LDC's FOREIGN BORROWING AND DEFAULT RISK: AN EMPIRICAL INVESTIGATION 1976-1980

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Working Paper #323
(January 1983)
Second Draft: June 1983
Revised: December 1983

This is a revised version of the NBER's Working Paper No. 1172, July 1983.

Edwards, Sebastian

"LDCs Foreign Borrowing and Default Risk: An Empirical Investigation, 1976-1980," 441.

Abstract

This paper investigates to what extent the international financial community has taken into account the risk characteristics of borrowing less developed countries when granting loans. Specifically, this study analyzes the determinants of the spread between the interst rate charged to a particular country and the London Interbank Borrowing Rate (LIBOR). The empirical analysis uses data on 727 public and publically guaranteed Eurodollar loans granted to 19 LDCs between 1976 and 1980. The results obtained show that lenders in Eurocredit markets have tended to take into account some of the risk characteristics of borrowers. One of the most interesting results obtained is the robust and significant positive relation (with a coefficient of approximately 0.6) between the log of the spread and the debt-output ratio . This relationship suggests that there are externalities in the process of LDCs borrowing. These externalities could be dealt with by imposing our optimal external borrowing tax.

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The recent foreign debt crisis faced by some less developed countries (LDC's) — i.e., Mexico, Brazil, Argentina — has generated concern among economists, bankers and politicians. In particular, the ability of the international banks to distinguish between "good" and "bad" risks has been questioned. It has even been suggested that the inability to restrict credit to countries with low "credit worthiness" has resulted in the overextension of some major banks and that, as a consequence, this has increased the probability of a global international financial collapse.[1]

The purpose of this paper is to investigate to what extent the international financial community has taken into account the risk characteristics of borrowing less developed countries when granting loans. Specifically, this study analyzes the determinants of the spread between the interest rate charged to a particular country and the London Interbank Borrowing Rate (LIBOR). If the financial community distinguishes between countries with different probabilities of default, these perceptions will be reflected in the spreads over LIBOR, with riskier countries (i.e., countries with a higher probability of default) being charged a higher risk premium or spread. However, when the perceived probability of default exceeds a given level, a "credit-ceiling" will be reached, and that particular country will be completely excluded from the credit market (Jonathan Eaton and Mark Gerowitz 1980, 1981a,b; Jeffrey Sachs and Daniel Cohen 1982; Sachs 1983). This paper also tries to determine if the international financial community anticipated,

as late as 1980, the international debt crisis of 1982-1983. This is done by computing the implicit subjective probabilities of default from the econometric analysis of the spreads over LIBOR.

The empirical analysis of the determinants of the default risk premium is important for several reasons. First, an understanding of the factors that influence lending behavior, is useful for borrowing countries. With this knowledge LDCs can take positive steps towards managing their economies in a way such that the perceived default risk is kept at a level compatible with what lenders think is prudent. Second, additional information on how the market assesses default risk will be helpful for determining the probability that the present repayment difficulties faced by some LDC's can be transformed into a major global crisis. And third, empirical information on the relationship between the level of the foreign debt and its cost is useful for the analysis of optimal borrowing strategies and of the social rate of discount in an open economy (see Arnold Harberger, 1983.)

A number of papers have recently analyzed the theoretical determinants of default country risk.[2] Recent work has focused on a number of aspects of the problem: First, the existence of credit ceilings, above which countries cannot borrow, has been explicitly introduced into the analysis (Eaton and Gersowitz, 1980, 1981a,b; Sachs and Cohen, 1982; Sachs, 1983; David Folkerts-Landau, 1982.) Second, variables other than the level of foreign debt, like international reserves, the propensity to invest and the current account deficit have been explicitly considered as affecting the default risk premium (Gershon Feder and Richard Just, 1979; Eaton and Gersowitz, 1980, 1981a; Sachs and Cohen, 1982; Sachs, 1983; Edwards, 1983). Recent theoretical analyses have also made a distinction between bond and bank foreign financing, and have explicitly introduced the possibility of rescheduling debt payments (Sachs and

Cohen, 1982; Sachs, 1982). Finally, it has been argued that if borrowers and lenders have different perceptions with respect to the probability of default, the analysis of optimal borrowing strategies would be substantially affected (Harberger, 1976, 1980).

