RESCHEDULINGS AND BANK VALUE:

A RATIONAL EXPECTATIONS APPROACH

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Working Paper Number 488
Revised: June 1988

Abstract

The effect of the developing countries' debt crises on commercial bank value has been subjected to comprehensive empirical analysis. The method employed allows for formation of expectations regarding international loans and investigates the stock market response to updating of these expectations during the rescheduling process.

The stock returns of the largest U.S. banks are analysed over the 1978-83 period. Results include the response of stock returns to news pertaining to reschedulings, the repudiation probability of rescheduled loans, and a determination of the systematically risky component of these loans. Our major finding concerns the evolution of the effects of the debt crisis on loan values: During the 1978-80 period loan reschedulings are positively correlated with bank stock returns, while during the 1981-83 period stock returns suffered a 4.2 percent loss because of LDC loans. These results are highly robust, and are used to explain the concomitant sudden decline in the LDC lending growth rate. Our results generally confirm and greatly extend previous studies of the debt crises, in particular the slowly realized but strongly negative response at the time of the Mexican nonpayment crisis.

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I. Introduction

The rapid increase in commercial bank lending to less developed countries during the past quarter century has already had its well-known historic consequences. The failure of the various major borrowers to make timely loan payments has been accompanied by fears of massive defaults. However, major defaults have not occurred. Instead, debt crises have taken the form of a process involving threatened or actual nonpayment, followed by negotiations, and culminating in rescheduling agreements.

These events have given rise to several very important questions about bank lending: How did reschedulings alter the value of bank loans? Has there been an evolution in the banking industry's ability to deal with the crisis? In particular, while reschedulings of commercial bank loans date back to the 1970s, the frequency of reschedulings increased dramatically in the early 1980s.[1] Thus it is of interest to inquire whether this transition to more frequent reschedulings significantly altered the effect of nonpayments. Did the interest rates charged on rescheduled loans reflect the risks of these loans? Should the banking industry have been more closely regulated?

Systematic study of the effects of reschedulings on banks has been very limited. Most studies have been concerned only with the Mexican crisis and its immediate aftermath. Additionally, the two principal methods of analysis employed each suffer from inadequacies. The first approach examines the relationship between bank exposure to Latin American countries and either bank stock prices (Kyle and Sachs (1984)) or bank stock price returns (Cornell and Shapiro (1986)) of the 1982-83 period. Both studies found a negative effect of exposure on the market value of banks.

This method is not adequate for the questions addressed here because it falls short of substituting for market perceptions. Since it is the change in investor perceptions that alters stock prices, it is important to determine the magnitude of such changes. Furthermore, detailed information on exposure was generally not available prior to the final quarter of 1982.

A second approach is to implement a standard event study method to measure the impact of nonpayment events on bank security returns. Presumably the actual nonpayment event is an important occurrence that conveys information on the likelihood of reschedulings or default, and alters expectations of future cash flows on outstanding loans. Schoder and Vandurke (1986) and Bruner and Simms (1987) investigated the Mexican exposure effect during the August 1982 Mexican crisis. The first study found no impact on the returns of August 19, the publication date of Mexico's nonpayment. The latter study, on the other hand, determined that the degree of Mexican exposure was positively related to initial returns, however, by the sixth day exposure had a negative effect. Özler (1987), investigated the effect of nonpayments on bank returns for the 1978-83 period. For this period, taken as a whole, a negligible effect on monthly bank security returns was deduced. When the 1978-80 and 1981-83 periods are investigated separately, however, it was concluded that in the first period the impact was positive, in contrast to the negative impact in the latter period.

This second approach is also subject to criticism. First, potential events, in this case nonpayment announcements are difficult to identify. Second, an event must be defined relative to investor expectations. Investor expectations may be altered, for example, by news about a country's general economic condition prior to the announcement date. This well known criticism implies that more sophisticated models of expectation formation that incorporate all potentially relevant information are needed.

Accordingly, we have first constructed a comprehensive empirical model of the rescheduling process. In this model, the expected values of international loans are calculated periodically by estimating both the probabilities of loan reschedulings and the values of those loans, conditional upon rescheduling taking place. The difference between the expected values in successive periods are calculated. These differences, which are the unanticipated changes in the value of international loans, are associated with the newly revealed information relevant to reschedulings. Second, we assume the market forms its rational expectations according to this model. This allows one to estimate the response of bank stock price returns to the unanticipated changes. A knowledge of the stock returns' response permits the calculation of repudiation probabilities of rescheduled loans. The response is additionally of interest because it provides insight into the competitiveness and efficiency of international lending.

The methodology is presented in Section II. Section III is the empirical specification. Section IV presents the results. A summary of the conclusions is contained in Section V.

II. Methodology

1. Using Capital Markets Data to Evaluate the Effects of News Related to Reschedulings

In our method, we examine the changes in bank security returns associated with news relevant to reschedulings. In investigating the security returns, we first assume that the capital asset pricing model (CAPM) holds. The CAPM (derived by Sharp (1964), Lintner (1965)) quantifies the equilibrium return on an asset as a function of its market-related risk. Second, we assume financial markets are efficient. The efficient markets hypothesis posits that the price of a security incorporates all information available at a given time, yielding an unbiased estimate of future rents to investors. Under these two assumptions, the realized returns will deviate from returns predicted by CAPM only when unanticipated information hits the market. We are concerned with identifying deviations that are caused by unanticipated information related to reschedulings.

In giving empirical content to the above discussion, we use a version of CAPM that is extended to control for industry specific returns. (Several alternative versions are also tested, but we present this version here for concreteness.) In this manner, the bank specific effects of reschedulings is separted from the fortunes of the industry. Accordingly, the return-generation process for each firm is described as:

$$(1) \qquad R_{jt} - R_{ft} = \alpha_j + \beta_j(R_{mt}-R_{ft}) + B_j(R_{nt}-R_{ft}) + \lambda \frac{I_{jt}}{V_{jt-1}} + \eta_{jt}$$

where:

R_{jt} = return on the security of bank j at time t,

R_{ft} = risk free rate,

R_{mt} = return on the market portfolio at time t,

R_{nt} = the return on a portfolio of other banking industry securities,

α_j = a constant measuring average abnormal returns, with expected value of zero under the efficient market hypothesis,

I_{jt} = variable that represents unanticipated change in the value of international loans at time t associated with revelation of information about reschedulings,

V_{jt} = market value of bank j at time t,

η_{jt} = error term with zero expected value.

In equation (1) the parameter λ measures the correlation of bank returns with news pertinent to reschedulings. In fact, assuming that financial markets are efficient λ will be unity.

