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# The Changing Role of International Bank Lending in Development Finance

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## Summary

During the past fifteen years, the international bank loan market has replaced the international bond and direct investment markets as the major source of private development capital. In addition, rescheduling of external debt, normally in the context of a comprehensive stabilization program, has generally replaced default by developing country borrowers. This paper examines how innovations in financial institutions over the past decade have facilitated these developments.

During the 1970s, institutional developments in the domestic banking systems of the industrialized countries had the effect of lowering the risk on deposit liabilities of the money-center banks. As a result, these banks gained a competitive advantage over the international bond and direct investment markets in intermediating the flow of loanable funds from surplus to deficit countries. Simultaneously, financial innovations increased the developing countries' cost of defaulting on external debt, creating incentives for them both to undertake stabilization programs and to seek to reschedule their external debt, rather than to default. These innovations resulted in lower perceived levels of risk in lending to developing-country borrowers and hence to a significant rise in the volume of private bank lending.

The pricing and allocation of private development credit came to reflect these institutional developments. While the international bond market allocates credit with the aid of a premium reflecting the likely risk of default by each individual borrower, the international banking

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market charges a more uniform risk spread and endeavors to exclude certain classes of borrowers from access to bank credit. Evidence cited in this paper shows that the bond markets have displayed large risk premia compared with the banking markets at times when a major developing-country borrower has experienced debt-service difficulties. In the banking markets, borrowing countries that choose projects or policies which tend to undermine their ability to service their external debt are denied access to refinancing credit, and the resulting liquidity crises then induce such borrowers to undertake stabilization programs. Thus the expected cost of having to undertake a stabilization program has replaced the risk premium as the incentive for borrowers to choose projects or policies of adequate quality. This paper also finds that if individual borrowers in developing countries do not take account of the cost of having to undertake a stabilization program in addition to the market cost of credit, then "overborrowing" may result.

## I. Introduction

During the past fifteen years, development finance has undergone major institutional changes. The international bank loan market has replaced the markets for international bonds and direct investment as the major source of private development capital. Furthermore, outright default by developing country borrowers unable to meet their debt obligations has been successfully replaced by the multilateral rescheduling of debt, normally in the context of a comprehensive stabilization program.

In this paper, we argue that certain institutional and financial innovations that were set in motion by the global payments imbalances of the early 1970s enabled the international banking markets to absorb a large volume of deposit liabilities from oil-exporting surplus countries, while at the same time allowing them to overcome the traditional problems of monitoring and enforcing loan contracts with developing countries (DCs); these developments facilitated a much enlarged flow of financial capital to DCs. We shall argue further that the increased role of bank lending in development finance has had important implications for both the pricing and the alloction of development credit, as well as for the allocation of risk between DC borrowers and their international bank creditors.

For example, during the period from about 1920 to 1931, 1/ when the foreign bond market and the market for direct investment were the primary vehicles for the private financing of development, a DC borrower that was unable to service its external debt typically defaulted on its bond issues. As a result, the lending rates that were established in the foreign bond market included risk premia sufficient to compensate lenders for the expected costs of such contingencies. Yields on a given country's bonds tended to rise whenever the market's evaluation of the risk of a

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1/ From 1931 to 1970 private financing of development projects or policies was minimal.

specific project or a particular policy stance in the borrowing country increased, and this mechanism served to direct capital to its most efficient use. In addition, the possibility of defaulting on a given stock of outstanding bonds acted to limit the liability of the borrower, so that the market ensured some sharing of risk between borrowers and lenders.

Under the present regime of bank-loan financed development, in which the debt of a delinquent DC is typically rescheduled (usually in conjunction with some form of stabilization program), the international banking sector has, in effect, "traded off" a portion of the risk premium that it would have received in return for an extension of the borrower's liability for his debt into the future. In return, competition in the international bank loan markets has ensured that the risk spread charged by international bank lenders has come to reflect only the expected loss that lenders would incur should it become necessary to reschedule a DC's debt. This means, in particular, that the spread has not always fully incorporated the risk associated with individual projects or policies. By incorporating only a lower and more uniform risk premium, the interest rates on international bank loans to DC borrowers may not have directly influenced the amount of risk that borrowers choose to assume. Instead, the international bank loan market has used quantity constraints on the refinancing of debt as incentive devices. By denying a non-performing developing country continued access to refinancing, the international banking markets can normally induce the borrower to accept a rescheduling of debt, combined with a stabilization program. 1/

In Section II, we first discuss how institutional developments in the domestic banking systems of the industrialized countries gave international banking markets an advantage over the bond and direct investment markets in competing for a greatly enlarged flow of loanable funds from surplus countries in the early 1970s. We then discuss how financial innovations in international bank lending, combined with an increased willingness and ability by international lending agencies to assist DCs experiencing payments difficulties, succeeded in reducing the risk of lending to DCs by providing incentives for them to undertake rescheduling accompanied by a stabilization program, rather than to default. In Section III, we discuss the effects of these institutional developments on the pricing and allocation of international bank loans to DCs. In particular, we show that the spreads charged to DC borrowers above the banks' cost of funds do not appear to vary sufficiently, when compared with the international bond markets, to capture fully the differences in risk among borrowers. Instead, some classes of borrowers are rationed

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1/ The possibility of non-price rationing of credit in bank-loan markets with imperfect information is well recognized in the economics literature. For a recent advance, which consolidates and reinterprets this literature, see Stiglitz and Weiss (1981). The idea that constraints can act as incentive devices has also been explored elsewhere, see Stiglitz and Weiss (1982).

out of the international bank loan market. A comparison of risk premia on international bank loans to DCs with those on international bonds issued by DCs provides some empirical support for these hypotheses. In Section IV we discuss the effects of the institutional innovations on the optimal amount of borrowing by DCs. Finally, a technical appendix provides theoretical support for some of the hypotheses adduced here concerning the pricing and allocation of loans in the international banking markets.