The empirical work on the subject has investigated several aspects of the problem, including the probability of a country rescheduling its payments (Charles Frank and William Cline, 1971; Nicholas Sargen, 1977), and the probability that a particular LDC borrower has reached its credit ceiling (Eaton and Gersowitz, 1980, 1981a,b). Generally, those studies that have analyzed lending behavior in international financial markets have found that lenders tend to take into account the riskiness of borrowers in making their lending decisions (Frank and Cline, 1971; Feder and Just, 1977a,b; Feder and Knud Ross, 1982; Sachs, 1981). Some studies, however, (Feder and Just 1977b; Sachs, 1981) have only found a weak and insignificant relationship between the speed and the debt-output ratio. In a recent paper Feder and Ross (1982) used data from the Institutional Investor creditworthiness ranking to show that lenders risk perceptions are systematically reflected in the spreads charged in Euromarkets.

The analysis presented in the present paper uses data for several years (1976-1980) to investigate what are the determinants of the subjective probability of default.[3] The sample considered in this paper only includes loans denominated in Eurodollars, thus avoiding the problem of different currency composition of loans, mentioned by Donogh McDonald (1982, p. 630). Also this paper only includes public and publically guaranteed loans, thus restricting the analysis to the determinants of country risk, as distinct from financial risk. Finally, the present study has considered a larger set of possible determinants of the probability of default than previous work.

I. Empirical Analysis

Assume that, as postulated by Feder and Just (1977b), Eaton and Gersovitz (1980), and Sachs (1981) among others, the spread over LIBOR charged on Eurodollar loans reflects the probability of default of a particular country. Then, observed data on the spread can be used to formally analyze the way in which variables like the debt-output ratio, the propensity to invest, the level of international reserves, and others affect the level of this perceived probability. However, before empirically analyzing the determinants of the spread three important questions should be addressed: (1) What is the exact form of the relationship between the spread and the probability of default; (2) What is the functional form of the probability of default; and (3) What are the determinants of this probability.

With respect to the first question — the relationship between the spread and the probability of default — in this paper I assume that the spread can be written in the following form:

$$s = [p/(1-p)]^{\gamma} \tag{1}$$

where s is the spread over LIBOR charged on a particular loan, p is the (subjective) default probability during the life of the loan, and γ is a variable that captures other elements affecting s. There are several ways to justify the choice of equation (1). For example, this expression can be directly derived from the assumption of risk neutral banks and perfect competition.[4]

Regarding the functional form of p, I follow the standard convention and assume that p has a logistic form:

$$p = \frac{\exp \Sigma\ \alpha_i y_i}{1+\exp \Sigma\ \alpha_i y_i} \tag{2}$$

where the y_i's refer to the determinants of the perceived probability of default (i.e., the debt-service ratio, the propensity to invest) and the

α_i's are the corresponding coefficients. Combining equations (1) and (2) the log of the spread can be written in the following form:

$$\log s = \alpha_0 + \Sigma \alpha_i y_i + \log \gamma \tag{3}$$

In this section the results obtained from the estimation of an equation of the type of (3) using data on 727 public and publically guaranteed loans granted to 19 LDC's during 1976-1980 are reported.[5] The spread variable for each country in a particular year was constructed as a weighted average of spreads actually charged for the individual public and publically guaranteed loans granted to that particular country, where the weights were given by the value of each loan.[6] The basic data were obtained from various issues of the world Bank's Borrowing in International and Capital Markets, and are presented in Edwards (1983).