Estimation of equation (1) requires a measure of I_{jt}. There is not, however, an obvious method to measure I_{jt}, because the rescheduling process is a complicated one. Borrower countries' economic conditions, developments in the world economy, and the nonpayment history of the borrower are all relevant to the pricing of assets that may be rescheduled. It is even more cumbersome to identify when any of this information is "new". A simple way of dealing with this issue is to choose some events to naively proxy I_{jt}. (For example, nonpayment events have been employed to proxy I_{jt} (Özler 1987).) Instead, we build an empirical model of expectations formation and assume that the market forms its rational expectations according to the model we construct, and estimate a version of (1). The paucity of the data, however, necessitates certain assumptions in the construction of the expectations model. This implies that the estimated value of λ could deviate from unity.[2] In the next section we present an empirical model of expectations formation and the interpretation of the estimated λ.

2. Empirical Model of the Rescheduling Process

In this section we build an empirical model of the rescheduling process. An expression for the expected value of international loans is developed. This disscussion is followed by a presentation of how we proxy for I_{jt}, the unanticipated change in the value of international loans associated with revelation of information about the rescheduling process.

To define the discounted revenue on a rescheduling transaction, consider a loan which after rescheduling is characterized by its size L, maturity M, and grace period G, during which only interest is paid. Once the grace period ends, the principal is repaid in equal installments. The rate of interest, r, on rescheduled loans is the sum of r_m, the discount factor, and s, the spread determined during bilateral negotiations. The loan contract described represents typical lending practice in Eurocurrency markets. It is assumed that the subsequent probability, π, of repudiation (i.e. the probability that the borrower will never make any payments) of a rescheduled loan is the same for each period. Then the discounted revenue of the rescheduling transaction is:[3]

$$A = L \sum_{k=1}^{G} r\left[\frac{1-\pi}{1+r_m}\right]^k + L \sum_{k=G+1}^{M} \left[\frac{1+r(M+1-k)}{(M-G)}\right] \left[\frac{1-\pi}{1+r_m}\right]^k \tag{2}$$

If the loan is not rescheduled, however, let M^*, G^*, and r^* represent the corresponding original terms of the outstanding loan with a repudiation probability of π^* and a discounted revenue A^*.

Suppose now that at period t we employ all available information to predict the rescheduling probability and the conditional revenues, A and A^*, for each future period. The expected value, calculated at period t for all future periods, can then be expressed as:

(3) $$\omega(\phi_t) = \sum_{\tau=1}^{\infty} [(P_{t+\tau}A_{t+\tau} + (1-P_{t+\tau})A^*_{t+\tau}) \mid \phi_t]/(1+r_m)^{\tau},$$

where

$P_{t+\tau}$ = the probability of a rescheduling agreement occurring in the τ^{th} period from time t,

ϕ_t = the set of variables available at time t relevant to reschedulings.

The term in the bracket is the expected value for the τ^{th} period from t, conditional on ϕ_t.

There are, however, two difficulties in calculating $\omega(\phi_t)$. First, complete loan histories are generally unavailable. Typically, the terms of a rescheduled loan are published but the original terms are not. Therefore, A^* in equation (3) cannot be calculated. To circumvent this difficulty we assume $(r^*-r_m) = 0$ so that $\pi^* = 0$ and $A^* = 0$.[4] This assumption in effect means that if a loan is never rescheduled then it is considered to be risk-free for all future periods. Whenever we use this modification of equation (3), we will denote the resulting quantity by ω'.

Second, data on π is not available, and it is difficult to directly estimate π, again due to paucity of data.[5] (As will be demonstrated later, however, π can be inferred from our estimations.) To circumvent this latter difficulty we first assign $\pi = 0$, and calculate the revenues from the rescheduling agreement using this value. This quantity, denoted by A', replaces A. With these two assumptions, equation (3) can be calculated in terms of $A'_{t+\tau}$ and $P_{t+\tau}$, and the result obtained in this way is denoted by ω''. Suppose now that at each period, conditional on all available information at that point, we have calculated ω''. Let $\Delta\omega''_t = \omega''(\phi_t) - \omega''(\phi_{t-1})$; then $\Delta\omega''_t \neq 0$ will imply the existence of new information relevant to future reschedulings during period t.

The variable $\Delta\omega''_t$, however, may not be the right variable to use in the investigation of stock returns, because $\Delta\omega''_t$ may be correlated with overall market movements (it is important to recall that I_{jt} deals with nonsystematic changes in the value of international loans). Therefore, we need to decompose $\Delta\omega''_t$ into its two risky components: a systematic component and a nonsystematic component and employ the latter as our proxy for I_{jt}. To be able to calculate the nonsystematic component of $\Delta\omega''_t$, we first present an equation that enables the calculation of the systematic risk (β_I) of an asset representing claims on international loans. Following the CAPM specification, let this relation be as follows:

$$(4) \qquad \rho_t - R_{ft} = \beta_I(R_{mt}-R_{ft}) + \epsilon_t$$

where

ρ_t = realized return on international loans in period t, and

ϵ_t is an error term with zero mean.

Since $\Delta\omega''_t$ can be expressed as a weighted average of its two risky components, the nonsystematic component of $\Delta\omega''_t$ is $\Delta\omega''_t R_{ft}/(R_{ft}+\beta_I(R_{mt}-R_{ft}))$. Decomposing $\Delta\omega''_t$ into the bank-specific measures $\Delta\omega''_{jt}$ equation (1) can be rewritten:

$$(5) \qquad R_{jt} - R_{ft} = \alpha_j + \beta_j(R_{mt}-R_{ft}) + B_j(R_{nt}-R_{ft}) + \frac{\lambda}{V_{jt-1}}\left[\frac{\Delta\omega''_{jt}R_{ft}}{R_{ft}+\beta_I(R_{mt}-R_{ft})}\right] + \eta_{jt},$$

The bracketed term is the proxy of I_{jt} in this model. The data for β_I are not directly available, but equations (4) and (5) can be estimated jointly.

Assuming that the financial markets are efficient and that the market forms its rational expectations according to the model just described, one expects the stock returns to respond to I_{jt} fully. However, λ is generally not estimated as unity because $\Delta\omega''$ is calculated under the assumption that rescheduled loans will be repaid as contracted upon, i.e., $\pi = 0$. (Market participants may of course have priors on π, however, this cannot be directly estimated because of the paucity of data). Employing the estimated value of λ, and the knowledge that if the market participants priors on π could be incorporated λ would be unity, we can infer π. That is $\Delta\omega' = \lambda\ \Delta\omega''$, and correspondingly:

(6) $$A = \lambda\ A'.$$

Recall that π is incorporated in A but not in A' and that the data for the remaining variables in A and A' are directly available. Employing the estimated value of λ along with data on other variables relevant to equation (6), numerical values for π and corresponding confidence intervals can be obtained. If the result of this estimation is $\lambda = 1$, then $\pi = 0$, and if $\lambda < 1$, then $\pi > 0$.

