THE PRICING OF BONDS AND BANK LOANS IN INTERNATIONAL MARKETS: AN EMPIRICAL ANALYSIS OF DEVELOPING COUNTRIES' FOREIGN BORROWING*

by

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ABSTRACT

The purpose of this paper is to compare the pricing of bank loans and bonds in international markets. The results obtained, using data on LDC debtors, indicate that in both markets the country risk premium has responded to some of the variables suggested by the theory. However, the way in which these variables affect the risk premium differs across these markets. Data on LDC bond yields in the secondary market for 1980-85 are also used to analyze the way in which this market reacted and anticipated the debt crisis.

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I. Introduction

The recent international debt crisis has generated renewed interest in the study of the determinants of default country risk premia. A number of papers have recently investigated, both theoretically and empirically, issues related to the pricing of developing countries' foreign debt and to optimal borrowing and lending strategies in international financial markets. In most theoretical models sovereign borrowers face, up to a certain limit, an upward sloping supply curve of foreign funds. This upward-sloping portion of the supply curve reflects the fact that as the level of the debt increases, the perceived probability of default (or rescheduling) also rises. 1/

Most recent empirical studies on creditworthiness and country risk have dealt with the international bank loan market, and have ignored the bond market in their effort to analyze the process of determination of default risk premia. For example, in Herring's (1983) volume on risk in international markets the word "bond" is not listed in the subject index. On the other hand, only one paper in Smith and Cuddington's (1985) recent volume addresses the difference between the international bank loan and bond markets. Also, most studies on debt rescheduling and on the determinants of risk spreads have concentrated exclusively on the bank loan market. 2/

Although the international bank loan market has been significantly more important, both in terms of coverage and volume, than the bond market, by ignoring the latter in empirical analyses researchers may be omitting an important source of information. In fact, some authors have pointed out that the international bond and bank loan markets are significantly different both

from economic and institutional points of view. 3/ It has even been argued that whereas interest rates charged in the bank loan market do not reflect the true risk associated with lending to the developing countries, yields on LDC bonds do in fact capture this risk [Folkerts-Landau (1985)]. In the present paper, data on spreads on bank loans to LDCs and on yields on LDC bonds are used to analyze the behavior of these two markets.

The purpose of the present paper is threefold. First, data on a large number of developing debtor countries are used to compare the pricing of bank loans and bonds in international financial markets. Data on Eurocurrency loans granted to 26 developing countries between 1976 and 1980, and on bonds issued by 13 developing countries during the same period are used to analyze the determination of the default risk premium. The second objective of the paper is to test some of the implications of the more recent models of foreign borrowing and country risk. In particular, the propositions that the default risk premium is a positive function of the level of debt and a negative function of the level of investment are tested. 4/ And third, data on yields on Mexican and Brazilian bonds in the secondary market between 1980 and 1985 are used to analyze the way in which this market anticipated and reacted to the debt crisis.

The paper is organized in the following form: Section II briefly discusses some of the more important economic and institutional differences between the bank loan and bond markets. In Section III data on spreads on bank loans granted to 26 developing countries between 1976 and 1980 and on initial offering yields on 167 bonds floated by 13 developing countries between 1976 and 1980 are used to analyze the process of risk pricing in these markets. In this section the results obtained from the bank loans data set

and from the bonds data set are formally compared. In Section IV monthly data on yields on Mexican and Brazilian bonds in the secondary market for the period 1980-85 are used to analyze the market reaction to the debt crisis. Finally, in Section V some concluding remarks are offered.

II. The International Bond Market and the International Bank Loan Market

During the nineteenth century and early twentieth century the public floatation of bonds was the most important form that developing countries had of obtaining international financing. In order to induce investors to hold these bonds, their yields were quite high, reflecting the market's perceived probability of default. In fact, during this period many countries actually defaulted on their bonds. 5/ On the other hand, during the 1970s and 1980s, the role of the bond market has been greatly reduced. International borrowing by developing countries has been largely dominated by bank loans, the majority of which have been granted by bank syndicates. Also, during this period outright defaults have been replaced by multilateral reschedulings. In spite of the reduced importance of the bond market in modern times, a number of developing countries have been able to float bonds. Between 1978 and 1984, for example, 50 developing countries issued bonds for an equivalent of approximately US$27 billion. Even though this amount represents no more than ten percent of new bank lending during the same period, it is still quite substantial in absolute terms.

Some authors have pointed out that the international bank loan and bond markets are significantly different both from institutional and economic perspectives. In particular, it has even been argued that while interest rates charged in the bank loan market do not reflect the true risk associated

with lending to the developing countries, yields on LDCs' bonds do in fact capture this risk [Folkerts-Landau (1985)]. In this section some of the more important differences between the international bank loan and bond markets will be briefly discussed. In the next section data on spreads on bank Euroloans and on LDCs' bonds will be used to empirically analyze the extent to which the process of determination of the country risk premium differs between these two markets.

A first important difference between the international bank loan and bond markets is that in the former banks form a fairly cohesive group; bondholders, on the other hand, are highly dispersed. This cohesion allows banks to react uniformly to debt repayment problems, and makes the job of monitoring and enforcing debt contracts much easier. Two fairly recent institutional developments have enhanced banks' ability to form a cohesive group. First, the fact that most international bank loans are made by syndicates implies that fairly large groups of banks establish a partner-type relationship at early stages of the lending process. Second, as a result of cross default clauses, when a bank (or syndicate) gets in trouble because of a borrower's default, all other banks that have loans outstanding with that country will also be affected by the crisis. 6/

Banks' cohesive behavior gives them an additional advantage to impose sanctions on those countries that default, or threaten to default. In fact, banks' ability to act cohesively has allowed them to enter into efficient negotiations processes with troubled debtor countries, and to reschedule most of their debt. Bondholders, on the other hand, usually are too dispersed to agree with each other on how to handle a debt crisis. 7/ Sachs and Cohen (1982) have actually argued that whereas bank lending is implicitly lending

with an option to renegotiate, bond lending excludes the possibility of rescheduling. Consequently, in their model bond lending is more risky -- that is, for the same amount of debt, country risk premia are higher on bonds than on bank loans. 8/

There are other, perhaps more important, reasons why the level of risk involved in international bank lending might be lower than that implicit in bond lending. During the last twenty years or so monetary authorities, both in developed and developing countries, have increasingly guaranteed bank deposits and loans. In fact, nowadays bank deposits and loans are, in most countries, implicitly or explicity insured; in a way Central Banks have agreed to become lenders of last resort. Consequently, it has been argued by McKinnon (1984) and Folkerts-Landau (1985) among others, that the moral hazard factor has become increasingly important in bank lending. According to this view, risk premia charged on bank loans do not reflect the real risk involved in these operations (see also Gutentag and Herring [1985a]). The bond market, on the other hand, has not been affected by this broadening implicit insurance scheme. Folkerts-Landau (1985) has argued that whereas bank loan spreads reflect the probability of rescheduling, bond spreads reflect the probability of default.