A number of variables were considered as possible determinants of the spread, including those suggested by a number of models that have recently appeared in the literature. (See Feder and Just, 1977b; Sachs and Cohen, 1982; Sachs, 1983; Eaton and Gersovitz, 1980; Edwards, 1983.) Specifically, the following variables — some of which have also been included in previous empirical work on the subject — were considered as possibly affecting s in the empirical analysis:

1) The debt-output ratio. As has been argued by Sachs and Cohen (1982) and others, it is expected that this variable will have a positive coefficient in the regression analysis. This variable can be considered to be an indicator of the degree of solvency of a particular country. The data on this variable refers to public and publically guaranteed debt and was obtained from the World Bank World Debt Tables;

2) The ratio of debt service to exports. This indicator measures possible liquidity (as opposite to solvency) problems faced by a particular country. It is expected that its coefficient will be positive. Data on this ratio was obtained from the World Debt Tables.

3) Ratio of international reserves to GNP. This indicator measures the level of international liquidity held by a country and as suggested in Edwards (1983), it is expected that its coefficient will be negative. This variable was constructed from data obtained from the International Financial Statistics.

4) Loan duration. This variable is measured in years, and measures the (weighted) average maturity of loans granted to a particular country. As has been shown by Feder and Ross (1982) its a priori sign in the regression analysis is ambiguous. The weighted average was constructed from data reported in Borrowing in International Capital Markets.

5) Loan volume. This variable shows the average value of each loan, and was obtained from Borrowing in International Capital Markets. Also, a priori, its sign is ambiguous.

6) Propensity to invest. This variable will tend to capture the country's perspectives for future growth. As is shown in Sachs and Cohen (1982), and in Edwards (1983), it should be negatively related to the spread. This indicator was obtained from data reported in the World Tables and in World Development Report (various issues).

7) Ratio of the current account to GNP. Sachs (1981) has argued that this variable will be negatively related to the probability of default. The data on this variable was obtained from World Tables and various issues of the World Development Report.

8) Average propensity to import. This indicator was constructed as the ratio of imports to GNP, and measures the degree of openness of a country. To the extent that a more open country is more vulnerable to foreign shocks (Frenkel, 1983), it is expected that it will be positively related to the probability of default. This variable was constructed from data obtained from the International Financial Statistics.

9) Growth of per capita GDP. It has been argued that a higher rate of growth of output will result in a lower probability of default (see Feder and Just, 1977b). Data on this indicator was obtained from World Tables and the World Development Report.

10) GNP per capita. This variable measures the relative economic size of a country. Some authors have argued, (i.e., Feder and Just, 1977b) that this variable should have a negative coefficient in equation 3. This variable

was obtained from various issues of the World Bank's World Tables and World Development Report.

11) Rate of inflation. It is possible to argue that, with other things given, a higher rate of inflation indicates a larger probability of a balance of payments crisis, and consequently a higher probability of default (McDonald 1982). This variable was taken from the International Financial Statistics.

12) Variability of International Reserves. According to the literature on the demand for international reserves (i.e., Jacob Frenkel 1983) the more variable are the flows of foreign funds faced by a country, the higher the probability of a balance of payments crisis. Consequently, it is expected that the coefficient of this variable will be positive. This indicator was constructed from data obtained from the International Financial Statistics.

13) Rate of Devaluation. This variable summarizes the exchange rate policy followed by a particular country. For a given level of the other variables (in particular inflation and reserves) a higher rate of devaluation will tend to indicate a higher willingness to use exchange rate adjustments to avoid balance of payments crises.[7] It is expected that it will have a negative coefficient in the regression analysis. The data was obtained from IMF's International Financial Statistics.

14) Government expenditure over GNP. It has been sometimes suggested that the larger the size of the government sector in a developing country, the higher the probability of a balance of payments crisis.[8] It is then expected that the coefficient of this variable will be positive. The data was obtained from World Tables and World Development Report.

Other variables were also considered as possible determinants of the probability of default (oil exporters dummy variables, for example). However, due to space considerations, and since their inclusion did not affect the results in any significant way, the estimates obtained when they were included are not reported here.