λ is additionally of interest because it provides insight into the efficiency and competitiveness of international lending. Specifically, $\lambda < 0$ indicates that the terms of reschedulings do not fully compensate for the repudiation probabilities of rescheduled loans. $0 < \lambda \leq 1$, however, indicates that rescheduling terms are such that the lenders collect rents from such agreements. This could be explained by an increase in the bargaining power of banks in the rescheduling process (Özler (1987)).

III. Estimation and Data Description

The empirical implementation of the approach is carried out in the following two stages.

A. First Stage

In this part we discuss the estimation of the components of ω''_t. First, a discrete choice model of the rescheduling process is estimated to obtain rescheduling probabilities. Assume that the value of a rescheduling agreement in the τ^{th} period from t is given by:

$$P^*_{t+\tau} = \delta \phi_t + \epsilon_t \tag{7}$$

where

$P^*_{t+\tau}$ = a latent variable which determines the occurrence of a rescheduling agreement in the τ^{th} period from t, i.e., $P_{t+\tau} = 0$ if $P^*_{t+\tau} < 0$ and $P_{t+\tau} = 1$ if $P^*_{t+\tau} \geq 0$,

ϵ_t = a normally distributed random disturbance term.

These equations describe a probit model for the probability of a rescheduling agreement being reached in the τ^{th} period from t.

The discounted value of the rescheduling transaction A′ is estimated by employing the Heckman (1976) two-step procedure in order to avoid sample selection bias. Specifically, the sample is constrained by omitting information on returns for those countries that do not reschedule during the sample period. Assigning zero value to those observations would imply a zero revemie in the event that those countries did reschedule, which obviously is absurd. Alternatively, if we use ordinary least squares only for the countries that have rescheduled without any correction for the constraint in the sample, then the parameter estimates will be biased downwards. To avoid this bias, following Heckman, one first uses estimates of equation (7) to get the estimated values of ψ and Ψ. ψ and Ψ are, respectively, the density and distribution functions of the standard normal evaluated at $\delta\phi_t/\sigma$. Second, the following equation is estimated by ordinary least squares using only the observations corresponding to $P_{t+\tau} = 1$:

$$A'_{t+\tau} = \gamma\,\phi_t + \gamma_1\left(\frac{\psi}{\Psi}\right)_t + \zeta_t \qquad (8)$$

where

$A'_{t+\tau}$ = value of rescheduling agreement in the τ^{th} period from t if a rescheduling agreement takes place, (i.e., $P_{t+\tau} = 1$),

Ψ/ψ = Mill's ratio,[6] and

ζ_t = normally distributed random error term.

An important issue here is the methodology of choosing the set of variables in ϕ of equations (7) and (8). It is difficult to find theoretical grounds for excluding any information at time t as a useful predictor of the occurrence and terms of a rescheduling agreement in future periods. Economic theory does not provide much guidance on which variables to include. The "country risk" literature, however, helps to indentify variables that predict occurrence of reschedulings as well as the terms of these loans.[7] In this study three types of variables are employed. Repayment problem variables incorporate information related to the failure of a borrower to fulfill a prior loan contract.[8] Regional dummies and time effects have also been incorporated. Macroeconomic indicators specific to the countries constitute the third class of variables. The Appendix provides a description of the variables utilized.

In this study we employ monthly data for 48 countries (see Appendix) over the 1975-83 period and information on bank rescheduling agreements for the 1978-85 period. For purposes of estimation we utilize forecast intervals, τ, of one year: one set of equations predicts reschedulings that take place between t and t+12 (since our data is monthly), a second set of equations predicts reschedulings which take place between t+12 and t+24, and so forth.[9] A similar construction applies to the estimation of A'. These estimating equations in turn are used to make predictions of P and A' employing data from 1978-83 period.

B. Second Stage

Now estimates from the first stage are employed to construct $\Delta\omega''_t$ and the bank-specific measures $\Delta\omega''_{jt}$ which reflect the change in the value of all international loans that are relevant for the j^{th} bank.[10]

Our procedure is to assume the market formed rational expectations according to the model above in calculating $\Delta\omega''_{jt}$, which in turn is part of the proxy for I_{jt}, equation (5). Using equations (4) and (5), we then estimate λ, which specifies how much of I_{jt} is capitalized as true profits (losses) in the stock returns of the commercial banks participating in reschedulings.[11,12] β_j is estimated simultaneously with the other parameters. In contrast, the standard approach of estimating capital pricing models is first to estimate β_j from the previous five years or so of the data in a regression of the form $R_{jt} - R_{ft} = \beta_j(R_{mt}-R_{ft}) + \epsilon_{jt}$ and then $\hat{\beta}_j$ is used as an independent variable in the final regression to produce estimates of the other coefficients. This approach may introduce bias in the parameter estimates as well as efficiency loss.

The model is estimated using least squares on the assumptions that error terms are not correlated across observations or across time. The latter assumption can be justified on the grounds of rational expectations. If there is correlation across equations, estimates of the parameters remain consistent, but inefficient.

R_{ft} is a vector of Treasury bill rates. R_{jt} is a monthly series of returns to the securities of the banks, compiled at the Center for Research in Securities Prices (CRISP) at the University of Chicago. We obtain the following variables from the same source: R_{mt} is the rate of return on a portfolio of all NYSE securities; R_{nt} is a return on a portfolio of thirty-five other banks that are not in our sample but listed on the NYSE; and V_{jt} is a series of value of total outstanding shares of bank j at time t. Monthly data for January 1978-December 1983 have been used. The sample of firms includes the twenty-one largest U.S. banks.[13]

IV. Results

Our results consist of two classes of information. The first class concerns the estimates which permit the calculation of unanticipated changes, I_{jt}, in international loan values associated with information about the rescheduling process. We then present results concerning the response of bank stock returns to these changes.

The results of our first stage estimates are provided in the Appendix. Table A-1 contains the probit estimates, equation (7), and A-2 contains the value estimates, equation (8). The estimation of equations (7) and (8) do not constitute the primary concern of this paper, so our discussion of them is brief.

First, variables associated with past repayment problems, time effects and regional dummies are determined to be quite important in these estimations. Macroeconomic indicators are also found to be generally consistent with prior studies in the country risk literature. Debtservice-to-exports ratio and total debt-to-exports ratio are both positively correlated with the occurence of reschedulings, while reserves-to-imports ratio, exports-to-

GNP ratio, GNP, and GNP growth are all correlated negatively.