## II. The Changing Structure of Development Finance

Until the late 1960s, the largest share of private external financing of economic development took place through the international bond market; the role of international bank lending was essentially limited to short-term financing of trade flows. Two related developments enabled money-center banks to surpass the other international financial markets in importance as recipients of international loanable funds, and hence as suppliers of development finance (Table 1). First, during the 1970s the perception spread that the national financial authorities in the major industrialized countries had assumed an increasing proportion of the risk on the deposit liabilities of money-center banks, thus enabling such banks to compete successfully for funds from surplus countries. 1/ Second, the risk that DCs would default on bank debt was reduced through financial innovations in the banking markets that increased the DCs' cost of default, and through the enhanced ability of international financial institutions to provide assistance to DCs which experienced difficulties in servicing their external debt. We first review briefly the international bond market and the way it dealt with default risk; we then examine the causes of the growing role of the international banking markets in development finance.

### 1. The international bond market

Before 1970, the role of bank lending had been confined mainly to the provision of trade credit secured by collateral in the form of traded goods. For example, during 1920-30, the last decade of extensive private resource transfers to developing countries prior to the 1970s, bank lending for development projects or balance of payments financing was virtually non-existent. A boom in the underwriting of foreign bonds in the United States began in 1924. Rising commodity prices created prosperous conditions in Latin America and Australia, and the United States itself entered a four-year period of prosperity. More than US$1.2 billion in foreign capital issues were sold in the United States in 1924; a peak was reached in 1927 when total foreign bond issues amounted to US$1.6 billion. In 1929, the collapse of the stock market in the United States, rising interest rates, and falling commodity prices resulted in a sharp decline

1/ In the United States, banks with deposit liabilities exceeding US$10 billion are referred to as money-center banks.

Table 1. Financial Flows to Non-Oil Developing Countries

(In billions of dollars)

| | Net New Bank Lending | Net New Bond Lending | Net New Direct Investment | Official Development Assistance |
|---|---|---|---|---|
| 1970 | 1 | 1 | 2 | 7 |
| 1971 | 1 | 1 | 2 | 7 |
| 1972 | 3 | 1 | 3 | 8 |
| 1973 | 5 | 1 | 4 | 9 |
| 1974 | 9 | 1 | 4 | 9 |
| 1975 | 15 | 1 | 5 | 12 |
| 1976 | 21 | 2 | 5 | 13 |
| 1977 | 15 | 3 | 5 | 15 |
| 1978 | 25 | 4 | 7 | 19 |
| 1979 | 40 | 3 | 9 | 22 |
| 1980 | 49 | 2 | 9 | 27 |
| 1981 | 50 | 4 | 13 | 25 |
| 1982 | 21 | 4 | 11 | 27 |
| 1983 | 13 | 3 | 8 | 27 |

Source: Group of Thirty, Foreign Direct Investment 1973-81. International Monetary Fund, International Capital Markets, Occasional Paper No. 23 (Washington, D.C., 1983). IBRD, World Development Report 1983 (Washington, D.C., 1984).

in foreign bond issues, and after a temporary revival in 1930 the market for new international bond issues essentially disappeared in early 1931. There was virtually no private debt financing of development from 1931 until bank financing began on a large scale in the early 1970s. By 1974, bond financing had declined to barely 10 percent of the bank-financed external debt of non-oil DCs (Table 1).

An important feature of the period when foreign bond markets were the main vehicle for private development lending was that defaults occurred with some regularity. If the borrowing entity--whether a national government, municipality, or private enterprise--defaulted on a particular bond issue, it was usually able to re-enter the bond market after some partial settlement had been reached with bond holders. However, if default occurred because of an unwillingness to pay--e.g., repudiation of debts contracted by previous governments--then the borrower was typically barred until the lenders had obtained redress. International bondholder councils served as the legal means for ensuring, albeit imperfectly, exclusion of delinquent debtors from the international bond markets (see Borchard (1951) and Wynne (1951)).

The early 1930s witnessed a substantial number of defaults, but in almost all cases borrowers subsequently offered bondholders readjustment plans providing for partial payment of debt service. By December 1935, debt service had been paid in full on 62 percent of all foreign dollar bonds outstanding, while interest was in default on 37 percent of the total owed, and principal and sinking funds were in default on 1 percent of the total. 1/

The most remarkable feature of the international bond markets was that during the turbulent period of 1920-1935 foreign bonds issued in the United States offered coupon rates that were sufficient to compensate bondholders for expected default and, in fact, produced a holding period rate of return of about 3 percent, which was comparable to the average holding period rate of return on U.S. Aaa bonds over the same period (see Madden et al., 1937; Winkler, 1931; and Durand, 1942).

## 2. The causes of the growing role of bank lending in development finance during the 1970s

The international payments imbalances generated by the 1973 oil price increase provided an unprecedented opportunity for the expansion of international credit markets. The increased supply of loanable funds from low-absorbing oil exporters was met by a sharp rise in the demand for balance of payments financing by non-oil DCs. These payments imbalances induced two institutional developments that made it possible

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1/ Figures computed by Corporation of Foreign Bondholders, various Annual Reports, 1930-1936. This does not include foreign bonds in default that had been issued before 1920.

for the international banking market to expand its role and serve as the main conduit for financial flows from surplus oil-exporting countries to non-oil developed countries.

a. The reduction in risks on the deposit liabilities of money-center banks

An institutional development with far-reaching consequences for the functioning of financial markets has been the gradual movement by the central banks and deposit insurance agencies in the industrial countries to assume a larger portion of the default risk of the deposit and debt liabilities of money-center banks. An indication of the extent to which the guarantees and assistance extended by national financial authorities have prevented an increase in assetholders' assessment of the risks attached to holding the deposit liabilities of money center banks can be obtained from Table 2, which compares the interest rates on certificates of deposit of U.S. money-center banks with the interest rates on Aaa commercial paper (short-term, fully transferable, high-grade corporate debt), and short-term treasury bill rates. The excess of the rate of return on certificates of deposit issued by money-center banks over the rates of return on six-month treasury bills remained below 100 basis points until the third quarter of 1978, then rose to 250 basis points by the third quarter of 1981. Thereafter, they declined gradually to 70 basis points in the first quarter of 1984, before rising rapidly to 120 basis points in the second quarter. The increase in the premium on money-center CDs in 1981 and the first half of 1982 can be interpreted as a reflection of heightened concern for the stability of the financial system, which subsided after concerted efforts to restore confidence by national and international financial authorities. The increase in the excess of CD rates over U.S. treasury bill rates in mid-1984 is largely due to difficulties experienced by some major money-center banks with their domestic portfolios.