Equation (3) was estimated using pooled cross-section time-series data for 19 countries during five years (1976-1980). For estimation purposes it was assumed that $\log \gamma_{nt}$ was equal to a constant k plus a random element

u_{nt} ($\log \gamma_{nt} = k - u_{nt}$). Following the usual convention in pooled time-series cross-section estimation, it was assumed that this random term u_{nt} was formed of a country-specific random error v_n, with zero mean and variance σ_v^2; a time-specific random element w_t, with zero mean and variance σ_w^2; and an independently distributed random term ε_{nt}, with zero mean and variance σ_ε^2 (see Theodore Anderson and Cheng Hsiao, 1981). Then the equation to be estimated can be written as:

$$\log s_{nt} = \alpha_o + k + \sum_{i=1}^{k} \alpha_i y_{int} + v_n + w_t + \varepsilon_{nt} \tag{4}$$

where

$$E(v_n^2) = \sigma_v^2;\ E(w_t^2) = \sigma_w^2;\ E(\varepsilon_{nt}^2) = \sigma_\varepsilon^2$$

and

$$E(v_n w_t) = E(v_n \varepsilon_{nt}) = E(w_t \varepsilon_{nt}) = 0$$

$$E(v_n v_m) = 0 \quad \text{for} \quad n \neq m$$

$$E(w_t w_s) = 0 \quad \text{for} \quad t \neq s$$

$$E(\varepsilon_{nt} \varepsilon_{ns}) = E(\varepsilon_{nt} \varepsilon_{nt}) = E(\varepsilon_{nt} \varepsilon_{ms}) = 0$$

Expression (4) is a typical random-effect error components equation. The results presented in this paper were obtained using the technique suggested by Wayne Fuller and George Batesse (1974) for estimating this kind of equation. In the estimation $(\alpha_o + k)$ was combined into a constant β_o. A possible problem with the estimation of (4) is that, to the extent that banks determine the spread and loan duration at the same time, use of Fuller-Batesse's technique would be subject to a simultaneity bias. However, following Feder and Ross (1982), and David Beim (1977) it was assumed that the duration of the loan is determined by banks prior to the determination of the spread. This indeed appears to be the case in the Eurocurrency credit markets (see

Euromoney, September 1978).

Table 1 contains the results obtained from the estimation of equation (1) using Fuller-Batesse's technique. These results are quite satisfactory, both from the point of view of the mean square errors of the regressions, and from the perspective of the signs and level of significance of the coefficients. Broadly speaking, the empirical evidence shows that international lending behavior to LDC's tends to take into account some of the economic characterstics of the specific borrowing countries. As may be seen, in all regressions the debt-output ratio is significantly positive, and smaller than one. This result suggests that a higher level of indebtedness will be associated with a higher probability of default and thus, a higher spread over LIBOR. This contrasts with results previously obtained by Feder and Just (1977b), using data for eight quarters in 1973-1974, and by Sachs (1981) where the coefficient of the debt-output ratio was always insignificant and very low. With respect to the debt-service ratio -- which measures potential liquidity problems -- its coefficients are also positive, as expected, and in most cases significant either at the 5 or 10 percent level.

The coefficient of the reserves to GNP ratio is, as expected, consistently negative, and in most equations it is significant at the 5% level. Also, the estimated values of these coefficients are high, indicating that the behavior of the reserves ratio has played an important role in the determination of the perceived probability of default. The main importance of this result is that from a policy point of view, countries that want to reduce the probability of being excluded from the international financial market due to an increase in the perceived probability of default, should be particularly careful in managing their international reserves. Also, these results suggest that the analysis of the demand for international reserves should incorporate the level of foreign