Second, alternative variable specifications that exclude the interactive terms or regional dummies and time effect have also been estimated.[14] The direction and significance of the nonpayment and macro variables have not been altered in these other specifications. The specification presented in the Appendix, however, has superior performance in terms of a better fit of the equations. Furthermore, we have verified that our second stage estimates, upon which the conclusions of this study are based, are robust to such changes.

Third, calculation of $\Delta\omega_{jt}''$ is based on these estimates.[15] On conceptual grounds this should be a random process, and Portmanteau tests indicate that it is.[16]

The second stage estimations are carried out employing equations (4) and (5). The model is estimated for the 1978-83 period as a whole and then separately for the 1978-80 and 1981-83 subperiods. (The characterization of the sample is presented in Table A-3.) In order to compare our results with the previous investigations of the Mexican crisis, we also investigate the period prior to and following it in greater detail.

Table 1 reports λ and its standard error σ_{λ}. (For estimates of the other parameters see Table A-4.) Our estimations for the entire sample of 1978-83 indicate that the rescheduling process, and hence the foreign debt crises, had only a very small impact on the average returns earned by the investors. The null hypothesis of zero effect,however, is not rejected.

This result is somewhat surprising, given the other evidence that banks have incurred losses on foreign loans, particularly since the debt crises of 1982. Our result, however, could be the consequence of averaging over two

TABLE 1

Impact of News Relevant to Reschedulings: Equations (4) and (5)*

Parameter	1978-83	1978-80	1981-83
λ	-.0017	.025	-.042
	(.028)	(.019)	(.018)
π		.015	.017
		(.002)	(.002)

*Numbers in parentheses are standard errors.

periods in which reschedulings have equal yet opposing effects. A number of factors relevant to the nonpayment probabilities of developing country loans, such as the recession in the industrialized countries and higher real interest rates, suggest that the structure of bank debt may have been altered in the early 1980s.[17] Specifically, early reschedulings might be better viewed as isolated events. In the early 1980s, however, reschedulings became widespread partly because of shocks confronting the world economy as a whole, even creating fears of a developing country's debtors' cartel that would repudiate all the loans. Accordingly, we divide our sample into two periods: 1978-80 and 1981-83. The estimated parameters and their standard errors are also in Table 1.

The results of the 1981-83 period generally confirm the common perception that reschedulings have been costly for bank stockholders. λ is estimated as -.042. In contrast, for the 1978-80 period, λ is determined to be positive (.025). However, the estimated parameter is not significantly different from zero in this earlier period. An F-test is conducted to test the hypothesis that the regression parameters have not changed during the two periods. The hypothesis is rejected at the .01 significance level implying a structural change between the two periods.

Employing the estimated values of λ along with other data on rescheduling terms, an estimate of the repudiation probability, π, of the rescheduled loans can be calculated. In solving for π (equation (6)) we employ the period's average values of rescheduling terms.[18] According to these calculations the market perceived a 1.5% repudiation probability of rescheduled loans in the 1978-80 period. At the same time, the spreads charged in reschedulings were more than enough to compensate for this risk, so that λ is positive. In the 1981-83 period the repudiation probability for rescheduled loans was viewed as 1.7%. The estimated value for λ (-4.2%) suggests that the terms of rescheduled loans were not enough to compensate for the risk of repudiation.

Our results also indicate that there is a significant non-diversifiable risk associated with these loans. This is evidenced in the estimates of β_I, which indicate the presence of positive correlation between international loans and the overall movements in the market. Hence, if estimates are conducted without taking this into account, it is possible to reach quite misleading findings. In fact, if the systematic component of $\Delta\omega_t''$ is not controlled, $\lambda = -.07$ is estimated with $\sigma_\lambda = .09$ during 1978-80, and $\lambda = .16$ with $\sigma_\lambda = .031$ during 1981-83.

It is important to note that the results presented are robust to alternative specifications of the CAPM. Specifically we have considered two alternatives:[19] 1) Equation (5) is estimated without extending it to include an industry factor. 2) Equation (5) is estimated by replacing the industry factor with an interest rate factor, i.e., $B_j(R_{nt}-R_{ft})$ of (5) is replaced by $G_j(R_{gt}-R_{ft})$, where R_{gt} is the return on a portfolio of government bonds.[20] Employing the first specification, one obtains λ = .037, σ_λ =.041, and λ =-.038, σ_λ = .02 for the 1978-80 and 1981-83 periods, respectively. The second specification yields respectively λ = .044, σ_λ = .038, and λ = -.037, σ_λ = .01 during 1978-80 and 1981-83.

Next we investigate in more detail the stock market response at the time of the Mexican crisis. λ is estimated as a linear function of time with quarterly break-points.[21] The estimation is carried out over a two-year period centered on the crisis month. λ is estimated to have a dramatic downward trend (Table 2).

The evolution of λ is important in identifying the nature of the market reaction. First, during August 1981-April 1982 λ is estimated positive. For the three month period immediately prior to the crisis, however, a small negative response is estimated. During the period following the crisis, the market response continues to become more strongly negative reaching -15% during the June-August 1983 period. Correspondingly,

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TABLE 2

Impact of the Mexican Crisis: Equations (4)-(5)

Estimates of λ With Quarterly Breakpoints*

	Period Number**							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
λ	.099	.064	.028	-.007	-.043	-.078	-.11	-.15
σ_λ	(.016)	(.016)	(.009)	(.010)	(.013)	(.017)	(.022)	(.027)

*The numbers in the paranthesis are standard errors.

**Quarterly periods commencing August 1981, ending August 1983, and omitting the crisis month, August 1982.

the repudiation probability reaches 1.83%. If the above estimation is repeated by allowing a separate estimate of λ on August 1982, the results are quite similar to those in Table 2, with λ near zero for the crisis month itself.

V. Conclusions and Summary

In this article we have implemented an empirical analysis of the response of bank stock returns to news pertaining to the international loan reschedulings. Our method has several advantages over existing alternatives; these are advantages associated with the fact that it allows both for the formation of expectations and the investigation of stock price response to the updating of such expectations. It is therefore a more accurate method of determining change in bank values. Also, upon implementing this method, one can calculate the repudiation probabilities of rescheduled loans. Finally it is possible to directly identify the extent of systematic risk of international loans. All these advantages are explicitly demonstrated here for the particular case of commercial bank loans to developing countries.