This evolutaion toward a domestic financial system in which financial authorities bear a significant portion of the risk attached to the deposit liabilities of money-center banks was largely completed by the early 1970s in the industrial countries outside the United States, either through direct state control and ownership as in Italy, or via automatic discounting facilities as in France, the United Kingdom, and Germany. In the United States, the Federal Deposit Insurance Corporation (FDIC), established in 1934, was gradually transformed from an insurance agency paying depositors of failed banks up to US$2,500, to a financial stabilization agency guaranteeing total deposit and debt liabilities of money-center banks (O'Driscoll and Short, 1984). The FDIC gradually transformed its authority to merge failing banks (conveyed in the 1935 Banking Act) into a vehicle for providing 100 percent insurance coverage for money-center banks. While the stockholders of failing banks have often lost their equity, the FDIC has always been able to structure mergers or to effect

Table 2. Yields on Deposit Liabilities of U.S. Money-Center Banks

(In percent per annum)

| | | Yield on Six-Month | | | Premium | |
|---|---|---|---|---|---|---|
| | | Certificates of Deposit of U.S. Money Center Banks (1) | U.S. Treasury Bills (2) | Aaa Commercial Paper (3) | (1)-(2) | (1)-(3) |
| 1975 | I | 6.7 | 5.9 | 6.6 | 0.8 | 0.1 |
| | II | 6.4 | 5.7 | 5.9 | 0.7 | 0.5 |
| | III | 7.5 | 6.8 | 6.7 | 0.7 | 0.8 |
| | IV | 6.9 | 6.0 | 6.1 | 0.9 | 0.8 |
| 1976 | I | 5.7 | 5.3 | 5.3 | 0.4 | 0.4 |
| | II | 6.0 | 5.5 | 5.6 | 0.5 | 0.4 |
| | III | 5.7 | 5.4 | 5.5 | 0.3 | 0.3 |
| | IV | 5.1 | 4.8 | 5.0 | 0.3 | 0.1 |
| 1977 | I | 5.1 | 4.9 | 4.8 | 0.2 | 0.3 |
| | II | 5.1 | 5.0 | 5.1 | 0.1 | 0.0 |
| | III | 6.1 | 5.8 | 5.8 | 0.3 | 0.3 |
| | IV | 6.9 | 6.4 | 6.6 | 0.5 | 0.3 |
| 1978 | I | 7.2 | 6.7 | 6.8 | 0.5 | 0.4 |
| | II | 7.8 | 7.0 | 7.2 | 0.8 | 0.6 |
| | III | 8.6 | 7.6 | 8.1 | 1.0 | 0.5 |
| | IV | 10.7 | 9.0 | 9.9 | 1.7 | 0.8 |
| 1979 | I | 10.7 | 9.5 | 10.1 | 1.2 | 0.6 |
| | II | 10.3 | 9.4 | 9.9 | 0.9 | 0.4 |
| | III | 11.0 | 9.6 | 10.6 | 1.4 | 0.4 |
| | IV | 13.7 | 11.8 | 13.1 | 1.9 | 0.6 |
| 1980 | I | 15.3 | 13.2 | 14.3 | 1.9 | 1.0 |
| | II | 11.3 | 9.6 | 10.8 | 1.7 | 0.5 |
| | III | 10.2 | 9.3 | 9.6 | 0.9 | 0.6 |
| | IV | 15.1 | 13.2 | 14.5 | 1.9 | 0.6 |
| 1981 | I | 15.4 | 13.6 | 14.5 | 1.8 | 0.9 |
| | II | 16.3 | 14.3 | 15.3 | 2.0 | 1.0 |
| | III | 17.5 | 15.1 | 16.2 | 2.4 | 1.3 |
| | IV | 13.9 | 12.2 | 13.0 | 1.7 | 0.9 |
| 1982 | I | 14.5 | 13.0 | 13.7 | 1.5 | 0.8 |
| | II | 14.3 | 12.6 | 13.5 | 1.7 | 0.8 |
| | III | 12.3 | 10.4 | 11.5 | 1.9 | 0.8 |
| | IV | 9.2 | 8.3 | 8.8 | 0.9 | 0.4 |
| 1983 | I | 8.7 | 8.2 | 8.3 | 0.5 | 0.4 |
| | II | 9.0 | 8.5 | 8.6 | 0.5 | 0.4 |
| | III | 9.9 | 9.3 | 9.4 | 0.6 | 0.5 |
| | IV | 9.6 | 9.0 | 9.2 | 0.6 | 0.4 |
| 1984 | I | 9.9 | 9.3 | 9.5 | 0.6 | 0.4 |
| | II | 11.5 | 10.2 | 10.8 | 1.3 | 0.7 |

Source: Federal Reserve Statistical Release H.15, various issues.

a "purchase and assumption" 1/ so that depositors in the end recouped their investments. 2/ Important examples of this evolving financial policy were the Franklin National Bank (the twentieth largest bank in the United States) which failed in 1974; the First Pennsylvania (the twenty first largest U.S. bank) rescued in 1980; and finally the Continental Illinois National Bank and Trust Company of Chicago (the eighth largest U.S. bank) which was rescued in July 1984. In all these cases, the full nominal value of foreign as well as domestic deposits was maintained, irrespective of the cause of the bank's difficulties. 3/

International cooperation among financial authorities to assume responsibility for off-shore bank supervision and assistance in case of need arose from concerns about the ability of the international financial markets to cope with financial flows from oil-exporting surplus countries to oil-importing deficit countries--the so-called "recycling process." Informal encouragement of international bank lenders to play an active role was backed by implicit understandings about the lender-of-last-resort obligation of central banks. Events since the onset of the current debt crisis in August 1982 have tended to reinforce the previously untested understanding that financial authorities would assist international bank lenders in coping with a systemic DC debt crisis. Concerted efforts by central banks, acting through the BIS and the U.S. Treasury Exchange Stabilization Fund, led to emergency loans to Mexico and support for the international interbank market in September 1982, thus enabling Mexico to reschedule its debts and remain current on interest payments. Increased pressure exerted by central banks on money-center banks to remain active in the interbank market (for example, to refrain from withdrawing deposits with Latin American banks in London) may have been interpreted as enhancing the obligation of central banks to assume the risk of money-center banks (Clark, 1984). Finally, a US$300 million emergency loan (guaranteed by the U.S. Treasury Exchange Stabilization Fund) coupled with a US$100 million loan from eleven money-center banks (guaranteed by the New York Federal Reserve Bank), was extended to Argentina in March 1984 and renewed in June 1984, so as to permit Argentina to remain less than 90 days in arrears on interest payments to U.S. banks. 4/

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1/ In a "purchase and assumption" transaction the ailing bank is acquired by another bank with a subsidy from the FDIC.