Table 1 --Estimation of Equation (4): Fuller-Batesse Procedure, 1976-1980

Independent Variable	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
Constant	0.329 (1.422)	0.141 (0.726)	0.305 (1.216)	0.285 (1.225)	0.345 (1.062)	0.314 (1.424)
Debt/GNP	0.622 (2.512)	0.544 (2.251)	0.634 (2.461)	0.545 (2.107)	0.613 (2.120)	0.633 (2.453)
Reserves/GNP	-1.155 (-2.164)	-1.211 (-2.253)	-1.079 (-1.632)	-1.282 (-2.345)	-0.995 (-1.412)	-1.152 (-2.142)
Debt Service/ Exports	0.426 (1.688)	0.567 (2.344)	0.440 (1.797)	0.441 (1.749)	0.386 (1.400)	0.353 (1.458)
Loan Duration	-0.012 (-0.648)	-0.011 (-0.581)	-0.013 (-1.719)	-0.014 (-0.753)	-0.018 (-0.953)	-
Loan Value	-0.001 (-1.340)	-0.001 (-1.658)	-0.001 (-1.269)	-0.001 (-1.131)	-0.001 (-1.500)	-
Investment/GNP	-0.681 (-1.991)	-	-0.756 (-1.324)	-0.757 (-1.318)	-0.624 (-0.972)	-1.186 (-2.266)
Current Account/GNP	0.435 (1.966)	-	0.387 (0.970)	0.487 (2.131)	0.365 (0.863)	-
Growth	-	-	0.007 (0.377)	-	0.008 (0.337)	-
Imports/GNP	-	-	-0.004 (-0.105)	-	0.007 (0.176)	-
Government Expenditure/GNP	-	-	-	0.708 (1.316)	-	-
Income per capita	-	-	-	-	-0.208 (-0.532)	-
Inflation	-	-	-	-	-0.008 (-0.127)	-
Reserves Variability	-	-	-	-	0.085 (0.974)	-
Rate of Devaluation	-	-	-	-	0.178 (0.888)	-
MSE	0.021	0.023	0.021	0.021	0.023	0.028

Note: The numbers in parentheses are asymptotic t-statistics. MSE refers to the mean square error of the transformed regression.

indebtedness as an additional determinant of the desired level of international liquidity [see Eaton and Gersovitz, 1980]. It is also interesting to note that the coefficient of the reserves ratio is quite high in absolute terms, exceeding in all cases the estimated value of the coefficient of the debt to GNP ratio.[9]

The coefficients of loan duration and loan value are negative, but insigificant. The coefficients of the imports-output ratio, growth, GNP per capita, variability of reserves, inflation, the government expenditure ratio, and the rate of devaluation are also insignificant.

In all regressions the estimated coefficient of the gross investment/GNP ratio was negative, as expected. Also in two of the five regressions where it was included, it was significant, suggesting that as has been indicated by Sachs (1981), Sachs and Cohen (1982) and Edwards (1983), a higher propensity to invest will tend to be associated with a lower perceived probability of default. The coefficients of the current account ratio is positive in the three regressions where it was included, being significant in two of the cases. This is a somewhat puzzling result, since it indicates that a lower deficit (or higher surplus) will result in a higher perceived probability of default and spread. The problem with this is that, with other things given -- especially the investment ratio -- a higher current account deficit means that the same investment is being financed with a higher proportion of foreign savings, and one would generally expect that in this case (i.e., lower domestic savings ratio) the perceived probability of default would be higher.

In all cases the estimated variance of the time-specific element $\hat{\sigma}^2_w$ exceeded the estimated country-specific variance σ^2_v, indicating that during the period under consideration differences across time in the country risk premium were more important than differences across country. This result is capturing the fact that throughout the period under consideration (1976-1980)

the level of world liquidity varied significantly (see Edwards 1983). On the whole, however, the low value of the mean square error of the regressions (MSE) show a quite satisfactory fit.

In sum, the evidence presented in this section shows that during the recent past, lending behavior by international banks in Eurocurrency markets has taken into account (some of) the economic characteristics of borrowers. Even though some of the coefficients were sensitive to the specification of the estimated equations and were not always significant at the conventional levels, the general results regarding some of the most important variables are consistent with what was expected. Particularly important is the result of a significantly positive relation between the debt-GNP ratio and the spread. These results which contradict previous findings (i.e., Feder and Just 1977b, Sachs 1981) indicate that, as has been suggested by Harberger (1983), there are "externalities" in the process of LDC borrowing and that these could be dealt with by imposing an optimal tax on foreign borrowing in developing countries.

