreign exchange have an obvious allocation cost in terms of reduced resources available for the import of intermediate imports and investment goods essential for self-sustaining growth.

Clearly, however, whether or not Third World countries have reduced their borrowing proportionally to the amount spent on arms imports is quite conjectural. In fact, Sjaastad (1983) 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, which 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 and 1974, real rates of interest on dollar-dominated external debt were very low. In fact, such rates 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.

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

What follows is an attempt to extend Brzoska's analysis by examining the more direct linkages between arms imports and Third World debt. For this purpose, a formal model indicating the equilibrium level of external debt has been developed.[1] This equilibrium level is solved for by a "reduced form" equation derived from a set of relationships that account for the major supply-and-demand determinants of external debt.

MODEL FORMULATION

The sample used in this analysis consisted of seventy-seven developing countries for which the requisite data could be obtained.[2] External debt is defined as public external debt owed to nonresidents, repayable in foreign currency and having a maturity of more than one year.

In selecting variables responsible for the volume of public external debt accumulated by 1982, it is reasonable to assume that a country's size will have a direct relationship to the amount of external indebtedness and the individual country's capacity to service this debt. Clearly, a large country (as measured by GNP) will 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 smaller country. At the same time, due to the diversity of output and the 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 (less developed country) economy, as measured by a country's GNP, the greater its demand for external indebtedness.

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.

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 the willingness of lenders to supply debt varies directly with a country's exports. This relationship is particularly important as it relates directly to the country's export financing. 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 the volume of merchandise exports.

An LDC's overall current account deficit (or surplus) provides the most direct impact on external debt, since obviously the size of the deficit is made possible by external financing. Clearly, the larger the current account deficit, the larger the overall external public debt.

International reserve holdings may be another important factor that affects 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, everything 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 larger volume of international reserves may result in larger or smaller volumes of external debt.

Three types of governmental expenditures[3]—arms imports, health, and education—are introduced as independent variables in the demand for external debt. 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 above.

Clearly, because of the high correlation between the independent variables defined above, it is not possible to determine through regression analysis the percent of LDC public external debt stemming from military expenditures. Given this constraint, the analysis below attempts to answer the question of whether military expenditures (after controlling for GDP, imports, and reserves) 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 a reduced form equation that is capable of measuring the influence of all independent variables simultaneously.

In the specification here, the GNP was assumed to be the most significant factor affecting the demand for external debt (see Heller and Frankel, 1982). This was followed in relative importance by total imports (TI); the current account balance (BI); and the individual public sector expenditures, comprised of arms imports (AI), health (SH), and education (SE).

The main variables assumed to affect the supply of external loans were those reflective of the borrowing country's ability to service debt. Gross International Reserves (GIRB) and exports (TE) were assumed to be the indicators most international lenders considered as indicative of a country's borrowing capacity. Notationally:

a) Total debt (PDB) supply = f1 (reserves, exports), and
b) Total debt (PDB) demand = f2 (GNP, imports, current account balance, military expenditures, education expenditures, and health expenditures)
c) Total debt (supply) = total debt (demand)

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), or, expressing equation (d) implicitly, 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, exports, current account balance, and imports) = 0, or
g) PDB = f3 {GNP(+), TI (+), GIRB (-), AI (+), SE (+), SH (+), TE(+), BI (+)] = 0

This reduced form equation (g) with expected signs was used for the estimations performed below.

FINDINGS

Total Sample

As expected, the regression results[4] indicate (see Table 4.1) the relative importance of gross national product and international reserves in affecting the level of Third World debt. These two variables have the expected sign and account for slightly over 70 percent of the observed level of debt (Equation 1, Table 4.1). 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 incur external indebtedness.

On the other hand, imports (TI), the balance of payments deficit

(BI), and arms imports (AI), all appear to have had an insignificant impact on Third World debt.

Analysis of Subgroupings

To test the general validity of this conclusion, our sample of developing countries was divided into two subgroupings through factor and discriminant analysis.

Several studies (Frederiksen and Looney, 1982, 1983, 1985a, 1985b; Looney and Frederiksen, 1986a) have indicated that developing countries lack homogeneity with regard to resource availabilities (largely savings and foreign exchange). In turn, the relative degree of resource availability affects the impact that defense expenditures have on economic growth—positive in countries with relatively abundant resources, and negative in those countries experiencing relative scarcities.

In light of 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 that have either more domestic resources (savings and investment) or more access to foreign capital (everything else being equal, such as gross national product) will be able to support a higher level of defense expenditures. On the other hand, those countries having a lower level of domestic resources or less access to international capital will not have as high a level of defense expenditures (everything else being equal).

Given the necessity to separate our sample of countries into subgroupings, the question remains as to the best operational method to accomplish this task. Frederiksen's and Looney's analysis, summarized above, indicated that a fruitful method of dividing countries for an analysis of arms imports is on the basis of their relative resource constraints.

A number of variables reflect relative resource scarcity in developing countries. These include measures of savings, investment, capital flow, debt servicing, exports, and imports. The statistical problem is that many of these measures are highly correlated with each other and, as such, are redundant in providing information as to resource scarcity.