We find the following: The stock returns of the largest twenty-one U.S. banks were negligibly altered during the 1978-83 period, taken as a whole, in response to news relevant to reschedulings. The nature of the response evolved dramatically during this period, however. Here we compared the response during 1978-80 and 1981-83 periods analyzed separately. In the earlier period, a positive impact (2.5%) is found. In the later period, the decline of the top banks' returns due solely to the debt crises is estimated to be 4.2%. More detailed investigation of the two-year period surrounding the Mexican crisis indicates that there was negligible change stock returns in the three months prior to the crisis. Following the crisis, however, the stock returns showed an increasingly negative response. In fact the response during June-August 1983 reached -15%.

The results of this study are consistent with those of previous ones. A direct comparison with Özler (1987) is possible since both studies focused on the same periods employing the same banks. Özler finds approximately a 2.0% decline in the stock returns of the largest twenty-one banks during the 1981-83 period. The stock returns are estimated to be affected positively by approximately a 6.0% during 1978-80. This latter finding is important in countering the common misconception that equates reschedulings with loan write-offs. However, the standard event study method exaggerates the gains in comparison to the gains identified in this study.

To make direct comparisons with the other studies is somewhat more difficult since these focus exclusively on the Latin American countries during the Mexican crises, and employ data on a varying number of banks and varying intervals. Qualitatively, however, our results during that period support the major findings of former studies. In particular, Sachs and Kyle (1984) determined that bank asset values show a declining trend following the crisis and reaching quite high magnititudes during mid- to late-1983. Our findings also support those of Cornell and Shapiro (1986) since they estimate a negative revaluation for the 1982-1983 period. Furthermore, as in their study, we did not find a strong negative valuation during the month of the Mexican nonpayment announcement. These results are also consistent with Brunner and Simms (1987) and Schoder and Vandurke (1986) in that the market responds negatively not during the announcement period but following it. These findings suggest the existence of a learning effect in the market regarding the full implications of the Latin debt crisis.

Our method permits the estimation of the systematic risk component of these loans as well, and this component is found to be positive and significant. Furthermore, we calculate that the repudiation probability of rescheduled loans is approximately 1.5% during 1978-80 and 1.7% during 1981-83. It seems, therefore, that negative revaluation of bank assets is associated with large losses that would be incurred in the event that a small probability hazard is experienced. In particular, the possibility of numerous major borrowers rescheduling simultaneously, perhaps in response to external, worldwide shocks, could explain such negative revaluation.

The implications of our results for bank management and regulation are of particular interest. As implied in the earlier studies and confirmed here in greater detail, there was in fact a penalty in the capital markets for participating in those developing country loans that were being rescheduled in the early 1980s. This indicates the existence of disincentives to continue such lending. Indeed bank lending growth declined to 7 percent in 1983 and to 3 percent in 1984, from previous levels of 15-30 percent per year during 1977-1980. It had not been so clear, however, why this decline did not take place earlier. This can now be explained by the change from the positive early response of bank values to reschedulings to a pronounced negative response. Our findings demonstrate that further analysis of the emergence of the bank lending market to LDCs is likely to continue to yield important insights into the sources and evolution of the debt crisis.

Footnotes

*I would like to thank to B. Douglas Bernheim, Timothy F. Bresnahan, John B. Shoven, Kenneth Sokoloff for valuable comments on earlier versions of this paper. The financial support of ISOP at UCLA and research assistance by Jean Helwege are also gratefully acknowledged.

An earlier version of this paper was circulated as UCLA Economics Department Working Paper #414 with the title of "Valuation of Rescheduled Loans, 1978-1983: A Rational Expectations Approach".

[1]Fifteen reschedulings occurred during the 1978-81 period, while in 1983 alone there were 20 rescheduling agreements. Correspondingly, the amount rescheduled increased to $62 billion in 1983 from an annual average of $1.5 billion during 1978-81. (IMF (1986)).

[2]Furthermore the estimated value of λ will be biased if I_{jt} is measured with error.

[3]For a more accurate formulation fees paid to the lenders should also be included. However complete data on fees is not available.

[4]This is obviously an inaccurate assumption, but at least the direction of the error is known. Given the paucity of data, this assumption is better than arbitrarily chosen interest rates, which are likely to contaminate the results further.

[5]In the history of bank loans there has not been a case of outright repudiation which makes it impossible to directly estimate these probabilities.

[6]This is the reciprocal of hazard rate. For further discussion see Amemiya (1985).

[7]In the existing literature, variables that are found to be negatively

correlated with the occurrence of rescheduling are export growth, GNP growth, capital inflows, investment, the amortization to debt ratio, income per capita, capital inflows as a ratio to debt service obligations, reserves to GDP ratio, exports to GDP ratio, and reserve to imports ratio. Variables that are positively correlated are debt service obligations, the stock of debt, and population. Similar variables are also employed in predicting the interest rates on international loans. See Eaton and Taylor (1986), McFadden et al., (1985) and Özler (1985) for a review of the literature.

[8]Past studies such as McFadden et al. (1985) have employed information on a country's past rescheduling agreements. We have employed more detailed information by collecting data on nonpayment dates of countries prior to agreements as well as previous IMF agreements or reschedulings as described in the Appendix.

[9]In principle, an infinite number of forecast intervals should be employed. Because of data constraints, four forecast intervals have been constructed.

[10]In this construction we assume that a bank's participation in a rescheduling has been proportional to its exposure to the individual country undergoing rescheduling. Because of paucity of public information through out the period, however, we used proxies constructed employing the Federal Reserve's Country Exposure Lending Survey and Compustat tapes. The former provides data on amounts owed to groups of banks (i.e., top nine, next 15 etc.) by each country. For further breakdown within each group we relied on Bank Compustat tapes and employed information pertaining foreign branch loan of each bank.

[11]This methodology will yield consistent parameter estimates, but because it implicitly assumes there is no uncertainty in the estimates of

$\Delta\omega''_{jt}$, the estimates of the standard errors of the parameters are inconsistent. (This is a general criticism of other similar two-step procedures such as Barro (1977, 1978); see Mishkin (1983)).

[12] In the empirical implementation ρ_t is constructed as :

$$\rho_t = \frac{\lambda \cdot s_t \cdot L_t + s_t^n \cdot L_t^n}{L_t^n}$$

where s_t is the spread charged on the rescheduled loan at time t, s_t^n = the average market spread on LDC loans at time t, L_t = the face value of rescheduled loans at time t, L_t^n = total outstanding loans to LDC's at time t (data for s and L are obtained from IMF (1986) and data for s^n and L^n are obtained from OECD). Equations (4) and (5) are estimated jointly by constraining β_I and λ to be the same in both.