II. The Perceived Probabilities of Default

The econometric estimates reported in Table 1 can be used to compute the estimated banks' perceived probabilities of default as:

$$(5) \qquad p_{nt} = \frac{\exp\left\{\tilde{\alpha}_{on} + \sum_{i=1}^{k} \hat{\alpha}_{in} y_{nti}\right\}}{1 + \exp\left\{\tilde{\alpha}_{on} + \sum_{i=1}^{k} \hat{\alpha}_{in} y_{nti}\right\}}$$

where $\tilde{\alpha}_o = \hat{\beta}_o - k$ is the imputed value for α_o in equation (4) (for $\hat{\beta}_o$ the estimated value of the constant in the regression analysis). Table 2 presents estimated probabilities of default for each country and each year, obtained from equation (4.1).[10] A number of interesting characteristics of these probabilities can be observed. First, it can be seen that, within each year, there is a

fairly wide variation in the perceived probability across countries. Second, for each country, these probabilities of default show some variation through time. For example, for the case of Venezuela the probability increases steadily between 1976 and 1979. While in 1976 Venezuela has the lowest estimated perceived probability of default, in 1980 this probability is around the middle of the distribution. For the case of Brazil, one of the countries that eventually ran into serious foreign debt problems, there is an increase in the perceived probability of default of approximately one full percentage point. Surprisingly, however, for Argentina a country which in 1982 encountered serious financial difficulties, Table 2 estimates indicate that the perceived probability of default declined throughout the period Also for the case of Mexico, these results show a decline in the probability of default in 1980.

In sum, the computations presented in Tables 1 and 2 suggest that even as late as 1980 the international financial market had not predicted in any important way the future payment difficulties faced by Argentina, Mexico and Uruguay.

III. Concluding Remarks

This paper has analyzed the relationship between foreign debt and default country risk in developing countries. The empirical analysis has used data on 727 public and publically guaranteed loans granted to 19 LDCs during 1976 and 1980. The result obtained suggest that banks lending behavior has tended to consider (some of) the economic characteristics of countries when determining the spread they charge. However, the results also suggest that, at least during this period, banks might have overlooked some aspects of the developing countries' economies. One of the most interesting results obtained is the robust and significant positive relation (with a coefficient of approximately 0.6) between the log of the spread over LIBOR and the debt-output ratio. This

Table 2 — Estimated Perceived Probabilities of Default From Equation (4.1)

(Percent)

	1976	1977	1978	1979	1980
Greece	8.0	8.0	7.7	7.2	7.9
Portugal	8.4	8.3	8.5	8.9	8.6
Spain	7.8	8.1	8.1	7.8	7.9
Yugoslavia	7.6	7.6	7.8	7.0	7.4
Argentina	8.4	8.7	8.8	7.2	6.1
Brazil	8.9	8.8	8.9	9.1	9.6
Colombia	8.7	8.3	7.8	7.5	7.3
Ecuador	7.8	8.0	8.4	8.6	8.6
Mexico	9.9	10.1	10.5	10.5	9.2
Panama	10.4	11.6	11.9	11.3	11.5
Uruguay	10.6	10.2	10.5	8.6	8.5
Venezuela	5.9	5.8	6.3	7.1	7.9
Indonesia	9.6	9.6	9.3	8.4	8.7
Korea	8.9	8.5	7.7	7.7	8.5
Malaysia	7.0	7.4	7.0	7.1	6.3
Phillipines	7.4	7.9	7.7	7.7	7.7
Thailand	7.4	7.4	7.4	7.6	7.8
Ivory Coast	9.9	10.0	9.4	9.9	10.0
Morocco	8.0	8.1	9.4	9.2	10.3

relationship suggests that, as has been recently indicated by Harberger (1983), there are externalities in the process of LDC's borrowing. These externalities could be dealt with by imposing an optimal external borrowing tax in these countries (Harberger 1983).

