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The International Commercial Loan Rate

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Studies of third world debt lending by commercial banks assert that while LDC bond yields reflected the "true" price of risk, commercial loan rates were generally inadequate over the great debt buildup period. This paper draws on the domestic commercial bank literature to demonstrate that banks actually adjusted a portfolio of factors, including maturity, grace period and loan size, in addition to the interest rate, in "pricing" loans to the developing world during the period 1976-82. Further, this study suggests that a more comprehensive international commercial loan rate embodying these factors might actually equal the bond rate. Such findings may be useful to borrowing countries conducting renegotiation of existing loan terms. For example, if a larger loan is desired, the borrower can offer to pay a higher interest rate or accept a shorter maturity, or some combination of factors.

I. Introduction

It has been suggested that during the period of the great debt buildup to third world countries between 1976 and 1982, the nominal loan rate charged to sovereign borrowers by private commercial banks was inadequate for the risk assumed (Haeusgen (1977)). Other researchers have asserted that the yields charged by the international bond market more accurately reflect the required return in the LDC debt markets over this period of time (Folkerts-Landau (1985); Edwards (1984)). Over the period, one can generally observe differences, or gaps, between the two credit interest rates for almost any given borrower country. This paper, however,

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will suggest that such a gap between bonds and loans might not exist when one considers a broader definition of the bank loan rate, which we call the "International Commercial Loan Rate."

According to domestic credit rationing literature[1] commercial banks consider a vareity of variables, not merely interest rate, in "pricing" risk on commercial loans. For international loans, research by Burton and Inoue (1985) and Edwards (1985) found that other elements such as loan maturity, grace period, and quantity adjustment in addition to the nominal interest rate are factored into loan terms.

This study's purpose is to examine the non-price elements of maturity, grace period, and quantity as potentially reconciling the observed gap between international bond and international bank loan rates during the period 1976-82.[2] Such findings can be useful in explaining how international banks adjust for risk.

The generalized view of this research can be illustrated in the following

(1) BANK RATE = LIBOR + MARGIN
(2) BOND RATE–(LIBOR + MARGIN) = GAP
(3) GAP = LOAN SIZE + MATURITY + GRACE PERIOD
(4) INTERNATIONAL COMMERCIAL LOAN RATE = LIBOR + MARGIN + LOAN SIZE + MATURITY + GRACE PERIOD

This paper begins by discussing the necessity for adjusting the bond-loan gap for term structure distortions. Following this adjustment, we describe the generation of a bond-loan risk premia as the basis for studying the gap filling process. Next, the variables utilized in the analysis are presented. This is followed by a recitation of sources of data and the methodology. Finally, the results are reported and some general conclusions from the research are provided.

II. The Need for Correction

The historical gap between yields on bonds and loans has been observ-

[1] For a sampling of this extensive literature, see Anderson and Ostras (1977), Baltensperger (1976) (1977) (1978), Freimer and Gorden (1965), Harris (1974), Hodgman (1974), Jaffee (1970), Keeton (1979), and Stiglitz and Weiss (1981).

[2] It was our intention to observe bank behavior during the massive debt buildup period of 1976-82. Prior to 1976, banks were not particularly aggressive in Euro-lending to the third world. After 1982 and the Mexican default, it is felt that loan pricing was conducted in an atmosphere of distress and not representative of normal bank behavior.

ed by Folkert-Landau (1985). This nominal gap, however, has not been consistently positive as is shown for Mexico in Table 1. Column (4) reveals a positive gap with bond yields exceeding loan rates beginning in the 3rd quarter of 1982. However in the previous periods the gap was negative, as bonds had lower yields than loans. In addition, column (5) shows that, except for the 3rd quarter of 1982, Mexican bonds produced yields even lower than the LIBOR[3] rate. This seeming anomalous result is explained by an inverted yield curve present in financial markets during this time whereby short term rates (i.e., LIBOR) were higher than long term bond rates.

Table 1

COMPARISON OF LDC BOND AND LOAN YIELDS FOR MEXICO
(In Percent)

	(1) Returns on U.S. dollar bonds	(2) LIBOR + margin	(3) LIBOR	(4) (1)minus(2)	(5) (1)minus(3)
1981 III	13.51	18.75	18.30	−5.24	−4.79
IV	14.30	15.49	14.80	−1.19	−0.50
1982 I	13.34	16.01	15.20	−2.67	−1.86
II	13.56	15.81	15.10	−2.25	−1.54
III	15.57	13.80	13.30	1.77	1.77

Sources: International Herald Tribune, various issues; World Bank, *Debt Reporting Service.*

III. Bond-Loan Risk Premium

To adjust for potential term structure distortions, a bond and loan *risk premia* was developed. In doing so, it was assumed that LDC sovereign borrowers pay a premium over industrial country borrowers and that this premium exists in both the bond and loan markets.