Another important difference between the bank loan and bond markets is that, while there are no secondary markets for bank loans, there is a fairly active secondary market for developing countries' bonds. In fact, the existence of this secondary market can be exploited to advantage in empirical studies of the country risk issue. For example, the behavior of bond yields in the secondary market can provide important information on the extent to which, after the debt crisis, the value of LDCs debt has been discounted by

the international financial community. 9/ This is done, for example, in Section IV of this paper.

According to Eaton and Gersovitz (1981b) and Gersovitz (1985), it is not clear whether there is more risk involved in international bank lending than in bond lending. They recognize that banks behave in a more cohesive way than bondholders, and that consequently have a clear advantage to impose sanctions. On the other hand, they argue that the non-cohesive behavior of bondholders forces countries to give them a "generous treatment relative to banks" (Gersovitz, 1985). The reason for this is that if payments on bond debt are suspended, bondholders have no alternative to calling a default. In fact, almost every country that has recently run into debt difficulties has tried to continue paying interest and amortizing their publicly sold bonds. Even though legally there are no debt seniority provisions in international lending, the tradition is that, as in the case of domestic lending, bondholders have precedence. 10/ Banks, on the other hand, can actually postpone the declaration of default while they negotiate with the debtor country the conditions under which the existing debt can be restructured. Eaton and Gersovitz (1981b) have further argued that, since public bonds are usually sold by prospectus, in the bond market there is more information regarding the level and conditions of foreign debt than in the bank loan market.

In sum, there are a number of economic, legal and institutional distinctions between the international bank loan and bond markets. In general, the majority of authors seem to be in agreement that there is a somewhat greater risk involved in bond lending. As a result of the implicit or explicit central bank guarantees on bank deposits and loans, spreads on these loans would not reflect the real default country risk involved. On the other

hand, according to this view, spreads on bonds would reflect in a more accurate way this risk. If this is the case, it is expected that spreads on bank loans and spreads on bonds will in fact be determined in a different way, with the latter being more sensitive to those variables that, according to the theory, affect the level of country risk. In Sections III and IV of this paper this issue is investigated empirically.

III. The International Bank Loan Market, the Bond Market and Default Country Risk: 1976-80

In this section data on over 900 Eurocurrency bank loans granted to LDCs between 1976 and 1980, and on 167 bonds issued by LDCs during this period are used to investigate the process by which the bank loans and bond markets determine the default country risk premium. 11/ In particular, it is tested if, as numerous models on foreign borrowing have suggested [i.e., Hanson (1974), Eaton and Gersovitz (1981a,b), Sachs (1982, 1984), Sachs and Cohen (1982), Edwards (1983)], the level of the country risk premium increases with the level of foreign indebtedness (i.e., the debt GNP ratio). Also, other implications of some theoretical models are tested, including the negative relationship between the investment-GNP and international reserves-GNP ratios and the country risk premium. In this section the results obtained from the bank loans and bond regressions are formally compared in order to assess whether these two markets price risk in a different way.

In the case of a developing country that cannot affect the world rate of interest, the cost of foreign funds obtained from abroad is formed by two elements: (1) "the" (exogenously given) risk-free world interest rate (i^*); and (2) a country-risk premium (s) related to the probability of default or

rescheduling. Suppose that this probability of default, as perceived by the lender (p), depends positively on the debt-output ratio D, and negatively on other variables, like the investment-GNP ratio. In order to simplify the discussion, consider the case of a one-period loan, where in case of default the lender (i.e., foreign bank or bondholder) will completely lose the interest and the principal. In this case the equilibrium condition for a risk-neutral lender will be given by:

$$(1-p)\,[1+(i^*+s)] = (1+i^*). \tag{1}$$

From here, this country's risk premium can be written as:

$$s = \left[\frac{p}{1-p}\right]k\ , \tag{2}$$

where $k = (1+i^*)$. 12/ If, alternatively, it is assumed that when default occurs only a fraction ϕ of interest and principal is lost, equation (2) should be replaced by $s = [(1-\phi)p/(1 - (1-\phi)p)]k$. 13/

Since the probability of default p is assumed to depend positively on the debt-output ratio D, according to equation (2) the country in question will face an upward-sloping supply curve for foreign funds (i.e., $\partial s/\partial D > 0$). Moreover, when the probability of default approaches unity, the country risk premium s will approach infinity. This means that developing countries will face an upward-sloping supply curve of foreign funds up to a certain point, and that when the probability of default gets very close to unity, a credit ceiling will be reached. At that point, the country in question will be completely excluded from the world's credit markets [Eaton and Gersovitz (1981), Sachs (1982, 1984), Sachs and Cohen (1982), Kharas (1984)].

With respect to the probability of default, in the empirical analysis I follow the standard convention and assume that p has a logistic form:

$$p = \frac{\exp \Sigma\beta_i x_i}{1+\exp \Sigma\beta_i x_i} \tag{3}$$

where the x_is are the determinants of the probability of default (including the level of indebtedness) and the β_is are the corresponding coefficients. Combining (3) and (2), and adding a random disturbance ε, the following equation, which can be estimated using conventional methods, is obtained:

$$\log s = \log k + \Sigma\beta_i x_i + \varepsilon. \tag{4}$$

Regarding the determinants of the probability of default (i.e., the xs in equation (3)) a number of variables suggested by theoretical studies were considered:

(1) The debt-output ratio. As has been pointed out above, in most theoretical models of foreign borrowing the debt-output ratio plays a crucial role; it is expected that this variable will have a positive coefficient in the regression analysis [Hanson (1974), Harberger (1980), Sachs (1984), Eaton and Gersovitz (1981a), Edwards (1983)]. The data for the debt-output ratio used in this paper refer to public and publicly guaranteed debt and were obtained from various issues of the World Debt Tables. It should be noted, however, that a number of previous empirical studies, that have used data on bank loans spreads, have failed to find this positive effect of the level of debt on the country risk premium. For example, Feder and Just (1977b) found, using data for 1973 and 1974, a very low and insignificant regression coefficient for the debt-output ratio. Moreover, in their preferred

regression they dropped this variable from the analysis. Sachs (1981), on the other hand, obtained a very small (0.0008) and insignificant coefficient for the debt-output ratio in his cross-section study. Burton and Inoue (1985) also obtained small and insignificant coefficients for this variable in their analysis of banks' risk premia. 14/

(2) 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. Gersovitz (1985), however, has recently argued, that under a willingness-to-pay approach to foreign borrowing, higher international reserves will reduce creditworthiness and will result in an increase in the country risk premium (s). This variable was constructed from data obtained from the International Financial Statistics.

(3) Investment to GNP ratio. This variable captures the country's perspectives for future growth. As is shown in Sachs and Cohen (1982), Sachs (1982, 1984) and in Edwards (1983), it should be negatively related to the spread; a higher investment ratio enhances creditworthiness. However, Gersovitz (1985) has recently argued that if borrowers use foreign funds to undertake risk-reducing investment, they will reduce the cost of the penalty in case of default. Hence, higher investment ratios will reduce creditworthiness and increase the default country risk premium. Whether this variable affects positively or negatively the risk premium is, then, an empirical issue. The data on the investment ratio were obtained from various issues of the World Tables and the World Development Report.