2/ Depositors at failing banks with deposits of less than US$10 billion for whom no merger or assumption could be arranged have occasionally suffered losses if their deposits exceeded US$100,000. The FDIC made one attempt to implement a policy of restricting insurance coverage to US$100,000 of deposits at larger banks in the case of the Penn Square Bank in 1982, but was forced to reverse this policy in the case of the Continental Bank. See FDIC, 1983.

3/ The protection of deposits has generally not been extended to the holders of equity in U.S. money-center banks.

4/ If interest payments are in arrears by more than 90 days, such interest claims may not be counted as current earnings under U.S. banking law. U.S. money-center banks would have been forced to make downward adjustment to first quarter 1984 earnings, averaging 25 percent.

b. The reduction in the risk of default on loans to DC borrowers

The reduction in the risk that money-center banks would default on their deposit liabilities gave bank credit a competitive advantage over other sources of finance for DCs, and made it possible for money-center banks to assume a larger share of the financial flows from countries with payments surpluses. However, the absence of a legal structure that assures a predetermined allocation of property rights in case of default--which introduces the possibility that the borrower may be unwilling to service his debt even though he is able--has worked to increase the risks associated with the granting of credits to DCs. The ability of the international markets to overcome some of these difficulties made it desirable for money-center banks to lend their increased deposit inflows to DCs. In this section, we first discuss the difference in legal institutions in domestic and foreign financial markets; we then examine how the international banking markets reduced the risk of lending to DCs through financial innovations of an institutional and legal character.

The legal institutions governing the allocation of property rights in conflicts that may arise between lenders and borrowers in international credit markets differ significantly from their domestic counterparts. In domestic credit markets, bankruptcy laws limit the claims of lenders to certain types of the individual borrowers' assets; thus the ability of the bankrupt borrower to acquire unencumbered assets in the future is not impaired. Similarly, the liability of the corporate borrower is limited to its current equity and the lender retains no claim on the future output of labor and management. Furthermore, the bankruptcy law provides the borrower's assets with some legal protection from seizure, through the possibility of reorganizing a bankrupt corporation. 1/ Such limitations on the domestic borrower's liability are balanced by the lender's right to declare the borrower to be in default in case of delinquency in servicing debt, and to try to attach the assets of the borrower before they are fully depleted. The domestic credit market also allows the lender to put restrictive covenants (such as limitations on the borrower's debt-equity ratios and amounts of subordinated debt) on its credit in order to prevent the risk of the credit from changing after the loan has been made. The institutional structure of the domestic credit market and the content of the bankruptcy code have thus developed so as to allow the borrower to share with the lender the risk of the investment project to be financed.

In contrast to domestic financial markets, the markets for external credit to DCs (foreign bonds, as well as international bank loans) have a much less developed institutional and legal structure, particularly as regards a clear definition of the borrower's liability and the lender's rights (Rendell, 1980). In particular, when the borrower is a sovereign entity the creditor has no recourse to the external or domestic assets of the borrower, because of the well-established legal principle of

1/ As an example, see Chapter XI of the U.S. Bankruptcy Code.

sovereign immunity under which domestic courts relinquish jurisdiction over a foreign state (Sweeney (1963) and John (1972)). Until 1976, when the Foreign Sovereign Immunities Act became law in the United States, European and U.S. courts generally adhered to the absolute theory of sovereign immunity and acceded to claims of immunity involving all commercial activities of foreign states, including those of state enterprises (Rendell, 1980). If the foreign borrower is a large nationally-recognized private entity in a DC then its domestic assets have also proven, in practice, to be immune from seizure by an international creditor. Furthermore, the domestic courts in DCs rarely afford the lenders equal standing with the borrowers de facto. 1/ This absence of legal institutions designed to limit the borrower's liability and safeguard the lender's rights is a feature that distinguishes the external credit market from the domestic credit market in a fundamental way, and it is probably an important reason for the low levels of private credit extended to DCs before the early 1970s.

Such shortcomings in the institutional structure governing the allocation of property rights in the event of debt-service difficulties have been overcome to some extent through financial innovations designed to raise the DC's cost of default. In particular, the introduction of cross-default clauses 2/ covering publicly guaranteed debt significantly strengthened the guaranty and meant that differences in risk of individual borrowing agencies or projects within a DC became blurred, since a delinquent borrower receives support from other borrowers so as to avoid triggering the cross-default clause. This innovation is all the more important because the increase in bank lending to DCs during the past ten years has tended to be restricted to governments, their agencies, borrowers with government guarantees, and borrowers whose size or importance to the economy meant that their debt was likely to be publicly guaranteed if the need arose.

In practice, most external private debt of DCs has been transformed into publicly guaranteed debt in times of debt service problems, since difficulties experienced by private borrowers in servicing their debt usually have taken the form of liquidity constraints on foreign exchange. The aggregation of the external debt of a DC, achieved through public guarantees and cross-default clauses, assures that bank lenders need not be concerned with the ability of individual borrowers to pay their external debt, but only with the ability of the individual DC, as an entity, to service its total debt. As a result, the differences in lending rates paid by different borrowers within the same DC have typically been less than 50 basis points. 3/

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1/ Foreign lending to developed countries is less hampered by these institutional shortcomings, since the lending entity frequently enjoys full recognition in the courts of the borrowing countries.

2/ A loan encumbered by a cross-default clause will become due immediately when the clause is triggered by a default of the associated loan.