The "bond risk premium" is defined and calculated as the respective

[3] In all cases, 6-month LIBOR was used.

LDC bond yield less the yield on a comparable industrial country bond.[4] In a similar fashion, the "loan risk premium" is the LDC margin over LIBOR less the margin over LIBOR for an industrial country. It is this gap between the bond premium and the loan premium which this study examines.

For Mexico, Table 2 illustrates the gap between the bond premium and loan premium in column (7). Except for the anomalous quote in the first quarter of 1982, there is a positive bond-loan premium gap. This paper will ultimately suggest that this gap might be at least partially filled by the nonprice adjustments of quantity, maturity, and grace period.

IV. The Variables

In this study, the maturity variable is measured in years to final maturity as recorded for individual loans syndicated. *A priori,* it could be expected that, other factors held constant, a more highly rated credit borrowers would obtain longer term funds. Grace period refers to the time before the first amortizations of principal begin. It would appear that countries with better credit ratings would normally be allowed a longer grace period. Finally, the quantity adjustment variable is measured by the quantity borrowed in millions of dollars. It is anticipated that a better credit rated country would obtain a larger loan.

V. Data

Bank loan data are provided by the World Bank's *Borrowing in International Credit Markets* (various issues). Country ratings are those as published in *Institutional Investor* magazine for the years since 1979. For the earlier period 1976-1978, ratings were generated by Sanders (1987)[5]

[4] It is critical in deriving the bond risk premium that LDC bonds be similar in parameters to the industrial country bond. In this regard, see footnote a in Table 2. The Mexican bond is a U.S. dollar 8 1/2% March 1987 instrument, while the Bergen City, Norway is a U.S. dollar 8% April 1987 bond. In order to make the higher coupon Mexican bond comparable with the lower coupon Norwegian bond, the observed yields on the Mexican bond were adjusted down 50 BP. Thus, in Column (1) of Table 2, while the quoted Mexican bond yield was 12.96% for 1981: III, the 50 basis point adjustment resulted in the 12.42% actually tabulated for analysis purposes. All third world bond yields in the study were adjusted in a similar manner throughout the study.

[5] The publishing of discrete country ratings only began in 1979; Sanders (1987) generated ratings back to 1976. The method for doing so involved a simple forecasting model. A

Table 2

THE GAP BETWEEN THE BOND RISK PREMIUM AND THE LOAN RISK PREMIUM FOR MEXICO[a]

	(1) Mexican Bonds	(2) Industrial country bond	(3) (1)minus(2) bond risk premium	(4) Mexico loan margin	(5) Industrial country loan margin	(6) (3)minus(4) loan risk premium	(7) Overall premium: Bond-risk premia less loan risk premia (3)minus(6)
1981-III	12.42	11.53	0.89	0.45	0.46	−.01	0.90
IV	12.56	12.06	0.50	0.69	0.46	.23	0.27
1982-I	13.31	13.49	−0.18[b]	0.81	0.57	.24	−.42
II	12.95	12.54	0.41	0.71	0.47	.24	.17
III	13.23	12.96	0.27	0.50	0.48	.02	.25

[a] The Mexican bond is a U.S. dollar 8 1/2% March 1987 instrument, while the industrial bond is a Bergen City, Norway U.S. dollar 8% April 1987 bond. The Mexican bond yield has been adjusted down 50 B.P. to make it comparable with the Norwegian bond coupon rate.

[b] The negative bond risk premium is anomalous. Data were taken on a particular day at the end of the period. In the first quarter, world interest rates peaked and it is likely that markets were a bit disorganized.

Sources: International Herald Tribune, & World Bank, *Debt Reporting Service.*

using macroeconomic data published in the Workd Bank's *World Debt Tables.*

Developing country bond yields were taken from various issues of the *International Herald Tribune.* Finally, the countries utilized in this analysis are listed in Appendix A.

VI. Models

In this study two increments of data were examined. The first set studied LDCs which issued bonds. These estimations on 13 countries over the period 1980-82 were necessary to examine the relationship between bond yields, the bond-loan gap, non-price risk adjustments, and country rating. If it could be found that the bond-loan gap was statistically related to country rating and the non-price elements of maturity, grace period, and quantity[6] than one could infer that these non-interest-rate elements might be filling the gap, at least in part, beween bonds and loans.

The second set of cross-sectional regressions examined the bank borrower market and sought to establish whether bankers use non-price elements in risk adjustment over time. These elements of pricing were regressed on country rating in seven separate annual (1976 through 1982) cross sections. In this manner, the progression of adjustment over time was studied.