(4) Ratio of the current account to GNP. Sachs (1981) has argued that this variable will be negatively related to the spread. The data on this

variable were obtained from World Tables and various issues of the World Development Report.

(5) Debt service ratio. This indicator, computed as the ratio of debt service to exports, measures possible liquidity (as opposed to solvency) problems faced by a particular country. It is expected that higher debt service ratios will reduce the degree of creditworthiness and result in a higher s (Feder and Just, 1977b). Data on this ratio refer to public and publicly guaranteed debt and were obtained from various issues of the World Debt Tables.

(6) Imports-GNP ratio. This indicator measures the degree of openness of the country in question. To the extent that, as Frenkel (1983) has postulated, more open economies are more vulnerable to foreign shocks, it is expected that the coefficient of this variable will be positive. This indicator was constructed with data obtained from the International Financial Statistics.

(7) Growth of per capita GDP. It has been suggested [Feder and Just (1977b)] that a higher rate of growth of per capita output will enhance creditworthiness. Data on this indicator were obtained from the World Tables and World Development Report.

(8) Index of real effective exchange rate (REER). Cline (1983) has recently argued that the inappropriate exchange rate policies followed in a number of LDCs were one of the most important causes of the debt crisis. In particular, according to this view the sustained real appreciations of these countries' currencies played a major role in the process of overborrowing. In order to analyze whether the real exchange rate behavior indeed affected the perceived degree of creditworthiness, an index of trade-weighted real

effective exchange rates for these countries was also included in the analysis. The data on this index were obtained from Edwards and Ng (1985).

In addition to these variables related to the degree of country risk of a particular country, variables that summarize the specific characteristics of bank loans and bond issues -- like maturity and so on -- were also incorporated in the respective regressions.

III.1 Country Risk and Bank Loans

In the analysis on bank loans that follows, it is assumed that the world's risk-free interest rate i* can be approximated by LIBOR. It is also assumed that in the bank loans market the default country risk premium s is given by the spread over LIBOR charged to different countries. The assumption that the spread over LIBOR captures the probability of default has some problems, since the cost of borrowing includes additional elements, like fees and commissions. Unfortunately there are no reliable data on these components of the cost. 15/ However, during the period considered in this section (1976-80), these additional elements were typically very small compared to the interest cost, and were relatively uniform across loans and countries. This, of course, has not been the case in the more recent period, where debt reschedulings have been characterized by very substantial fees and commissions.

In the regression analysis, data on spreads for 26 countries during 1976-1980 were used. 16/ The spread variable was constructed, in each year, as a weighted average of spreads actually charged for public and publicly guaranteed Eurocurrency bank loans, denominated in U.S. dollars, and granted to each particular country. The weights were given by the value of each loan. The basic data were obtained from various issues of the World Bank's Borrowing in International and Capital Markets.

Following the traditional convention, of the following type of pooled regressions were estimated (where n refers to the nth country and t to the t time period):

$$\log s_{nt} = \gamma_n + \alpha_t + \Sigma\beta_i x_{nti} + \varepsilon_{nt}, \qquad (5)$$

where γ_n and α_t are country-specific and time-specific fixed effects terms, and ε_{nt} is an error with the usual characteristics. Note that the time-specific term α_t is capturing log k [= $\log(1+i_t^*)$] from equation (4). In order to test whether the γ_n and α_t dummies should indeed be included in the regression, F-statistics for their significance as a group were computed. 17/ In every case it was found that the null hypothesis that each of these effects were zero as a group was strongly rejected; consequently both γ_n and α_t were included in the estimation. Equation (5) was estimated using both OLS and instrumental variables techniques. The reason for this is that some of the country risk determinants may not be completely exogenous. 18/

In addition to the country risk variables described above two variables related to the specific characteristic of bank loans were also included. The variable "maturity" measures the (weighted) average maturity of bank 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 of loan maturities was constructed from data reported in Borrowing in International Capital Markets. The variable "loan volume" shows the weighted average value of each bank loan, and was constructed using data obtained from Borrowing in International Capital Markets. Also, a priori, its sign is ambiguous.

In Table 1 the results obtained from the estimation of equations of the type of (5) for the case of bank loans are presented. As can be seen these

results are quite satisfactory. First, and contrary to most previous results [i.e., Feder and Just (1977b), Sachs (1981), Burton and Inoue (1985)], the coefficient of the debt-output ratio was positive, as expected, and always significant at conventional levels. Also, the value of the coefficient was quite robust across specifications; its point estimate ranged from 0.75 to 1.09. These results provide support to most modern theoretical models which postulate that LDCs face, up to a certain point, an upward-sloping supply curve of foreign funds.

The coefficient of the reserves to GNP ratio was in most cases negative, but it was never significant. This suggests that for these countries and during this level period the international liquidity held by each country played no significant role in the process of determination of bank-loan country risk premia.

On the other hand, the coefficient of gross investment to GNP was in all cases negative, as expected. Further, in all the regressions, this coefficient was significant at conventional levels. These results provide important support to those models that postulate that the level of the country risk premium is affected by the way in which the borrowed funds are spent. The absolute value of the point estimate of this coefficient is quite similar to that of the debt output ratio. In order to test whether these two coefficients were significantly different in absolute terms, an F-test was computed. The F-statistic had a value of 0.005, indicating that the null hypothesis that these coefficients are equal in absolute terms cannot be rejected. This suggests that, if a country uses all its additional foreign indebtedness to increase investment, its level of creditworthiness will tend not to change. However, if some of the additional foreign funds are used to finance consumption, the perceived probability of default will increase. 19/

Perhaps surprisingly, the coefficient of the current account to GNP ratio, which measures the fraction of investment financed through borrowing from abroad, was never significant. This contrasts with Sachs' (1981) findings, where in a cross country analysis (for 1979), this ratio was found to be significantly negative.

The coefficient of the debt service ratio was always positive, as expected, and in three of the regressions significantat conventional levels. This provides some indication that the determination of the country risk premium in bank lending has reflected both solvency and liquidity considerations. 20/ The import/GNP ratio, on the other hand, turned out to be negative in all the regressions where it was included, and in two of these is was significant at the 10 percent level. The coefficient of growth was always insignificant, as was that of the real exchange rate index. This provides some evidence indicating that a real exchange rate overvaluation did not result in higher perceived probabilities of default. It should be recognized, however, that this result is not conclusive, since only under fairly restrictive assumptions can declines in REER be interpreted as a movement towards overvaluation. 21/ With respect to the variables that measure the loans' characteristics, the coefficient of the loan maturity was negative in all cases, and was significant in only one of the regressions. The coefficient of loan value also had negative coefficients in every regression; only in one of them was it significant.