3/ World Bank Debtor Reporting System.

A similar aggregation of responsibility was achieved on the lending side of the international bank loan market through the practice of syndication, whereby many lenders subscribe to a small portion of a loan. The practice of syndication has involved all major lenders with the major debtor countries. Thus, should a DC borrower become delinquent, cross-default clauses would trigger default on all outstanding loans, and syndication ensures that all bank lenders would be affected.

In addition to the aggregation of the borrowing and lending side of the international bank market, other legal developments have tended to help the lenders protect their assets. The most important of these was the Foreign Sovereign Immunities Act of 1976, which established a more restrictive interpretation of sovereign immunity. In particular, immunity will not be recognized where the action is based on a commercial activity of a foreign state or its agencies (Rendell, 1980).

The net effects of these financial and legal innovations are to raise the cost incurred by a DC in the event any of its loans are declared to be in default, by attempting to ensure that such a DC will be denied access to the international banking markets and have its external economic relations interrupted. Syndication prevents a borrower from selectively defaulting on loans owed to a subset of lenders, while the cross-default clauses prevent individual public sector borrowers from defaulting without the DC as a whole being declared in default by most of international banking market. Since regulatory requirements prevent money-center banks from extending loans to borrowers that already have loans in default, DCs with public sector loans in default will forfeit access to the bank loan markets.

The relative openness of DC debtor countries, combined with their potentially high marginal productivity of capital, implies that a default on external debt (with the resulting exclusion from the international banking markets and interruption of external commercial relations) involves substantial costs. Instead, DCs experiencing debt difficulties have typically chosen to seek a rescheduling of debt in return for adopting a stabilization program (Table 3). 1/ This institutional evolution away from outright default towards rescheduling with a stabilization program has been given added impetus by the support lent to such efforts by international financial institutions as well as by the domestic financial authorities in the industrialized countries. In particular, these institutions, in concert with the international banking markets, have provided the bridging finance necessary to support a stabilization program until DCs with payments difficulties could service their external debt again and return to the international banking markets.

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1/ The theoretical possibilities for the outcome of a failure to service debt range from default without residual payments to the lender to rescheduling without loss of principal or interest to the lender.

Table 3. Multilateral Debt Renegotiations, 1975-83

(In millions of U.S. dollars)

| Country | Number of Reschedulings, 1975-83 | 1975-1980 | | 1981 | | 1982 | | 1983 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Paris Club | Commercial Bank | Paris Club | Commercial Bank | Paris Club | Commercial Bank | Paris Club | Commercial Bank |
| Argentina | 2 | | 970 | | | | | | 6,000 |
| Bolivia | 2 | | | | 444 | | | | 536 |
| Brazil | 2 | | | | | | | 3,800 | 9,800 |
| Central African Rep. | 2 | | | 55 | | | | 13 | |
| Chile | 2 | 216 | | | | | | | 4,100 |
| Costa Rica | 2 | | | | | | | 107 | 1,259 |
| Dominican Rep. | 1 | | | | | | | | 660 |
| Ecuador | 2 | | | | | | | 200 | 2,150 |
| Gabon | 1 | 105 | | | | | | | |
| Guyana | 3 | | 29 | | | | 14 | | 24 |
| Honduras | 1 | | | | | | | | 122 |
| India | 3 | 436 | | | | | | | |
| Jamaica | 3 | | 126 | | 103 | | | | 166 |
| Liberia | 4 | 30 | | 25 | | | 27 | 25 | |
| Madagascar | 3 | | | 142 | | 103 | | | 195 |
| Malawi | 3 | | | | | 24 | | 30 | 57 |
| Mexico | 2 | | | | | | | 2,000 | 22,550 |
| Morocco | 1 | | | | | | | 1,200 | |
| Nicaragua | 3 | | 582 | | 190 | | 55 | | |
| Niger | 1 | | | | | | | 29 | |
| Nigeria | 1 | | | | | | | | 1,830 |
| Pakistan | 1 | | | 263 | | | | | |
| Peru | 4 | 478 | 821 | | | | | 450 | 2,320 |
| Romania | 4 | | | | | 234 | 1,544 | 195 | 572 |
| Senegal | 4 | | | 77 | | 84 | | 81 | 92 |
| Sierra Leone | 2 | 66 | | | | | | | |
| Sudan | 4 | 373 | | | 638 | 174 | | 550 | |
| Togo | 5 | 170 | 68 | 92 | | | | 300 | 84 |
| Turkey | 5 | 4,696 | 2,640 | | 3,100 | | | | |
| Uganda | 2 | | | 27 | | 10 | | | |
| Uruguay | 1 | | | | | | | | 170 |
| Yugoslavia | 1 | | | | | | | | 3,800 |
| Zaire | 6 | 1,594 | 402 | 574 | | | | 1,600 | |
| Zambia | 1 | | | | | | | 320 | |
| Total | 84 | 8,164 | 5,638 | 1,255 | 4,475 | 629 | 1,640 | 10,900 | 56,487 |

Source: World Bank Debt Tables, 1983.

The effect of these financial and legal innovations is to shift some of the risk incurred by international bank lenders in increasing their role as financial intermediary between surplus countries and less developed deficit countries to national financial authorities and to the borrowing DCs. The national financial authorities, in their efforts to safeguard the money-center banks, have moved towards assuming the default risk of these banks' deposit liabilities. Simultaneously, the replacement of outright default by the rescheduling of debt combined with a stabilization program has extended the borrower's liability into the future. 1/

## III. The Pricing and Allocation of International Bank Loans to DCs

The replacement of the foreign bond market and the market for direct investment by the international bank credit market as the main conduit for development finance has had significant consequences for the pricing and allocation of development credit. In particular, even a casual inspection of the difference between the borrowing and lending rates of banks active in the international market suggests that the spread between the interest rate charged to borrowers and the banks' own cost of funds (LIBOR) has come to reflect the banking market's assessment of expected loss due to debt rescheduling, rather than the specific risk of default on individual projects or policies in each borrowing country. 2/ This hypothesis is supported by the observation that these spreads are relatively small and have exhibited little variation either across borrowers or over time. 3/

For example, Table 4 indicates that despite the advent of the DC debt crisis in 1982, the interest rate spreads over LIBOR on loans to non-oil DC borrowers remained, on average, less than 50 basis points greater than those paid by borrowers in industrial countries during the entire period from 1974 to 1983. The difference between the average spreads paid by DCs that were obliged to undergo a rescheduling and those on loans to industrial countries remained below one percentage point until 1981, when it rose to about 150 basis points, on average.