Pooling

Regressions on the bond data involve a pooling cross-section time-series method detailed in Kimenta ((1971), pp. 508-514). Since pooling

regression of various country risk ratios (established in the literature to relate to country rating) was run on *Institutional Investor* country ratings as the dependent variable for the period 1979-82. The coefficients were applied to country risk ratios taken from *World Debt Tables* for the period 1976-78. The final endogenous variable generated was the country rating for the period 1976-78. A listening of such generated ratings is available from the authors.

[6] A reader might be concerned with matters of endogeneity in the regression models. It could be asserted that country rating is simultaneously determined with interest rates, maturity, loan size, etc. We feel, however, that such an assertion probably ignores practice by lenders in using customer credit ratings. Before the lender prices up a loan, he or she must first know the borrower's credit rating. Investment bankers have bonds rated by the services before establishing a yield for sale. This rating then generates or prompts the loan terms. We therefore conclude that causation does run from right to left in the regression functions, thus fulfilling the OLS assumption.

preserves statistical power in small samples, the technique seems appropriate for the 13 bond issuing countries over a three year period. Under ordinary least squares, the usual suspicion is that the residuals are autoregressive while the cross section is heteroscedastic. The pooling time series-cross section method produces intertemporally independent residuals which are homoscedastic.

To test for the presence of heteroscedasticity in the cross-sectional regressions on bank market data, the White Test was utilized (White (1980)). See Appendix B for a development of this test.

VII. Results

1. Pooling

Table 3 summarizes pooling regressions of various specifications of the

Table 3

POOLING CROSS SECTION-TIME SERIES REGRESSION ON COUNTRY RATING
(Bond-Issuing Countries: 1980-82)

Dependent Variable	Coefficients[b]	n	R^2
Bond Rate	−.088[a]	39	.13
	(−2.32)		
Bond Risk Premium	−.088[a]	39	.27
	(−3.73)		
Overall Premium	−.069[a]	39	.16
	(−2.69)		
Grace Period	.025[c]	39	.06
	(1.51)		
Maturity	.038[c]	39	.04
	(1.26)		
Quantity	41.67[a]	39	.13
	(2.39)		

[a] Significant at $\alpha = 5\%$.
[b] t-statistics in parenthesis.
[c] Grace period is significant at $\alpha = 14\%$; maturity is significant at $\alpha = 21\%$.

bond-loan gap on country rating.

The purpose of this analysis is to establish whether the gap between bonds and loans ("overall premium") is related to country rating. As can be seen, the coefficient is significant at −.069, suggesting that the gap becomes larger as the country rating declines. Thus, sovereign entity bond yields rise relative to nominal bank loan rates as country rating dropped. This increasing gap may have been filled by other loan risk adjustments such as maturity, grace period and quantity.

Table 3 indicates that quantity adjustments were related to country rating at a 5% level of significance, grace period was related at an α of 14%, and maturity was significant at an α of 21%. Thus, by observing the significance of the risk adjustment factors in Table 3, one obtains a first indication that the loan markets adjusted several factors, not merely interest rate, for increased risk in country loans.

2. Cross Sectional Regressions

Table 4 presents the results of the cross sectional regressions. The table demonstrates the use of risk adjustment factors over time. Both loan margin (except for 1977, 1978 and 1980) and quantity adjustments (except for 1976 and 1982) were related to country rating at the $\alpha = 5\%$ for the data period. It can also be observed that maturity was being consistently adjusted relative to country rating beginning in 1979. Finally, even grace period factor was adjusted in 1977, 1979 and 1982 relative to country rating.

VIII. Concluding Remarks

A major conclusion suggested from this study is that international commercial banks acted no differently during the great debt buildup period than in normal domestic lending settings. Risk adjustment in response to changes in credit rating involved a portfolio of items which include interest rates, maturity, grace period and loan size. These findings are consistent with the domestic credit rationing literature.

Such knowledge may be useful to borrowing countries in dealing with their private lenders. For example, a borrower who is quoted a low nominal interest rate would know that he could be paying a high overall loan "rate" if other non-price risk adjustments (which might be adjusted unfavorably) are also considered.

The study also demonstrated the care that must be exercised in com-

Table 4

ANNUAL CROSS SECTION REGRESSIONS ON COUNTRY RATING[e]
(Banking Data)

Dependent Variable	Coefficients						
	1976	1977	1978	1979	1980	1981	1982
Quandt	6.85	4.37[a,b]	10.83[a,b]	9.10[a,b]	46.59[a]	13.69[a,b]	3.08
	(.46)	(3.71)	(4.54)	(3.73)	(3.59)	(6.70)	(.079)
Margin	−.017[a]	−.01	−.02[d]	−.021[a]	.015[b,f]	−.018[a]	−.016[a]
	(−2.58)	(−1.18)	(−1.78)	(−7.90)	(10.65)	(−3.98)	(−2.34)
Grace Period	.01	.05[c]	.04	.03[a]	−.016[b]	.011	.058[a]
	(.35)	(1.92)	(1.51)	(2.31)	(−.38)	(.35)	(3.53)
Maturity	.062[a]	.016	.04	.06[a]	.153[a,b]	.063[a]	.098[a]
	(2.62)	(.71)	(1.03)	(3.39)	(23.42)	(2.51)	(2.41)
n[g]	23	27	29	31	29	27	24