In the equations reported in Table 1 a number of the country-risk variables turned out to be insignificant. For this reason, and in order to check the robustness of this results, some regressions that excluded these variables (but still included the country and time-specific dummies, the loan value and maturity) were also run. The results obtained clearly support those

reported in Table 1 and discussed above. For example the reestimation of equation (5.1) after dropping the insignificant country risk variables yielded the following result:

$$\log s_{nt} = \hat{\gamma}_n + \hat{\alpha}_t + \underset{(2.196)}{1.071}\ (\text{Debt/GNP})_{nt} \underset{(-2.152)}{-1.280}\ (\text{Gross Investment/GNP})_{nt}$$

$$+ \underset{(1.764)}{0.460}\ (\text{Debt Service/Exports})_{nt} \qquad (5.7)$$

$$N = 113$$
$$\bar{R}^2 = 0.877$$
$$F = 24.71$$

In sum, the results reported here indicate that the pricing of bank loans has indeed responded to (some of) the variables suggested by the theory. In particular these regressions show that the country risk premium is positively affected by higher level of indebtedness and higher debt-service ratio, and negatively affected by higher levels of investment. Given the relatively small variation that spreads and bank loans exhibited both across countries and over time during this period, it is somewhat surprising to find that they have in fact responded to the most important elements pointed out by the theory. In fact, until very recently some authors had argued that since bank spreads have varied so little, they could not have reflected the economic determinants of the country risk premium [Gutentag and Herring (1985), Folkerts-Landau (1985)]. The results reported here provide some evidence to the contrary.

III.2 The Bond Market and Country Risk

In this section data on yields on initial offering for 167 bonds floated by 13 LDCs between 1976 and 1980 are used to analyze the process of determination of the default country risk premium in the bond market. 22/ Even

Table 1. BANK LOAN SPREADS: POOLED DATA, 1976-80

	EQ (5.1) (OLS) a/	EQ (5.2) (OLS) a/	EQ (5.3) (OLS) a/	EQ (5.4) (INST) a/	EQ (5.6) (INST) a/
Debt/GNP	1.032	1.084	1.086	0.760	0.752
	(2.168)	(2.213)	(2.245)	(2.021)	(1.970)
Reserves/GNP	-0.934	-0.917	-0.652	0.242	0.247
	(-1.470)	(-1.079)	(-0.776)	(0.286)	(0.290)
Gross Investment/ GNP	-1.014	-1.415	-1.471	-1.409	-1.416
	(-1.917)	(-1.966)	(-2.084)	(-2.089)	(-2.081)
Current Account/ GNP	0.314	-0.103	-0.104	-0.064	-0.061
	(1.139)	(-0.241)	(-0.247)	(-0.180)	(-0.170)
Debt Service/ Exports	0.408	0.456	0.396	0.463	0.478
	(1.515)	(1.561)	(1.465)	(1.749)	(1.682)
Imports/GNP	--	-0.066	-0.067	-0.068	-0.067
		(-1.503)	(-1.579)	(-1.878)	(-1.822)
Growth	--	0.016	--	--	0.007
		(0.372)			(0.151)
REER	--	-0.002	-0.002	-0.002	-0.002
		(-0.971)	(-1.186)	(-1.232)	(-1.198)
Maturity	-0.007	-0.005	-0.004	-0.002	-0.002
	(-0.453)	(-0.287)	(-0.287)	(-1.232)	(-0.141)
Loan Value	-0.001	-0.001	--	--	--
	(-0.636)	(-0.629)			
N	116	113	113	113	113
$\bar{R}^2$	0.889	0.897	0.894	0.892	0.891
F	26.11	23.88	25.64	25.30	24.33

Notes: OLS is ordinary least squares and INST is instrumental variables. The number in parentheses are t-statistics. N refers to the number of observations. F is the F statistic for the regression as a whole, and $\bar{R}^2$ is the R^2 corrected by degrees of freedom.

a/ These equations included country-specific and time-specific dummies.

though the data on bonds yields used in this section are not exactly equivalent to the data on bank loans spreads used in Section III.1, both sets of results are later compared in order to assess the extent to which these two markets have behaved differently.

Since only a small number of developing countries floated bonds in the 1976-80 period, we faced a degrees of freedom problem. For this reason, the data on bonds' yields were treated somewhat differently than the data on bank spreads. First, bonds denominated in US dollars, DM, Yen, and Swiss Francs were considered. Consequently, currency dummies were incorporated to the regressions. Second, bonds placed both by the public and private sectors were included, and an index that distinguishes across borrowers was introduced in the regression analysis. However, only 26 out of the 167 bonds were issued by the private sector. And third, the yields were not averaged for every year; the independent variable, then, is the spread on each individual bond.

Both international (i.e., Eurobonds) and foreign bonds were included, and a dummy variable (Type) that took the value of 1 for Eurobonds was introduced. The majority of the bonds considered (94 out of 167) were, in fact, foreign bonds. In the regression a distinction was also made as to whether a particular bond had been publicly or privately issued. The dummy variable "Issue" took the value of one for publicly floated bonds. Finally, in order to have a homogeneous data set, floating rate notes were excluded from the regression analysis. 23/

The data on LDC bond yields were obtained from various issues of the World Bank Borrowing in International Capital Markets. Since the World Bank discontined this publication in 1981, the yields considered here include all the data available from this particular source. Depending on the currency of

denomination of each bond, the spreads were constructed as the difference between their yields and the yield of long-term US, German, Swiss or Japanese government bonds. The data on the developed countries bond yields were obtained from various issues of the IFS. With respect to the country risk explanatory variables, exactly the same variables used in the bank loan regressions were incorporated. Of course, in addition to these country-risk variables, the bond-specific variables -- such as maturity, type, issue and borrower -- were also incorporated.

Equations of the type of (5) were estimated for spreads on all the LDC bonds and for the subset of LDC foreign bonds. As in the case of banks, the regressions were estimated using both an OLS fixed effect method and a fixed effect instrumental variables procedure. 24/ In Table 2 the results obtained are presented. These results are quite interesting. First, as in the case of bank loans, the coefficient of the debt output ratio is positive, and in most equations significant at conventional levels. It is interesting to note that the point estimate of this coefficient appears to be, in general, slightly higher for the bonds regressions than for the bank spread regressions of Table 1.

Another interesting finding relates to the gross investment ratio. As was expected, and as in the case of the bank spreads, this coefficient was always negative and significant. In the bonds regressions, however, the absolute value of the point estimate is significantly smaller than that obtained in the bank loan regressions. This indicates that increases in the investment ratio enhances creditworthiness by significantly more in the bank loan market than in the bond market. This finding is in fact indicative that, as suggested by some authors and discussed in Section II of this paper, bonds and bank loans are priced in a different way.