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Footnotes

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[1]See, for example, the Wall Street Journal editorial, March 9, 1983. On the recent international debt crisis see the comprehensive discussion in William Cline (1983). In particular, see his Chapter 5 for a discussion on bank's responsibility in the present crisis. See also Time magazine (January 10, 1983), The Economist, (5-11 March 1983), Martin Feldstein (1983), David Folkerts-Landau (1982). The indebtedness situation is particularly critical regarding Latin American debtors. For example, U.S. private banks have "extended credit of more than U.S. $50 billion to Mexico, Brazil and Argentina, an amount that exceeds 80 percent of the banks equity" (Feldstein, 1983, p. 2). The extent of the indebtedness crisis is reflected by the fact that in 1982 twenty countries undertook debt renegotiations, while in the second half of the 1970s an average of only 4 countries per year renegotiated their debts.

[2]See Donogh McDonald (1982) for an excellent and exhaustive survey on the subject.

[3]Most previous work has used cross-section data for a particular year or quarter. Feder and Just (1977b) used loans data for 8 quarters during 1973-1974. The present paper uses the most recent data available, since in 1981 the World Bank stopped the publication of Borrowing in International Capital Markets from where the data on the spreads was obtained.

[4]This can be illustrated by assuming the simple case of a one period loan. Consider that the risk-free interest rate is given by LIBOR(i^*), and that the interest rate charged to a particular country (i) is equal to LIBOR plus the spread(s). Assume also that in case of default the principal and interest are completely lost (this is a non-essential assumption). Then, the following equilibrium condition will hold $(1-p)(1+i) = (1+i^*)$. From here it follows that $s = [p/(1-p)]\gamma$, for $\gamma = (1+i^*)$. Alternatively, more complicated models, like the one in Feder and Just (1977b), can be used to develop expressions similar to (1).

[5]Countries included in the empirical analysis are: Argentina, Brazil, Colombia, Ecuador, Greece, Indonesia, Ivory Coast, Korea, Malaysia, Mexico, Morocco, Panama, Philippines, Portugal, Spain, Thailand, Uruguay, Venezuela, Yugoslavia.

[6]It is important to notice that there are some problems with the quality of this data. The most serious problem is that the interest rate is not the only component of a loan's cost. In particular in the present study — as in those by Feder and Just (1977b) and Sachs (1981), for example — it has not been possible (due to lack of information) to incorporate data on fees and commissions. It should be noted, however, that these fees are typically low compared to the interest rate component of the costs (see, for example the discussion in Cline 1983, pp. 82-83).

[7]Cline (1983, Ch. 1) has indicated that the mismanagement of the exchange rate policy is one of the main cuases of the international debt crisis. Deviations of Purchasing Power Parity were included instead of the rate of devaluation as an indicator of exchange rate policy. The results obtained, however, were not different.

[8]See, for example, the discussion in Harberger and Edwards (1982). Cline (1983) argues that the increase in the Mexican fiscal deficit was one of the main causes for the 1982 debt crisis in that country.

[9]An interesting question is what will happen to the perceived probability of default if a country increases its foreign debt to finance the accumulation of international reserves. In this case the change in the (log of the) spread will be given by

$$d \log s = [\hat{\alpha}_1 + \hat{\alpha}_2 + \alpha_3(\psi+i)/XR]\, d(DR)$$

where $\hat{\alpha}_1$, $\hat{\alpha}_2$ and $\hat{\alpha}_3$ are estimated regression coefficients of debt/GNP, reserves/GNP, and debt service/exports ratios respectively, ψ is the fraction of the debt's principal that has to be amortized every year, i is the interest rate actually charged, XR is the exports/GNP ratio and DR is the Debt/GNP ratio. Computations reported in Edwards (1983) suggest that an increase in DR coupled with an equiproportional accumulation of reserves will tend to leave the spread unaffected.

[10]Each equation's estimates will generate different sets of perceived probabilities. However, the overall picture presented in Table 2 is not affected by the equation used to generate these probabilities. For further details on this and on the computation of these perceived probabilities of default see Edwards (1983).