The variations in spreads around their arithmetical average have been very narrow, normally less than 100 basis points. The spreads for a sample of non-oil DC borrowers are given in Table 5 and are seen to

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1/ In the context of domestic financial markets, replacement of default by the rescheduling of debt accompanied by a stabilization program would be analogous to extending the liability of the borrowing firm to its employees and management.

2/ Such costs include any loss of interest and principal agreed to in the rescheduling, as well as transaction costs and the cost of not being able to adjust loan portfolios.

3/ Interest equivalent front-end fees added on average 24 basis points to the spreads charged developing countries. See Mills and Terrell (1984).

Table 4. Average Interest Rate Spreads Above LIBOR on Publicly Guaranteed Loans, 1974-1983

| | Industrial Countries | Non-oil LDCs | Rescheduled Countries | Difference in Average Spreads: Rescheduled countries minus industrial countries |
|---|---|---|---|---|
| 1974 I | 0.67 | 1.00 | 1.05 | 0.37 |
| II | 0.59 | 1.07 | 1.18 | 0.59 |
| III | 0.90 | 1.17 | 1.01 | 0.11 |
| IV | 1.36 | 1.43 | 1.35 | -0.01 |
| 1975 I | 1.41 | 1.68 | 1.73 | 0.31 |
| II | 1.54 | 1.78 | 1.78 | 0.24 |
| III | 1.55 | 1.74 | 1.80 | 0.25 |
| IV | 1.58 | 1.72 | 1.79 | 0.20 |
| 1976 I | 1.52 | 1.84 | 1.86 | 0.34 |
| II | 1.28 | 1.81 | 1.95 | 1.67 |
| III | 1.44 | 1.95 | 1.98 | 0.53 |
| IV | 1.33 | 1.82 | 2.03 | 0.70 |
| 1977 I | 1.30 | 1.79 | 1.94 | 0.64 |
| II | 1.23 | 1.73 | 1.95 | 0.72 |
| III | 1.28 | 1.66 | 2.00 | 0.71 |
| IV | 1.09 | 1.66 | 1.88 | 0.78 |
| 1978 I | 0.92 | 1.52 | 1.87 | 0.95 |
| II | 0.93 | 1.47 | 1.69 | 0.76 |
| III | 0.87 | 1.29 | 1.54 | 0.67 |
| IV | 0.73 | 1.13 | 1.20 | 0.47 |
| 1979 I | 0.65 | 0.95 | 1.25 | 0.60 |
| II | 0.62 | 0.87 | 1.02 | 0.40 |
| III | 0.67 | 0.76 | 0.91 | 0.24 |
| IV | 0.49 | 0.74 | 0.87 | 0.38 |
| 1980 I | 0.56 | 0.78 | 0.91 | 0.35 |
| II | 0.57 | 0.84 | 0.91 | 0.34 |
| III | 0.54 | 0.82 | 1.12 | 0.58 |
| IV | 0.56 | 1.03 | 1.25 | 0.69 |
| 1981 I | 0.54 | 0.82 | 2.00 | 1.44 |
| II | 0.47 | 1.12 | 2.25 | 1.78 |
| III | 0.46 | 0.94 | 1.75 | 1.29 |
| IV | 0.46 | 0.90 | 1.50 | 1.04 |
| 1982 I | 0.57 | 0.85 | 1.75 | 1.22 |
| II | 0.47 | 1.10 | 1.75 | 1.28 |
| III | 0.48 | 1.05 | 2.50 | 2.02 |
| IV | 0.56 | 1.29 | 1.75 | 1.21 |
| 1983 I | 0.72 | 1.82 | 2.12 | 1.40 |
| II | 0.65 | 0.71 | 2.25 | 1.60 |
| III | 0.65 | 1.90 | 2.25 | 1.60 |
| IV | 0.65 | 0.84 | 2.25 | 1.60 |

Source: World Bank Debtor Reporting System.

Table 5. Interest Rate Spreads Above LIBOR on Public and Publicly Guaranteed Loans for Selected LDC Borrowers

(Quarterly averages)

| | | Colombia | Chile | Ecuador | Peru | Mexico | Argentina | Nigeria | Turkey | Indonesia | Philippines | Brazil | Korea |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1979 | I | -- | -- | 1.043 | 1.75 | .829 | .842 | 1.06 | 1.63 | -- | .923 | 1.107 | -- |
| | II | .717 | .96 | .872 | -- | .698 | .81 | -- | -- | .68 | .834 | .983 | -- |
| | III | -- | .82 | .835 | 1.563 | .697 | .775 | 1.0 | 1.75 | -- | .75 | .916 | -- |
| | IV | -- | .887 | -- | 1.39 | .704 | .70 | -- | -- | -- | 1.094 | .739 | -- |
| 1980 | I | .744 | 1.0 | .584 | -- | -- | .605 | 1.0 | -- | -- | .764 | .975 | .77 |
| | II | -- | .83 | .740 | 1.4 | .619 | .637 | -- | -- | -- | -- | .98 | .905 |
| | III | .800 | .757 | .625 | 1.2 | .410 | .585 | .938 | -- | .65 | .75 | 1.221 | .85 |
| | IV | .800 | .790 | .784 | 1.375 | .416 | .606 | .902 | -- | -- | .91 | 1.571 | .975 |
| 1981 | I | .765 | .735 | .375 | 1.06 | .81 | .623 | .889 | -- | .64 | .94 | -- | 1.125 |
| | II | .719 | .688 | .682 | 1.088 | .50 | .728 | .875 | -- | -- | .943 | 1.862 | .865 |
| | III | -- | .663 | .800 | .896 | .449 | .563 | .875 | .63 | -- | 1.04 | 2.107 | .813 |
| | IV | .637 | .740 | .375 | 1.179 | .688 | 1.004 | .875 | -- | -- | .75 | 2.075 | .647 |
| 1982 | I | .608 | .773 | .313 | .75 | .813 | .909 | -- | -- | -- | 1.93 | 2.125 | .729 |
| | II | .625 | 1.013 | .375 | .912 | .713 | -- | -- | -- | .375 | .875 | 2.125 | .553 |
| | III | .688 | 1.375 | -- | 1.25 | .50 | -- | .875 | -- | -- | .875 | 2.125 | .547 |
| | IV | .625 | 1.47 | -- | -- | -- | -- | .875 | 1.25 | .375 | .688 | 2.125 | .625 |
| 1983 | I | -- | .313 | -- | -- | 2.25 | -- | .875 | -- | .35 | .688 | 2.125 | .604 |
| | II | 1.045 | .375 | -- | -- | -- | 1.75 | .875 | 1.375 | -- | 1.125 | 2.125 | .52 |
| | III | -- | -- | -- | -- | -- | -- | .875 | 1.75 | -- | -- | 2.125 | .773 |
| | IV | 1.625 | -- | -- | -- | 1.5 | -- | .878 | .5 | -- | .125 | 2.125 | |
| 1984 | I | -- | -- | -- | -- | -- | -- | -- | -- | .475 | -- | 2.125 | .78 |
| | II | 1.625 | -- | -- | -- | -- | -- | -- | .875 | -- | .167 | 2.125 | .765 |
| | III | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