Table 2. BOND SPREADS: POOLED DATA, 1976-80

	EQ (5.8) All Bonds (OLS) a/	EQ (5.9) All Bonds (OLS) a/	EQ (5.10) All Bonds (INST) a/	EQ (5.11) Foreign Bonds (OLS) a/	EQ (5.12) Foreign Bonds (OLS) a/	EQ (5.13) Foreign Bonds (INST) a/
Debt/GNP	0.972	1.694	1.064	1.980	1.853	1.572
	(1.704)	(1.433)	(1.628)	(2.184)	(2.005)	(1.450)
Reserves/GNP	0.023	0.882	0.874	0.078	0.116	4.428
	(0.400)	(0.618)	(0.453)	(1.072)	(1.318)	(1.604)
Gross Investment/ GNP	-0.048	-0.051	-0.066	-0.066	-0.070	-0.086
	(-3.597)	(-2.869)	(-3.242)	(-3.704)	(-3.755)	(-3.812)
Current Account/ GNP	-0.935	0.093	-0.516	-0.919	-1.969	-1.544
	(-0.636)	(0.053)	(-0.250)	(-0.408)	(-0.746)	(-0.654)
Debt Service/ Exports	-0.748	-1.414	-0.485	-1.205	-1.524	-0.143
	(-1.586)	(-1.088)	(-0.766)	(-1.601)	(-1.771)	(-0.167)
Imports/GNP	--	-1.229	0.048	--	--	--
		(-0.601)	(0.502)	--	--	--
Growth	--	0.038	0.027	--	--	--
		(-0.601)	(1.006)	--	--	--
REER	--	0.001	-0.002	--	0.006	-0.002
		(0.103)	(-0.336)	--	(0.770)	(-0.220)
Borrower	-0.036	-0.049	-0.035	0.091	0.095	0.086
	(-0.589)	(-0.767)	(-0.570)	(1.054)	(1.103)	(0.982)
Maturity	-0.071	-0.074	-0.074	-0.050	-0.051	-0.044
	(-2.815)	(-2.925)	(-2.901)	(-1.670)	(-1.673)	(-1.457)
Type	0.147	0.087	0.105	--	--	--
	(0.673)	(0.391)	(0.467)	--	--	--
Issue	-0.071	-0.094	-0.109	-0.169	-0.171	-0.261
	(-0.515)	(-0.666)	(-0.777)	(-0.952)	(-0.960)	(-1.440)
N	167	164	164	94	94	94
$\bar{R}^2$	0.354	0.436	0.440	0.409	0.590	0.590
F	7.67	7.14	7.06	9.18	8.63	8.58

Notes: t-statistics in parentheses.

a/ These equations were estimated including time-specific dummies and currency dummies.

A puzzling result relates to the debt service coefficient. Contrary to what was expected, and to the case of bank loans, this coefficient turned out to be negative. Moreover, in one of the six equations it was marginally significant. The coefficients of imports/ GNP, growth, REER, borrower, type and issue were in all cases insignificant at conventional levels. The coefficient of maturity, however, was significantly negative. As in the case of bank loans, this is somewhat puzzling since it suggests the presence of a negatively sloped yield curve.

The results reported in this section, then, further support some of the more important implications of modern models of external borrowing. First, there is evidence that bond spreads depend postively on the level of indebtedness of the country. This result is in agreement with the findings reported in Section III.1 for bank loans. Second, the results reported in Table 2 also indicate that the perceived degree of country risk is negatively affected by the level of investment a country undertakes. With the exception of maturity and the debt service ratio, the other coefficients included in these bond spread regressions were typically not significant.

III.3 Comparison

A comparison of the bank and bond spread regressions does suggest that, as was discussed in Section II of this paper, there are some differences in the way in which risk is priced in each of these markets. While both spreads are affected in a significant fashion by the debt-output, debt-service and gross investment ratios, a casual look at the evidence suggests that bond spreads are (slightly) more sensitive to increases in the debt output ratio, and that they are less sensitive to changes in the investment ratio. This latter difference

was actually quite marked. Also, while the bank spreads regressions suggested a negative relation between the reserves ratio and the degree of creditworthiness, the bonds spreads regressions indicate in that market that such relation is either non-existent or positive. Moreover, as expected, the bank spreads were positively affected by a higher debt service ratio; the bond regressions, however, indicate a negative relation between spreads and debt service ratio. Finally, in both sets of regressions, the coefficient of maturity turned out to be negative.

In order to get additional insights on the process of risk pricing in these two markets, regressions for bonds and bank loans spreads were simultaneously estimated using jointly generalized least squares (i.e., seemingly unrelated regressions). The data set used was slightly smaller, and excluded bonds issued by the private sector. Tests for the equality, across equations, of the coefficients of the debt-output ratio, the investment ratio, the reserves ratio, the debt service ratio and the current account to GNP ratio were performed. The F-statistics obtained indicate that the null hypothesis of equality across equations of the debt output coefficient cannot be rejected ($F = 0.33$). On the other hand, the hypothesis of equality across equations of the debt service ratio was strongly rejected ($F = 5.79$), as were the hypotheses of equal coefficients across equations for the investment ratio ($F = 2.9$) and for the reserves ratio ($F = 2.7$). Finally, the equality of the current account ratio could not be rejected at marginal levels ($F = 2.1$).

In general, then, the comparison of the bank and bond spread regressions suggest some differences between the process of risk pricing in these markets. The more important of these differences relates to the impact of the investment ratio on the risk premium. While in both markets higher investment

enhances creditworthiness, this effect is much more important in the bank loans market. Even though the results reported here are by no means conclusive, they do indicate that in both markets (some of) the relevant theoretical variables played an important role in determining the country risk premium.