[a] $\alpha = 5\%$, two-tailed test.
[b] These coefficients were produced from a transformed WLS function which corrected for heteroscedasticity.
[c] $\alpha = 6.6\%$, two-tailed test.
[d] $\alpha = 8.5\%$, two-tailed test.
[e] t-statistics in parenthesis.
[f] of the wrong sign.
[g] The varying sample sizes are due to missing data for the various macro ratios on respective countries in various years.

paring international Euro bank loans (priced on a LIBOR plus margin basis) with comparable bond yields. LIBOR is a short term interest rate while bond rates are long term. Special attention to this factor must be given when conducting research around time periods of changing, or shifting, yield curves such as occurred during 1976-82. The solution of this research was to create bond risk and loan risk premia, which abstracts away from term structure problems. This concept of risk premia could be useful in future research.

It is also clear that LDC bond yields are the more comprehensive measure of return since nominal LDC bank loan rates have been shown to be an inadequate measure of the true "cost" of funds.

In extending this paper, future research could concentrate on the actual quantifying of discreed tradeoffs between margin, maturity, grace period, and loan size to better able lenders and borrowers alike to know the precise numerical tradeoffs that have in the past been negotiated in international commercial bank lending deals.

Appendix A

Borrowing LDCs Used in the Study

Bank Loan Borrowers

Argentina	Jamaica
Brazil	Jordan
Chile	Kenya
Korea	Paraguay
Yugoslavia	Turkey
Colombia	Tunisia
Greece	Dominican Republic
Ivory Coast	Algeria
Morocco	Egypt
Panama	Gabon
Portugal	Nigeria
Philippines	Peru
Thailand	Trinidad
Uruguay	Ecuador
Bolivia	Indonesia
Costa Rica	Malaysia

Cyprus	Mexico
Hungary	Romania
Zimbabwe	

Bond Borrowers

Argentina	Mexico
Panama	Venezuela
Indonesia	Colombia
Malaysia	Greece
Hungary	Philippines
Brazil	Portugal
Korea	

Appendix B

The White Test is especially applicable in small samples by employing the entire cross section of data points. This is in contrast with the common Goldfeld-Quandt Test which requires deleting a portion of the middle of the data set. With only 38 countries in each cross section, the Goldfeld-Quandt Test might not pick up the unequal variance condition due to a loss of degrees of freedom if the middle section is deleted.

The null hypothesis under the White Test states that the sample variances of the OLS estimators under homoscedasticity are equal to those under heteroscedasticity. For the example of quantity adjustment, we begin with cross section annual regressions for each of the years 1976-82 as follows

$$(1) \qquad Y_i = \beta_0 + \beta_1 X_i + e_i$$

where Y_i is the quantity lent to country i, and X_i is the country rating for country i.

The actual White Test begins with the estimation of

$$(2) \qquad e_i^2 = \alpha_0 + \alpha_1 X_{i1} + \alpha_2 X_i^2 + u_i$$

where e_i are the residuals from (1) for country i, X_i is the rating for country i, X^2 is the country rating squared.

The R^2 generated from the above is transformed into nR^2, which is distributed Chi Square for n sample size and p = 2 in our case with only

one original OLS independent variable, country rating.

In those cases where heteroscedasticity is present, the Glesjer Test (Glesjer (1969)) is utilized to specify the variable correction as follows

$$(3) \qquad e_i = \delta_0 + \delta_1 Q_i + \varepsilon_i$$

where e is as in (2) above and Q is a variable suspected of causing the heteroscedasticity, in our case individual-country GNP.

In those cases where both the intercept and coefficient are significant in the Glesjer Test, the variables are subsequently transformed by dividing through by a weight derived for each data point by solving for each value of Q for each country i, using the coefficients in (3). When the intercept is insignificant, transformation is accomplished by simply dividing through by GNP.

The final estimating equation, utilizing the transformed variables, is a form of weighted least squares denoted as follows

$$(4) \qquad Y_i^* = \beta_1 W_i + \beta_2 X_i^* + e_i^*$$

where Y_i^* is quantity/weight, W_i is the weight for country i, X^* is country rating/weight for country i, and $e_i^* = e_i$/weight.

Note that the intercept is forced through the origin since GNP was not theoretically established as relevant in the original regressions of quantity on country rating.

Where heteroscedasticity was found, WLS in (4) was performed for that year. In cases of insignificant heteroscedasticity, (1) was run.

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