One solution to this problem is to simply pick several variables—savings and exports, for example—and create two groups of countries: one with high savings and exports (an unconstrained group) and the other with low savings and exports (the relatively constrained group). This procedure suffers from the fact that the selection of variables is somewhat arbitrary. More importantly, since some countries are likely to have low rates of savings and high exports, or vice versa, they thus

In order to make the following analysis as objective as possible, a large number of variables reflective of resource scarcity was selected as an initial data set. These independent variables were then factor-analyzed. The advantage of factor analysis is that by determining the common variance among the independent variables, the researcher can objectively reduce the number of variables to be retained for further analysis.

From a total of thirty-four variables, the factor analysis[5] produced seven major independent measures of resource scarcity. The variables most representative of each trend were:

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

The next step in creating subgroupings of countries based on their relative resource scarcity was to utilize the seven variables above as discriminating variables in a discriminant analysis.[6] Using these variables, the discriminant analysis split the countries into two groupings based on their relative attainment of each of the seven variables (i.e., the countries were profiled into two composite groups [Table 4.2] based on their relative resource abundance as reflected in the seven measures of scarcity).

In general, Group I countries seem to be the poorer, less economically dynamic nations, this group being heavily weighted with African and poorer Latin American countries. The Group II countries consist of several major oil exporters and several of the more dynamic newly industrialized nations, such as Mexico, Greece, India, Korea, Spain, Algeria, and Malaysia.

Further insight into the two groups can be gained by examining the means of the variables used in the discriminant analysis (Table 4.3):

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 averaged nearly 4.5 times as much for Group II countries than for Group I countries.
3. The level of international reserves is also much higher for Group II countries—nearly ten times as much as the average for Group

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 1970-1982 period for Group II countries.

In terms of profiles, therefore, 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 percentages of their overall budgets.

Given the contrasting economic environments between the two types of countries, it is logical to expect that the determinants of external debt varied considerably between the groups.

When analyzed separately, the constrained and unconstrained countries produce sharply differing pictures of the contributions of arms imports toward Third World debt (Table 4.4). For the constrained countries, GNP and GIRB account for slightly over 50 percent of the fluctuation in external debt. However, adding imports, or TI (Equation 3, Table 4.4), to the regression equation causes reserves sign to change from positive to negative. So strong are total imports in contributing to this group's debt that GNP becomes insignificant in the regression equation. A similar result is obtained by including BI, the balance of payments (exports-imports), to the regression equation.

Of importance for the present study is the high statistical significance of arms imports in contributing to the regression equation after controling for either imports (Equation 5, Table 4.4) or the balance of payments (Equation 6, Table 4.4).

Apparently, these countries are constrained in the sense that they rely on public external borrowing as a major source of foreign exchange. The low growth in imports for this group as a whole suggests that foreign exchange may be rationed to one extent or another with governments not able to rely on taxes from exports to fund the bulk of their expenditures. In this environment, increased public external debt may be the only way to maintain or increase arms imports available to the governments. The high statistical significance of imports in the debt regression is consistent with this interpretation, as is the low degree of significance of GNP in the regression equations.

Unconstrained countries, however, show no statistically significant relationship (Equation 11, Table 4.4) between arms imports and external public debt.

The positive sign on the balance of payments may indicate that, in general, this group of countries has not been reliant on public external debt for financing the bulk of their imports. (In fact, the fast rate of growth of their imports—9.5 percent per annum over the 1970-1982 period—may have been financed largely out of export earnings.) The relatively low debt-service ratios for this group of countries indicates that, in general, they are relatively resource unconstrained and that increased arms imports have in large part been funded out of expanded government revenues rather than external indebtedness.

To sum up, the use of public external indebtedness to finance arms imports does not appear to be universal among developing countries. In fact, it is possible that a large group of relatively debt-free (debt as a percent of GDP) resource unconstrained countries has contained military expenditures within the limits imposed by self-financing rather than risk jeopardizing overall creditworthiness.

On the other hand, the bulk of debt accumulated by the resource-constrained group of LDCs has stemmed from arms imports and, presumably, military expenditures. Apparently, the perceived need to expand defense expenditures by this group in regard to foreign exchange shortages has resulted in relatively high levels of external indebtedness, measured either as a percent of exports or imports for the group as a whole.

It should be stressed that these results were obtained by regression arms imports in 1981 on the total outstanding public external debt as of 1982. Clearly, the accumulated debt in 1982 would be only partially affected by whatever component was accrued to finance arms imports in the previous year.

Additional regressions were run, using the average level of military exports for the period 1972-1982 on the accumulated debt in 1982. The results of these regressions produced the same general picture as those presented above. These results are difficult to verify, however, since all the countries in the sample did not have observations for all the years under examination.

Another test of the hypothesis that public external borrowing has played a significant role in financing Third World arms imports for a large group of Third World countries involves examining the actual determinants of arms imports.