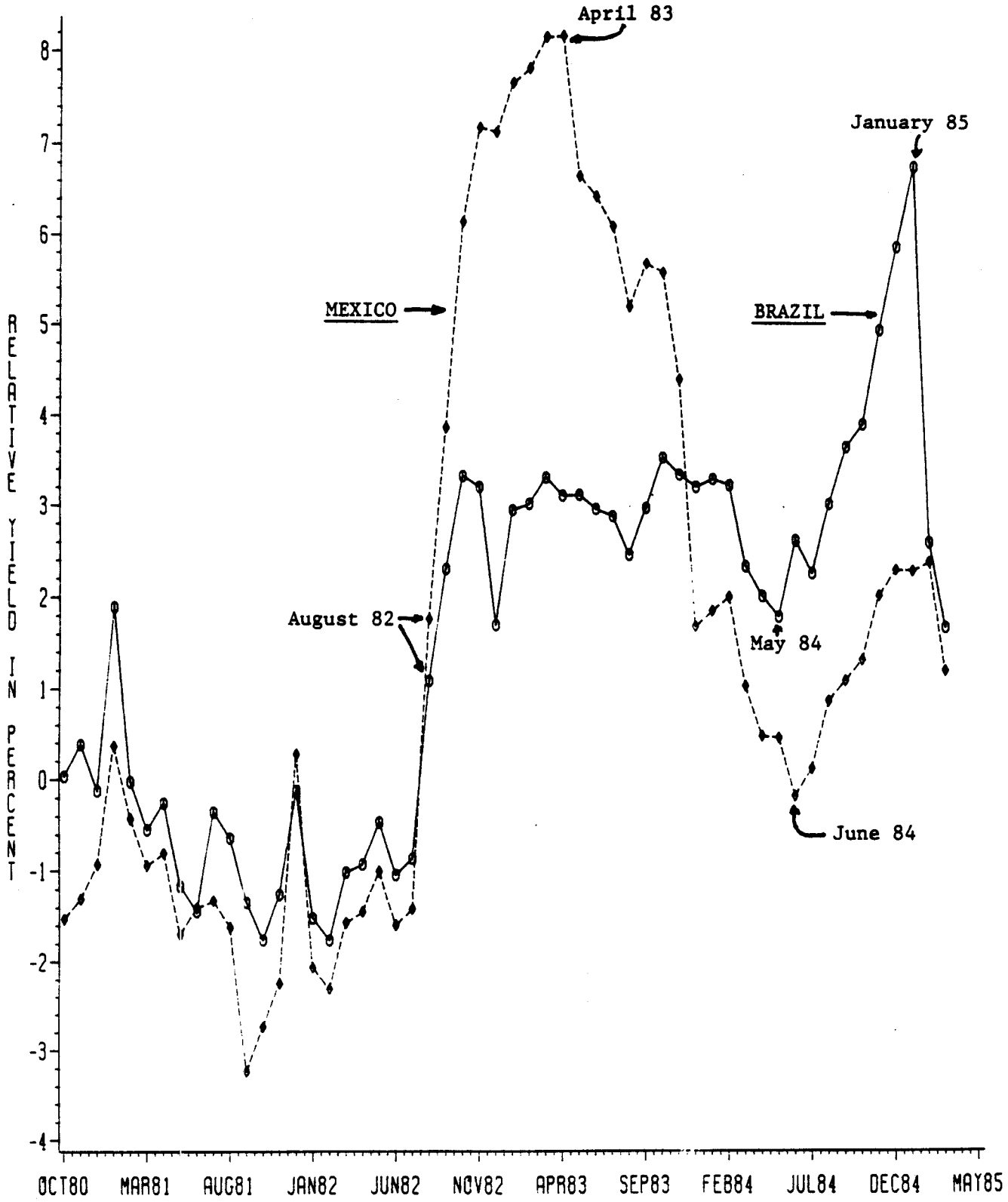
IV. The Secondary Market for LDC Bonds and the Debt Crisis: 1980-85

The results presented in the preceding section showed that, during 1976-80, spreads in the international bank loan market and in the bond market reflected (some of) the theoretical determinants of the default country risk premium. However, the data used in that analysis did not include the debt crisis period. In this section the behavior of country risk premia during and immediately after the debt crisis is investigated. Some interesting questions relate to whether the international financial community anticipated the crisis and the extent to which the market reflected, after the crisis erupted, the higher risk involved in LDC lending. Unfortunately these questions cannot be addressed with data of the type used in Section III. After mid-1982 the vast majority of these countries could not float bonds. Also, since that date a large proportion of bank loans have reflected "forced lending," where the spreads charged -- even corrected by fees and commissions -- don't necessarily reflect the implicit riskiness of dealing with these troubled countries.

However, the change in perception regarding the degree of riskiness of LDCs debt can be analyzed using data from the secondary market for LDC bonds. In this section data on yields on Mexican and Brazilian bonds in the secondary market are used to analyze the characteristics of this market, and its reaction to changes in the perception of the level of risk. Figure 1 presents monthly data on the spread between a Mexican government bond and a World Bank comparable

FIGURE 1

SPREADS ON MEXICAN & BRAZILIAN BONDS: 1980.10–1985.3



Source: See text.

O = BRAZIL
DIAMOND = MEXICO

bond and between a Brazilian bond and the same World Bank bond, for the period October 1980 through March 1985. Since it can be reasonably assumed that World Bank bonds are quite safe, these spreads can be considered as good proxies for the default country risk premium. 25/

Perhaps the most interesting feature of this figure is that, contrary to bank loan spreads, the bonds' yield spreads experienced significant variations during this period. For both countries it was slightly negative from October 1980 through mid-1982. It then jumped, reaching peaks of more than 800 basis points for Mexico and 400 basis points for Brazil. In late 1984 and early 1985 the spreads experienced an important decline for both bonds. Also, this figure suggests that the market anticipated by only a few weeks -- and only partially -- the Mexican debt crisis of August 20, 1982. As late as July of 1982, the spreads were negative, and not significantly different from the average for the preceding 18 months. Gutentag and Herring (1985a), however, have argued that the market anticipated by approximately a full year the crisis. Clearly, that contention is not reflected in our spreads data presented in Figure 1.

It is interesting to see whether the major turning points in these spreads were in any way related to major economic or political events in these countries. The first major increase in the spreads took place in early August 1982, just prior to Mexico's official announcement that it was facing serious problems to pay its debt. This August jump in the spread -- which for Mexico was equal to 319 basis points -- took place only 30 days after Mexico had obtained a jumbo loan for US$2.5 billion under convenient conditions. The relative tranquility observed in the spreads' behavior until July of 1982 is somewhat puzzling. Between the third quarter of 1981 and June of 1982, the

international media was plagued by stories that clearly pointed out that both the Mexican and Brazilian economies were facing serious problems. For example, between July 1981 and mid-August 1982, the New York Times published twelve stories that stressed the sharp weakening of Mexico's external position. 26/ During the same period, the New York Times published four stories related to Brazil's external sector. A possible interpretation for the apparent normal behavior of the spreads, is that until July of 1982 most analysts -- and the market -- believed that these countries were going through temporary cash flow problems, but that their solvency was not seriously at stake. 27/

During September of 1982, new negative developments affected the Mexican economy. On September 1, President Lopez Portillo nationalized the banks; on September 7, the government announced that all principal payments of the foreign debt would be suspended until the end of 1984. On the positive side, the IMF announced that it expected to have a US$5 billion package for Mexico by late 1980. The market reacted to this news by further discounting the value of Mexico's debt: in October of 1982, the spread reached 612 basis points.

Interestingly enough, between July and October of 1982 no major negative events affected the Brazilian economy. In spite of this, between July and October, the Brazilian spread increased by 418 basis points. There is little doubt that the market was reacting to the Mexican and Argentinian situations, and was in fact anticipating Brazil's formal acknowledgement that it was also in serious trouble, and that it could not make payments on its debt. Between October of 1982 and April of 1983, while the Mexican spread continued to climb, the Brazilian spread stabilized around 280-300 basis points. The fact that Brazil reached an early agreement -- in February of 1983 -- with its creditors, was reflected in the relatively lower and stable spread on its bonds.