[13] The top twenty-one U.S. banks are: Bank of America, Citicorp, Chase Manhattan, Manufacturers Hanover Corp., Morgan (J.P.) & Co., Chemical N.Y., Continental Illinois, Bankers Trust New York Corp., First Chicago Corp., Wells Fargo & Co., Irving Bank Co., Crocker National Co., Marine Midland Banks Inc., Bank of Boston Corp., Northwestern Corp., Interfirst Corp., Republic Bank Corp., NBD Bancorp. Tex., Texas Comm. Bankshares Inc.

[14] The results of these estimations are available from the author upon request.

[15] As presented in Table A-3, the mean of $\Delta\omega''_{jt}/V_{jt-1}$ during the 72-month period under consideration is .014, with a standard error of .06.

[16] The Q-statistic calculated from the autocorrelations check are 15.23, 16.31 and 17.66 for 12, 18 and 24 lags respectively. The critical chi-squared at the 5% level are 21.05, 28.86, 36.41 at 12, 18 and 24 degress of freedom respectively.

[17]For example the real interest rate increased to 11 percent in 1982 from an average of -.08 during 1971-80. The recession in the industrialized countries is estimated to have cost $79 billion in terms of trade loss and $21 billion in export volume loss to developing countries during 1981-82. See Cline (1984, pp.12-13).

[18]Average values during 1978-1980 for r_m(Libor), r, G and M are: 0.118, 0.136, 1.75, 4.4, respectively. For 1981-83 the corresponding values are: 0.31, 0.151, 2.9, 6.5 respectively.

[19]In an earlier version of this paper I have employed an additional alternative return generation process. The specification, unlike the models above relied on nonlinear estimation procedures since the risk free rate was specified as a linear function of Treasury bill rate. The qualitative results of that procedure support the findings here.

[20]R_{gt} is the return on 16-20 year maturity government bonds calculated from CRISP bond tapes. Sheridan Titman has kindly provided this data.

[21]That is, $\lambda = \lambda_0 + kQ$ where λ_0 and k are the parameters and Q is an integer that takes the same value for all the months in a quarter.

APPENDIX

Variables and Data Sources for the First Stage Estimates

The following abbreviations are used for data sources:

IFS,IMF - International Financial Statistics (tape)

WDT - World Bank, World Debt Tables

Dependent Variables

The dates and the terms of bank debt reschedulings are obtained from IMF (1986).

Independent Variables

(GNP and total debt (in TDX below) are the only variables that are not available on a monthly basis. Annual values of these variables have been scaled down.)

DEF24: A dummy variable that becomes one if the borrower has failed to comply with a bank loan contract in the past 24 months, zero otherwise. This data has been collected by the author through search of financial press, and is available upon request.

IMG6: A dummy variable that becomes one if the borrower has reached a conditionality agreement with the IMF or rescheduled loans with official lenders. The IMF standby Agreements and the use of the IMF Extended Fund Facility are obtained from IMF Annual Reports. Data on official Loan reschedulings is obtained from IMF (1986).

TDEF: This variable indicates the number of months passed (up to 24 months) without the signing of a rescheduling agreement since nonpayment.

Time and regional affects

TIME: Monthly time indicator that is one in the first month.

AFR: A dummy variable that is one for African countries.

LAT: A dummy variable that is one for countries in the Western Hemisphere.

DSX: Debt service divided by exports. Debt service is obtained from WDT, and exports is obtained from IFS.

REM: Total official reserves minus gold divided by imports. Both variables are from IFS.

XGP: Exports over GNP. Exports in U.S. dollars is obtained from IFS and is obtained from WDT.

GNP: Real (in 1972 U.S. $) per capita gross national product.

TDX: Total debt divided by exports. Total debt is from WDT.

GNPG: Real gross national product growth.

PPP: Purchasing Power Parity. It has been calculated as the difference between the domestic and U.S. Consumer Price Index (CPI) inflation rates and less the rate of domestic currency depreciation vis-a-vis the U.S. dollar. All the relevant variables are constructed from IFS.

RED: The real Eurodollar rate. The end-of-year 1 year Eurodollar deposit rate r_m is adjusted using domestic CPI inflation $\dot{p}$ and the rate of exchange rate depreciation (all from IFS) to yield

$$RED = \frac{(1+r_m)(1-e)}{(1+\dot{p})}$$

Countries Included In The Analysis

(Based on IMF classification)

Non-Oil Developing Countries

Europe

Cyprus

Greece

Portugal

Turkey

Yugoslavia

Asia

Burma

Sri Lanka

India

Indonesia

Korea

Malaysia

Nepal

Pakistan

Philippines

Singapore

Thailand

Africa

Burundi

Cameroon

Ethiopia

Ivory Coast

Kenya

Liberia

Malawi

Mauritania

Mauritius

Morocco

Sudan

Tunisia

Middle East

Egypt

Israel

Western Hemisphere

Argentina

Bolivia

Brazil

Chile

Colombia

Costa Rica

Dominican Republic

Ecuador

El Salvador

Honduras

Jamaica

Mexico

Panama

Paraguay

Peru

Uruguay

Venezuela

Trinidad and Tobago

TABLE A.1

Probability of Reschedulings

Equation (7): Probit Estimation

(numbers in parentheses are standard errors)

	1st forecast interval	2nd forecast interval	3rd forecast interval	4th forecast interval
Constant	0.215 (0.510)	-1.147 (0.415)	-0.712 (0.386)	-0.130 (0.535)
DEF24	1.177 (0.208)	0.891 (0.188)	0.223 (0.195)	-0.694 (0.248)
IMG6	0.325 (0.089)	-0.048 (0.008)	-0.002 (0.076)	-0.056 (0.080)
TDEF	0.056 (0.008)	0.049 (0.008)	0.062 (0.008)	0.031 (0.015)
TIME	0.009 (0.002)	0.007 (0.001)	0.009 (0.001)	0.009 (0.001)
AFR	-0.279 (0.146)	-0.039 (0.115)	0.178 (0.102)	0.533 (0.103)
LAT	0.835 (0.108)	0.876 (0.088)	1.037 (0.085)	1.133 (0.082)
DSX	0.555 (0.227)	0.290 (0.165)	0.460 (0.149)	0.444 (0.163)
REM	-0.127 (0.028)	-0.127 (0.019)	-0.100 (0.014)	-0.089 (0.012)
XGP	0.063 (0.086)	0.049 (0.041)	0.027 (0.038)	-2.009 (0.353)
GNP	-0.334 (0.153)	-0.065 (0.090)	0.048 (0.073)	0.239 (0.073)
TDX	0.144 (0.030)	0.042 (0.025)	0.207 (0.023)	-0.061 (0.029)
GNPG	-1.819 (0.366)	-2.397 (0.286)	-1.610 (0.255)	-1.237 (0.26)
PPP	-0.004 (0.003)	0.0001 (0.002)	-0.007 (0.002)	-0.112 (0.003)

Table A.1 (cont.)