be very close to the average spreads given in Table 4. Furthermore, Table 6 displays the surprising fact that the average interest rate on loans to non-oil DCs has consistently remained below that on large corporate loans in the United States. Thus the institutional evolution in the international bank loan market has involved a movement away from pricing to offset the expected risk of outright default, to a new system where rates on syndicated international credits reflect only the (lower) expected cost of rescheduling. This development has led in turn to lower and less variable spreads than those existing even in well-developed domestic financial markets. 1/

A comparison between the pricing and allocation behavior of the international bank loan market and that of the market for the international bonds issued by DCs provides direct evidence in support of the hypothesis that interest rates in the international bank loan market tend to reflect the lower expected loss in a rescheduling, rather than the higher loss that would be incurred in an outright default. In particular, the risk premia paid by DC borrowers in the foreign bond markets are considerably larger (and exhibit more variation in response to changes in the individual borrower's expected ability to service his external bond debt) than the spread above LIBOR paid by DC borrowers. For example, in January 1982 the yield on deutsche mark-denominated international bonds issued by the Mexican public sector was 70 basis points above the average yield on deutsche mark international bonds of the same maturity issued by all industrialized countries. After increasing slightly to 140 basis points by July 1982, this yield difference widened to 430 basis points in August 1982, following the Mexican moratorium. It generally remained in the range of 400 basis points until the credibility of the Mexican adjustment program became established in mid-1983, after which the yield differential fell to 240 basis points and then to 160 basis points by March 1984.

Table 7 indicates that a very similar pattern of yields also occurred in the cases of Brazil and Venezuela over roughly the same period. The yield differential on Argentina's public sector bonds exhibited the largest variation (10.5 percentage points in September 1982) and generally remained in the 8.5 to 9.5 percentage point range until the first quarter of 1984, when the yield difference dropped to the 5 percentage point level. From this perspective, the rather larger yield differential of 5 percentage points that existed in August 1984 can be interpreted as a reflection of concern over Argentina's credibility in implementing its adjustment program. Comparison of the differential between the yield on international bonds and that on syndicated credits denominated in the

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1/ The recent decline in the share prices of U.S. money-center banks, relative to the Dow Jones Index, casts some doubts on the continued correctness of the banks' assumption about their prospective losses on debt reschedulings. However, banks' expected future earnings have also been adversely affected by the increased competition in traditional domestic bank markets by non-bank competitors. In addition, the domestic loan portfolio of money-center banks may also be a source of concern.

Table 6. Comparison of Interest Rates on Foreign and Domestic Bank Loans

| | | Average Domestic Bank Loan Rates 1/ (1) | Interquartile Range of Domestic Bank Loan Rates 2/ (2) | Money Center CD Rates of Return (3) | Average Spread on Domestic Loans (1)-(3) (4) | Average Interest Rate on Loans to Non-Oil LDCs (5) | LIBOR Rate (6) | Average Spread on Loans to Non-Oil LDCs (7) |
|---|---|---|---|---|---|---|---|---|
| 1979 | I | 12.0 | 1.7 | 10.7 | 1.3 | 12.1 | 11.2 | .9 |
| | II | 12.3 | 1.5 | 10.3 | 2.0 | 11.5 | 10.7 | .8 |
| | III | 12.0 | 1.0 | 11.0 | 1.0 | 12.3 | 11.6 | .7 |
| | IV | 15.8 | 1.0 | 13.7 | 2.1 | 15.1 | 14.4 | .7 |
| 1980 | I | 18.3 | 2.2 | 15.3 | 3.0 | 16.7 | 16.0 | .7 |
| | II | 18.3 | 2.2 | 11.3 | 7.0 | 13.5 | 12.7 | .7 |
| | III | 11.3 | 1.0 | 10.2 | 1.1 | 11.8 | 11.0 | .8 |
| | IV | 15.0 | 1.0 | 15.1 | -0.1 | 16.7 | 15.7 | 1.0 |
| 1981 | I | 19.1 | 1.5 | 15.4 | 3.7 | 17.1 | 16.3 | .8 |
| | II | 19.2 | 0.7 | 16.3 | 2.9 | 18.1 | 17.0 | 1.1 |
| | III | 20.7 | 0.6 | 17.5 | 3.2 | 19.2 | 18.3 | .9 |
| | IV | 17.6 | 2.1 | 13.9 | 3.7 | 15.7 | 14.8 | .9 |
| 1982 | I | 17.7 | 1.0 | 13.0 | 4.7 | 16.0 | 15.2 | .8 |
| | II | 16.7 | 1.3 | 12.6 | 4.1 | 16.2 | 15.1 | 1.1 |
| | III | 11.6 | 2.0 | 10.4 | 1.2 | 14.4 | 13.3 | 1.1 |
| | IV | 10.9 | 2.0 | 8.3 | 2.6 | 11.3 | 10.1 | 1.2 |
| 1983 | I | 10.8 | 2.0 | 8.2 | 2.6 | 11.1 | 9.3 | 1.8 |
| | II | 10.3 | 1.4 | 8.5 | 1.8 | 10.1 | 9.4 | .7 |
| | III | 11.3 | 0.7 | 9.3 | 2.0 | 12.1 | 10.3 | 1.8 |
| | IV | 11.6 | 1.5 | 9.0 | 2.7 | 10.7 | 9.9 | .8 |

Source: Federal Reserve Bulletin, various issues; and World Bank Debtor Reporting System.