Clearly, at least until December of 1982, the behavior of the Mexican spread reflected the chaotic situation that characterized the last few months of the Lopez Portillo administration. In December of that year, President de la Madrid was sworn in, and strict austerity measures were announced. On December 22, the IMF gave final approval to a US$4 billion loan to Mexico. Between December 1982 and April of 1983, the Mexican government continued to negotiate with banks, and to implement corrective measures. In May 1983, the IMF announced that Mexico's economic performance during the first quarter was in line with the agreement with the Fund. In that month the Mexican spread experienced, for the first time in 10 months, a significant decline: 152 basis points. For the next 13 months the Mexican spread continued to decline, as the economy's conditions improved significantly. On August 27, 1983, an agreement to reschedule Mexico's debt was signed. After further reductions, in June of 1984, the spread reached its lowest value since mid-1982. In July 1984 the spread began to climb once again. A possible explanation for this is that during the second half of 1982 the market was unsure whether the Mexican government was also going to reschedule its bond debt. In late 1984, however, it was officially announced that neither bonds nor debt to international agencies would be rescheduled and the spread, once again, declined.

Throughout this period -- April 1983 to June 1984 -- the Brazilian authorities continued to make some progress in further negotiations with the IMF and with banks. In July of 1983, a new agreement with the IMF was reached, and the disbursement of the US$5.4 billion standby loan continued. At the same time, the political system was going through important reforms, as Brazil got ready for the first civilian president in 20 years. Between April 1983 and May 1984, the Brazilian spread was remarkably stable, averaging 285 basis points.

Between May 1984 and January 1985 -- the month when the new president was supposed to be chosen -- the Brazilian spread experienced a steep increase, climbing by more than 490 basis points. The behavior of the spread during this period reflected, basically, political uncertainty. These months were characterized by political turmoil, as the issue of whether the next president should be elected by direct popular vote was actively -- and sometimes violently -- discussed. On January 15, 1985, Tancredo Neves was elected, without major incident, as the first civilian Brazilian president in more than 20 years. That month the government reported that it had made important progress in negotiations to reshedule US$50 billion of its debt. During March and April, the Brazilian spread dropped dramatically to its June 1982-June 1984 levels.

In order to formally analyze the behavior of the risk premium in the bond secondary market, a regression analysis using data on the Mexican bond spreads was undertaken. Due to some data deficiency, the Brazilian spreads were not scrutinized as closely. A problem with this analysis, however, is that there are no monthly data on total debt, total debt service, or GNP for Mexico. For this reason, in this regression analysis it is not possible to use the same independent variables as in Section III; a number of proxies were used. The ratio of the financial system long-term foreign debt relative to exports was used as a proxy of the debt output ratio. 28/ The international reserves to imports ratio was used as a proxy for the reserves output ratio. Also, the balance of trade, the annual rate of growth in manufacturing production, the index of the effective real exchange rate and the price of Mexican oil were included in the regression. 29/ In the specification used the spread was the dependent variable and the spread lagged one period was included as an explanatory variable; all independent variables were lagged one month. 30/

The following results were obtained from the estimation of the time series of the Mexican bonds spreads in the secondary market.

$$\begin{aligned} \text{spread} = {} & \underset{(-1.623)}{-6.641} + \underset{(2.807)}{0.820}(\text{Debt/Export}) - \underset{(-3.634)}{0.768}(\text{Reserves/Imports}) \\ & + \underset{(1.233)}{0.0005}(\text{B of Trade}) - \underset{(-1.695)}{9.284}(\text{Growth Manuf. Prod.}) \\ & + \underset{(1.429)}{0.062}(\text{Real Effective Exchange Rate}) + \underset{(1.801)}{0.187}(\text{Price Mexican Oil}) \\ & + \underset{(8.290)}{0.653}(\text{Spread})_{-1} \qquad \bar{R}^2 = 0.954 \\ & \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad DW = 2.079 \end{aligned}$$

These estimates are quite interesting. First, as expected, the coefficient of the debt-export ratio was positive and significant at conventional levels. This result is in agreement with those obtained in Section III, and indicates that the secondary market takes into account some of the economic variables suggested by the theory when pricing LDCs' bonds. Also, as expected, the coefficient of the reserves-imports ratio was negative and significant. With the exception of the price of oil all other explanatory variables were insignificant.

These results were obtained using the actual values of the explanatory variables. However, modern theories of financial markets' behavior have suggested that expectations play a crucial role and that asset prices react to unanticipated changes of the relevant variables. In order to anlayze the extent to which this has been the case for Mexican bonds, this equation was also estimated using proxies for the unexpected changes of all the right-hand side

variables. Interestingly enough the results obtained when "surprises" of the right-hand side variables were used basically confirm those reported above. 31/

V. Concluding Remarks

In this paper several aspects of LDCs' foreign borrowing and country risk have been investigated. The empirical analysis looked at the process of determination of country risk premia both in the bank loan and bond markets, and compared the way in which LDCs' debt is priced in these two markets. These two markets have important differences both from economic and institutional perspectives. Some authors (e.g., Folkerts-Landau, (1985)) have even argued that, whereas interest rates charged by banks do not reflect the true risk associated with lending to the LDCs, yields on developing countries' bonds do in fact capture this risk.

The main findings of this analysis can be summarized as follows. First, it was found that, both in the bond and bank loan markets, the country risk premium has been a positive function of the debt output ratio and a negative function of the investment GNP ratio. This corresponds to what most modern models of foreign borrowing have suggested, and contradicts findings reported in previous studies [i.e., Feder and Just (1977b), Sachs (1981) and Burton and Inoue (1985)], where, using spreads on bank loans and different data sets, this coefficient was not significant. In the bank loan regressions it was also found that other variables, like the reserves to GNP ratio and the current account ratio, had the expected sign but were typically non-significant; the debt service ratio was, however, marginally significant.

Second, a comparison of the bank and bond regressions indicates that, as argued by some authors, there are some differences in the process of

determination of country risk premia in these two markets. These differences are reflected by the fact that in the regressions some of the coefficients are significantly different across markets. However, the coefficient of the debt output ratio is the only coefficient not significantly different across these two regressions.

Third, using data on yields on Mexican and Brazilian bonds in the secondary market, it was found that the international financial market had only anticipated by a few weeks -- and only partially -- the Mexican crisis of August 20, 1982. These data also show that after the debt crisis, the market discounted quite heavily the Brazilian and Mexican debt. A regression analysis performed using time series of monthly spreads of Mexican bonds in the secondary market confirm the results obtained in the preceding sections, in the sense that the country risk premium had responded to some of the variables suggested by the theory. Also, this analysis indicates that changes in the Mexican country risk premium responded to unanticipated changes (or surprises) of the relevant exogenous variables.

FOOTNOTES

1/ On the recent debt problem, see the volume edited by Smith and Cuddington (1985). See also Sachs (1984) and the survey by Eaton, Gersovitz and Stiglitz (1986). For an analysis of different aspects of international risk, see Herring (1983). On country risk and creditworthiness see, for example, Feder and Just (1977b), Feder and Ross (1982), Melvin and Schlagenhauff (1986), Feder and Uy (1985) and Edwards (1984, 1986).