	1st Forecast interval	2nd Forecast interval	3rd Forecast interval	4th Forecast interval
RED	-2.972 (0.510)	-1.160 (0.408)	-1.794 (0.381)	-1.823 (0.534)
DFDSX*	0.101 (0.318)	-1.898 (0.389)	-3.170 (0.412)	-2.504 (0.379)
DFREM	0.028 (0.043)	-0.058 (0.039)	0.072 (0.033)	0.138 (0.044)
DFXGP	-0.063 (0.086)	0.007 (0.059)	0.028 (0.054)	2.052 (0.359)
DFGNP	0.064 (0.243)	0.340 (0.208)	1.301 (0.197)	1.638 (0.223)
DFTDX	-0.115 (0.034)	0.035 (0.029)	0.115 (0.036)	0.212 (0.045)
DFFGNPG	-0.089 (0.527)	-0.333 (0.487)	1.584 (0.443)	1.847 (0.524)
DFPPP	0.006 (0.003)	-0.005 (0.002)	-0.002 (0.002)	-0.005 (0.003)
Log Likelihood Ratio	967.0	863.66	992.93	795.04

*The variables that take the DF prefix are constructed by interacting the default dummy with the macro variables represented after the DF prefix.

TABLE A-2

Conditional Value of Reschedulings

Equation (8): OLS Estimation

(numbers in the parentheses are standard errors)

	1st Forecast interval	2nd Forecast interval	3rd Forecast interval	4th Forecast interval
Constant	-0.768 (0.278)	-0.320 (0.848)	-2.726 (0.596)	-3.287 (0.591)
DEF24	0.389 (0.307)	-0.022 (0.423)	0.669 (0.279)	-0.565 (0.344)
IMG6	0.111 (0.063)	-0.007 (0.056)	-0.229 (0.059)	-0.165 (0.077)
TDEF	0.027 (0.009)	-0.002 (0.016)	0.054 (0.015)	0.068 (0.014)
TIME	0.008 (0.001)	0.009 (0.002)	0.018 (0.002)	0.023 (0.003)
AFR	-0.057 (0.120)	-0.081 (0.111)	0.159 (0.116)	0.488 (0.204)
LAT	0.551 (0.158)	0.047 (0.310)	1.217 (0.278)	1.429 (0.336)
DSX	-0.756 (0.267)	-0.022 (0.194)	0.344 (0.186)	1.058 (0.259)
REM	0.001 (0.031)	-0.005 (0.047)	-0.103 (0.029)	-0.103 (0.028)
XGP	-0.835 (0.567)	-1.376 (0.502)	0.973 (0.508)	-1.092 (0.727)
GNP	0.235 (.14)	0.110 (.09)	0.139 (.09)	0.701 (0.137)
TDX	0.042 (0.031)	-0.062 (0.022)	0.031 (0.023)	-0.239 (0.051)
GNPG	-1.126 (0.371)	-0.214 (0.845)	-0.834 (0.464)	-1.114 (0.448)
PPP	0.006 (0.001)	0.003 (0.001)	0.001 (0.002)	-0.005 (0.004)

Table A-2 (cont.)

	1st Forecast interval	2nd Forecast interval	3rd Forecast interval	4th Forecast interval
RED	-1.088	0.351	-1.664	-1.180
	(1.605)	(0.436)	(0.535)	(0.780)
DFDSX*	0.795	-1.562	-3.442	-2.450
	(0.282)	(0.648)	(0.734)	(0.729)
DFREM	-0.049	0.105	0.162	0.250
	(0.026)	(0.033)	(0.023)	(0.043)
DFXGP	0.837	1.993	-0.562	0.826
	(0.567)	(0.637)	(0.632)	(0.843)
DFGNP	0.014	-0.199	1.383	1.149
	(0.190)	(0.208)	(0.282)	(0.377)
DFTDX	-0.027	0.056	0.088	0.343
	(0.028)	(0.023)	(0.027)	(0.062)
DFGNPG	0.396	1.086	0.865	2.510
	(0.230)	(0.029)	(0.513)	(0.661)
DFPPP	-0.009	-0.003	-0.009	-0.013
	(0.002)	(0.002)	(0.002)	(0.003)
M**	0.538	0.119	1.672	0.654
	(0.251)	(0.457)	(0.359)	(0.125)
R^2	.52	.41	.44	.39

*As in Table A-1 (*).

**The inverse of Mill's ratio (hazard rate).

Table A-3

Characterization Of The Sample For The Second Stage Estimates

(Means and Standard Deviations)

	1978-83	1978-80	1981-83
Bank security returns	0.014 (0.077)	0.015 (0.069)	0.013 (0.084)
T-Bill (R_f)	0.008 (0.002)	0.008 (0.002)	0.009 (0.002)
NYSE portfolio (R_m)	0.014 (0.045)	0.017 (0.048)	0.011 (0.042)
G-Bond (R_g)	0.006 (0.039)	0.001 (0.038)	0.011 (0.039)
Industry index (R_n)	0.018 (0.052)	0.012 (0.050)	0.025 (0.540)
$(\Delta\omega''_{jt}/V_{jt-1})$	0.014 (0.060)	0.003 (0.022)	0.025 (0.081)

Table A-4

Impact of News Relevant to Reschedulings: Equations (5) and (6)

(Numbers in parentheses are standard errors)

Parameter	1978-80	1981-83	Parameter	1978-80	1981-83
λ	0.025 (0.019)	-0.042 (0.018)	α_{10}	0.016 (0.010)	-0.004 (0.011)
β_I	0.473 (0.100)	0.220 (0.010)	α_{11}	0.003 (0.010)	0.002 (0.011)
α_1	0.011 (0.010)	-0.015 (0.011)	α_{12}	0.018 (0.010)	0.004 (0.011)
α_2	-0.002 (0.010)	0.026 (0.011)	α_{13}	0.008 (0.010)	-0.013 (0.011)
α_3	0.015 (0.010)	-0.005 (0.011)	α_{14}	0.005 (0.010)	0.004 (0.011)
α_4	0.005 (0.010)	0.001 (0.011)	α_{15}	0.015 (0.010)	0.007 (0.011)
α_5	0.007 (0.010)	0.003 (0.011)	α_{16}	0.010 (0.010)	-0.002 (0.011)
α_6	0.003 (0.010)	0.007 (0.011)	α_{17}	0.010 (0.010)	-0.018 (0.011)
α_7	0.003 (0.010)	-0.013 (0.011)	α_{18}	0.018 (0.010)	-0.006 (0.011)
α_8	0.026 (0.010)	0.005 (0.011)	α_{19}	0.002 (0.010)	0.010 (0.011)
α_9	-0.009 (0.010)	0.006 (0.011)	α_{20}	0.011 (0.010)	-0.014 (0.011)
			α_{21}	0.016 (0.010)	-0.003 (0.011)

(continued)

Table A-4 (cont.)