Logically, arms imports should be related to the overall level of military expenditures (ME) and/or the general level of central government expenditures (GEC). Whether a country is an arms producer[7] should affect arms imports. For example, one might expect Third World countries capable of producing at least one major weapons system to have a different level of technical and industrial capabilities than countries without 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. The ability of a Third World country to produce its own arms is dependent on the following components (Peleg, 1980):

1. Financial resources
2. Level of industrial development
3. Scientific and educational potential
4. Organizational and political abilities

Limited economic and financial resources explain, at least partially, the difficulties of Third World countries in developing an independent weapons industry. The development of an arms industry, especially a totally independent one, requires very large amounts of financial resources. These are often beyond the abilities of most Third World states. It is well known that even some of the advanced industrial nations (such as Great Britain and France) have been compelled to cancel military production plans due to financial difficulties.

In short, we might expect that countries with relatively abundant sources of foreign exchange and domestic savings capable of being appropriated by governments are likely to be the arms 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. Given the high cost of sophisticated imported arms, we would expect a high proportion of such expenditures to be financed by external debt (everything else being equal).

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 (i.e., 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 effect 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; everything else being equal, indigenous arms production should reduce the need for imported arms.

performance, external debt, and structural composition of arms and nonarms producers (Table 4.5), indicates that the arms producers can be characterized as possessing much higher levels of domestic savings, less export instability, superior export performance, higher external debt, but a much lower debt burden (as a percentage of GDP) and higher capital inflows than the nonarms-producing countries.

In fact, by using discriminant analysis, Looney and Frederiksen (1986b) indicated that a nearly perfect classification of Latin American arms producers and nonarms producers could be made using only debt and import/export indicators as discriminating variables. That study also demonstrated that military and size variables were not capable of discriminating between arms producers and nonarms producers. Interestingly enough, debt and external variables and their relative magnitudes were nearly identical to those used to discriminate between the constrained and unconstrained countries above, with producers in general profiling in a manner similar to constrained countries.

In short, we should expect a much closer link to exist between constrained countries and arms imports and military expenditures than that existing for the unconstrained countries.

Two control variables, arms imports in the previous year (AI80) and GNP, were also introduced into the regression equation. Each has an expected positive sign.

The external financing variables chosen to reflect the external debt associated with the financing of arms imports was the World Bank's figure on external borrowing commitments contracted in 1981. As its name indicates, this figure represents the new external debt contracted the same year that arms deliveries were made.

To summarize, arms imports (AI) are hypothesized to be a function of the following:

(AI) = f (ME(+), PBCB(+), PRODUCE(-), GEC(+), AI80(+), GNP(+))

All the variables except arms imports in 1980 (AI80) are for the year 1981. The results obtained (see Table 4.6) support the general picture discussed above. In particular:

1. Public borrowing commitments are positive and significant in affecting arms imports in the constrained countries, but not in the unconstrained countries.
2. Indigenous arms production appears to reduce arms imports in the constrained countries, with perhaps a similar (but marginal) effect in the unconstrained countries.
3. As anticipated, the link between military expenditures and arms imports is much stronger for the unconstrained group of

In general, therefore, it appears that a relatively large group of Third World countries has had a significant volume of arms imports financed by external credits, while a smaller but still significant group of Third World countries has, because of a relative abundance of foreign exchange earnings, managed to finance arms imports without a significant resort to increased external indebtedness.

Clearly, there are other subgroupings of developing countries that might just as logically have resorted to external financing of arms imports. A classification related to the constrained and unconstrained groups examined above would be the mineral-oil and nonmineral-oil exporters. Mineral-oil countries are classified as those LDCs having mineral and/or oil comprising at least 40 percent of their merchandise exports (see Nankani, 1979). Regressions with these subgroups (see Table 4.7) provided similar, though not statistically significant, results as those obtained above for the constrained and unconstrained groups.

Other possible subgroupings of developing countries include: (1) High income (over $1,000 per capita) and low income (under $1,000 per capita); (2) Those countries with military governments (Sivard, 1983), presumably more willing to borrow for increased arms imports; and (3) civilian regimes, presumably less willing to contract external debt for arms imports. None of these subgroupings revealed statistically significant results (Table 4.7).

CONCLUSIONS

The main question posed at the beginning of this chapter was whether or not arms imports have contributed to Third World public external debt. In general, the results presented above indicate that the answer is no; however, 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 general "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, these countries will be lucky to be able to service their existing public debt.

NOTES

1. The model is based on that developed by Heller and Frenkel (1982).
2. Economic and debt variables were taken from the World Bank (1984a). Military expenditure data was taken from the U.S. Arms Control and Disarmament Agency (1984).
3. Government expenditures are taken from Sivard (1983).
4. As can be inferred from the degrees of freedom, the results reported here are for smaller samples of countries than previously reported due to the elimination of countries with missing values.
5. The complete results of the factor analysis can be obtained from the author upon request.
6. See SAS Institute (1982) for a description of the program. The sample countries were initially assigned an arbitrary 1 or 0 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 these groups.
7. For purposes of classification, military producers are defined as those countries currently producing at least one major weapons system (Neuman, 1984).