2/ See, however, Eichengreen and Portes (1986). On debt rescheduling see, for example, Cline and Frank (1971), Feder and Just (1977a), Cline (1983), and McFadden et. al. (1985). On risk spreads, see Feder and Just (1977b) and Edwards (1984).

3/ See, for example, Eaton and Gersovitz (1981a), Gersovitz (1985), Sachs and Cohen (1982), Sachs (1984), Sachs (1982), McKinnon (1984), and especially Folkerts-Landau (1985).

4/ See, for example, Sachs (1984), Sachs and Cohen (1982), Eaton and Gersovitz (1981b), and Edwards (1983).

5/ For a fascinating account of some of the LDCs' defaults, see Wynne (1951). See also Eichengreen and Portes (1986).

6/ Cross default clauses typically don't include bonds. Wellon (1979) for example, points out that when establishing cross default clauses, experienced borrowers distinguish among types of debt.

7/ Traditionally, however, bondholders have tried to jointly face crisis situations through different organizations, including the Foreign Bondholders Protective Council and the Council of Foreign Bondholders. Historically, however, different bondholder groups have many times engaged

in internal discussions and have negotiated separately (Wynne 1951). Also, in actual debt crisis situations, bondholders and banks have usually disagreed sharply on how to face the problem. Perhaps the most recent and extreme case is that of Costa Rica in 1980 where the bondholders, represented by the Banque Nationale de Paris, and the banks, led by the Bank of America, entered into a serious conflict. On the Costa Rica case see, for example, Suratgar (1984).

8/ In Sachs and Cohen (1982) bond borrowing is also characterized by a lower ceiling. Even though traditionally bonds have not been included in debt reschedulings, there is at least one recent case where this has happened. In 1980 ADELA -- a small Latin American development financing agency -- rescheduled a US$25 million floating notes issue.

9/ See, for example, Kyle and Sachs (1984). Recently, however, a very limited secondary market for LDCs' bank loans has developed.

10/ See Suratgar (1984).

11/ Basically, there are two possible strategies that can be followed in order to motivate the empirical analysis reported below. First, a model of borrowing and foreign debt pricing can be explicitly derived. Second, the more important implications of existing models can be tested. In this paper I have decided to follow the second route, since it allows a more general type of analysis. This approach also has the advantage of allowing testing of the relative merits of alternative models. However, in a previous paper (Edwards, 1983) I followed the first strategy and formally derived a model of foreign borrowing and debt pricing.

12/ If, however, a risk averse lender is assumed, equation (2) will contain some additional terms. See Gutentag and Herring (1985b).

13/ For an alternative way of deriving an equation similar to (2) in the context of monopolistic banks, see Feder and Just (1977b).

14/ See, however, Edwards (1984).

15/ The papers by Feder and Just (1977b), Sachs (1981) and Edwards (1984) have also excluded fees and commissions. Mills and Terell (1984) have found that fees and commissions have been equivalent, on average, to 24 basis points.

16/ In my 1984 article, I used data for only 19 countries. Also, in that study a different estimation technique was used. The countries considered in the present study are: Algeria, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Greece, India, Indonesia, Ivory Coast, Jordan, Korea, Malaysia, Mexico, Morocco, Panama, Philippines, Portugal, Spain, Thailand, Tunisia, Uruguay, Venezuela and Yugoslavia. Not all these countries had data for every year. The data are available on request. It is important to notice that, contrary to the more recent period, during 1976-80 spreads over LIBOR experienced a nontrivial variation across countries in any particular year.

17/ This, of course, is a standard procedure. See Judge et. al. (1980).

18/ The following instruments were used: constant, lagged debt-output ratio, lagged reserves-GNP ratio, lagged and current current account ratio, imports-GNP ratio, loan maturity, growth investment ratio, exports, debt service ratio, real effective exchange rate index and growth.

19/ This statement has to be qualified in an important way. To the extent that the debt-service ratio plays a role in the determination of the risk premium, even if all of the newly borrowed funds are used for investment, the spread will increase. The results reported in Table 1 indeed suggest that the debt-service ratio has played some role in the process of determination of the risk premium.

20/ Since the debt ratio is computed relative to GNP and the debt service ratio relative to exports, both point estimates cannot be directly compared.

21/ These assumptions are: 1) the equilibrium real exchange rate is constant in every country, and 2) the equilibrium real exchange rate is the same across countries for the period under study. These assumptions are, of course, very restrictive.

22/ The countries included in this section are: Argentina, Brazil, Ecuador, Indonesia, Korea, Malaysia, Mexico, Panama, Philippines, Spain, Thailand, Venezuela, and Yugoslavia. This is a subset of the countries included in the bank loan spreads analysis.

23/ Only a relatively smaller number of floating rate bonds were issued by the developing countries during this period. Most of the bonds considered in this study were straight bonds. A potential problem with these data is that the different bonds may have different call provisions. Unfortunately it is not possible to find data on these provisions from standard sources like the World Bank or AGEFI.

24/ As before, F-statistics were computed to test whether the time specific and country specific fixed effect dummies shoud be included in the regression. The null hypothesis that the country dummies are jointly zero cannot be rejected. However, the hypothesis that all the year dummies are zero is rejected. As a result, these regressions included α_t and excluded γ_n.

25/ These data refer to yields on US dollar denominated bonds of comparable maturities. For 1982 through 1985 the data were taken from Folkerts-Landau (1985). For 1980-1981 the data were directly obtained from the International Herald Tribune, which is the source used by Folkers-Landau. The same bonds were followed through time. The following bonds were used:

World Bank, 10 1/4, June 1987; Mexico, 8 1/4, March 1987; Brazil, 8 1/4, Decenber 1987. For all cases, except December 1984 and January 1985, the yields refer to the first Monday of each month. For January 1985 and December 1984, the second Monday was used. Kyle and Sachs (1985) also used yields differentials with respect to World Bank notes to illustrate the change in the valuation of the LDCs debt. Gutentag and Herring (1985) looked at the spread over LIBOR on Nafinsa floating rate notes.

26/ These stories included the Alfa group announcement that it could not pay its foreign debt (10 May 1982), Minister Silva Herzog's forecast of zero growth for 1982 (13 May 1982), and Mexico's request for an IMF team to visit the country (17 August 1982).

27/ This interpretation is somewhat consistent with the result of Section III, where it was found that liquidity considerations played no major role in the determination of risk premia in the bond market.

28/ This variable has also been used by Melvin and Schlagenhauff (1986). These data were obtained from the IFS.

29/ Since Mexico is not a member of OPEC, the actual price obtained for Mexico's "isthmus" quality oil was used. Unfortunately the time series for this price start only in January 1981.

30/ Note that in this regression the role of political events has not been incorporated formally. The reason for this is that it is not easy to construct a "political instability" index. However, an analysis of the residuals of this equation confirms the hypothesis that political developments affected in a nontrivial way the pricing of Mexican bonds in the secondary market.

31/ These results are available from the author on request.

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