Parameter	1978-80	1981-83	Parameter	1978-80	1981-83
β_1	0.491 (0.197)	0.928 (0.255)	β_{13}	1.071 (0.197)	0.649 (0.255)
β_2	0.912 (0.197)	1.048 (0.255)	β_{14}	1.686 (0.197)	1.184 (0.255)
β_3	0.902 (0.197)	1.021 (0.255)	β_{15}	0.778 (0.197)	1.059 (0.255)
β_4	0.675 (0.197)	0.849 (0.255)	β_{16}	0.660 (0.197)	1.514 (0.255)
β_5	0.533 (0.197)	0.714 (0.255)	β_{17}	0.827 (0.197)	1.020 (0.255)
β_6	0.677 (0.197)	0.869 (0.255)	β_{18}	0.990 (0.197)	0.635 (0.255)
β_7	0.615 (0.197)	1.079 (0.255)	β_{19}	0.537 (0.197)	1.184 (0.255)
β_8	0.853 (0.197)	1.165 (0.255)	β_{20}	0.935 (0.197)	1.744 (0.255)
β_9	1.115 (0.197)	1.316 (0.255)	β_{21}	0.759 (0.197)	0.769 (0.255)
β_{10}	1.295 (0.197)	1.016 (0.255)			
β_{11}	0.838 (0.197)	1.088 (0.255)			
β_{12}	0.740 (0.197)	0.705 (0.255)			

(continued)

Table A-4 (cont.)

Parameter	1978-80	1981-83	Parameter	1978-80	1981-83
B_1	0.718 (0.269)	0.778 (0.319)	B_{14}	0.555 (0.271)	1.095 (0.320)
B_2	0.365 (0.270)	0.678 (0.321)	B_{15}	0.862 (0.270)	1.235 (0.319)
B_3	0.656 (0.271)	1.013 (0.322)	B_{16}	0.901 (0.269)	0.683 (0.319)
B_4	0.829 (0.270)	1.051 (0.321)	B_{17}	0.760 (0.269)	0.632 (0.319)
B_5	0.581 (0.269)	0.489 (0.319)	B_{18}	1.156 (0.269)	0.978 (0.319)
B_6	0.646 (0.270)	1.087 (0.321)	B_{19}	0.752 (0.269)	1.049 (0.319)
B_7	0.302 (0.269)	0.950 (0.320)	B_{20}	0.682 (0.269)	0.456 (0.319)
B_8	1.256 (0.270)	0.895 (0.320)	B_{21}	0.826 (0.269)	0.771 (0.319)
B_9	0.308 (0.269)	1.311 (0.320)			
B_{10}	1.077 (0.269)	0.973 (0.319)			
B_{11}	0.720 (0.269)	1.223 (0.319)			
B_{12}	0.698 (0.271)	0.544 (0.320)			
B_{13}	0.495 (0.269)	0.548 (0.319)			

References

Amemiya, T. Advanced Econometrics, Cambridge: Harvard University Press, 1985.

Barro, R., "Unanticipated Money Growth and Unemployment in the United States," American Economic Review, March 1977, 67, 101-115.

__________, "Unanticipated Money, Output, and the Price Level in the United States," Journal of Political Economy, August 1978, 86, 549-580.

Bruner, R. and Simms, Jr. J., "The International Debt Crisis and Bank Security Returns in 1982," Journal of Money, Credit, and Banking, February 1987, 19, 46-55.

Cline, W., International Debt Systematic Risk and Policy Response, Washington: Institute for International Economics, 1984.

Cornell, B., and Shapiro, A., "The Reaction of Bank Stock Prices to the International Debt Crisis", Journal of Banking and Finance, March 1986, 10, 55-73.

Country Exposure Lending Survey Federal Financial Institutions Examination Council, various issues.

Eaton, J. and Lance, T., "Developing Country Finance and Debt," Journal of Development Economics, June 1986, 22, 209-265.

Heckman, J., "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and Simple Estimators for Such Models," Annals of Economic and Social Measurement, Fall 1976, 5, 475-492.

International Monetary Fund, International Capital Markets: Developments and Prospects, Washington, DC: IMF Occasional Paper No. 43, 1986.

__________, Annual Report, various issues, Washington, DC.

Kyle, S., and Sachs, J., "Developing Country Debt and the Market Value of Large Commercial Banks," NBER Working Paper No. 1470, Sept. 1984.

McDonald, D., "Debt Capacity and Developing Country Borrowing," IMF Staff Paper No. 29, December 1982, 29, 603-46.

Lintner, J., "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets," Review of Economics and Statistics, 47, February 1965, 13-37

McFadden, D., Richard, E., Gerhard, F., Hajivasiliou, V., and O'Connell, S., "Is There Life After Debt? An Econometric Analysis of Credit Worthiness of Developing Countries," in G. Smith, J. Cuddington (eds.) International

Debt and Developing Countries, Washington, DC: World Bank, 1985, 179-209.

Mishkin, F., "Monetary Policy and Long-Term Interest Rates: An Efficient Markets Approach," Journal of Monetary Economics, January 1981, 7, 29-55.

__________, A Rational Expectations Approach to Macroeconometrics: Testing Policy Ineffectiveness and Efficient-Markets Models, Chicago: The University of Chicago Press, 1983.

OECD, Financial Market Trends, Paris (various issues).

Özler, S., "On the Relation Between Reschedulings and Bank Value," UCLA Dept. of Economics mimeo, 1987.

__________, "Rescheduling of Sovereign Government Bank Debt" Ph.D. dissertation, Stanford Univ.,1985.

Schoder, S. and Prashant V., "The Market for Bank Stock and Banks' Disclosure of Cross-Border Exposure: The 1982 Mexican Debt Crisis", Working Paper, Wharton School of Finance, University of Pennyslvania, 1986.

Sharpe, W.F., "Capital Asset Prices: Atheory of Market Equilibrium Under Conditions of Risk," Journal of Finance, 19, September 1964, 425-442.

World Bank, World Debt Tables, Washington, DC., 1985.