1/ Large long-term U.S. corporate loans with floating interest rate.
2/ Interest rate range that covers the middle 50 percent of total dollar amount of loans made.

Table 7. Yields on Deutsche Mark-Denominated International Bonds 1/

(Percent per annum)

| | Industrial Countries 1/ (1) | Developing Countries 2/ (2) | Brazil 3/ (3) | Mexico 4/ (3) | Argentina 5/ (4) | Venezuela 6/ (5) | (3)-(1) | (4)-(1) | (5)-(1) | (6)-(1) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1982 Jan. | 10.0 | 12.0 | 11.2 | 10.7 | 13.8 | 10.5 | 1.2 | 0.7 | 3.8 | 0.5 |
| Feb. | 10.1 | 12.0 | 11.4 | 10.8 | 13.6 | 10.7 | 1.3 | 0.7 | 3.5 | 0.6 |
| March | 9.8 | 11.8 | 11.0 | 10.8 | 13.3 | 10.8 | 1.2 | 1.0 | 3.5 | 11.0 |
| April | 9.2 | 11.6 | 10.9 | 10.7 | 14.0 | 10.8 | 1.7 | 1.5 | 4.8 | 1.6 |
| May | 8.9 | 12.0 | 11.1 | 10.5 | 15.3 | 10.8 | 2.2 | 1.6 | 6.4 | 1.9 |
| June | 9.2 | 12.9 | 11.3 | 10.9 | 16.9 | 10.9 | 2.1 | 1.7 | 7.7 | 1.7 |
| July | 9.1 | 12.7 | 10.9 | 10.5 | 15.5 | 10.9 | 1.8 | 1.4 | 6.4 | 1.8 |
| Aug. | 9.1 | 13.4 | 13.4 | 13.1 | 17.8 | 11.5 | 4.3 | 4.0 | 8.7 | 2.4 |
| Sept. | 9.0 | 15.2 | 14.8 | 13.3 | 19.5 | 12.1 | 5.8 | 4.3 | 10.5 | 3.1 |
| Oct. | 8.8 | 15.3 | 13.6 | 13.0 | 19.1 | 12.2 | 4.8 | 4.2 | 10.3 | 3.4 |
| Nov. | 8.5 | 14.5 | 13.8 | 12.9 | 17.5 | 12.2 | 5.3 | 4.4 | 9.0 | 3.7 |
| Dec. | 8.1 | 13.8 | 13.0 | 12.1 | 16.8 | 11.7 | 4.9 | 4.0 | 8.7 | 3.6 |
| 1983 Jan. | 7.8 | 15.0 | 14.1 | 12.0 | 17.6 | 12.0 | 6.3 | 4.2 | 9.8 | 4.2 |
| Feb. | 7.9 | 16.3 | 14.6 | 13.2 | 17.5 | 14.0 | 6.7 | 5.3 | 9.6 | 6.1 |
| March | 7.7 | 14.7 | 13.1 | 12.2 | 17.0 | 12.7 | 5.3 | 4.5 | 9.3 | 5.0 |
| April | 7.5 | 14.2 | 12.6 | 12.1 | 17.0 | 11.9 | 5.1 | 4.6 | 9.5 | 4.4 |
| May | 7.5 | 13.8 | 12.5 | 11.6 | 17.3 | 11.4 | 5.0 | 4.1 | 9.8 | 3.9 |
| June | 7.7 | 14.0 | 12.5 | 10.7 | 17.5 | 11.5 | 4.8 | 3.0 | 9.8 | 3.8 |
| July | 7.9 | 13.6 | 12.6 | 10.3 | 16.4 | 11.6 | 4.7 | 2.4 | 8.5 | 3.7 |
| Aug. | 7.9 | 13.9 | 14.3 | 10.3 | 15.5 | 11.6 | 6.4 | 2.4 | 7.6 | 3.7 |
| Sept. | 7.9 | 14.4 | 14.4 | 10.7 | 16.8 | 11.7 | 6.5 | 2.8 | 8.9 | 3.8 |
| Oct. | 7.8 | 14.6 | 14.5 | 10.7 | 19.3 | 11.7 | 6.6 | 2.9 | 11.5 | 3.9 |
| Nov. | 7.7 | 13.7 | 14.9 | 10.4 | 16.9 | 11.6 | 7.2 | 2.7 | 9.2 | 3.9 |
| Dec. | 7.8 | 12.6 | 13.1 | 10.0 | 15.8 | 11.1 | 5.3 | 2.2 | 8.0 | 3.3 |
| 1984 Jan. | 7.8 | 11.3 | 11.3 | 9.6 | 12.7 | 9.9 | 3.5 | 1.8 | 4.9 | 2.1 |
| Feb. | 7.6 | 10.5 | 10.2 | 9.5 | 11.2 | 10.0 | 2.6 | 1.9 | 3.6 | 2.4 |
| March | 7.5 | 10.7 | 10.6 | 9.1 | 12.9 | 9.9 | 3.1 | 1.6 | 5.4 | 2.4 |

Sources: Deutsche Bundesbank, Statistical Supplement No. 2 of Monthly Report Verlag Börsenzeitung, Renditenübersicht festverzinslicher Wertpapiere. (Yield Survey of fixed-interest securities)

1/ Public sector DM-bonds issued by nonresidents.
2/ Average yields of a medium-term international DM bonds.
3/ Bond issued in 1980 with a 9 1/4 percent coupon and due in 1988.
4/ Bond issued in 1978 with an 11 percent coupon and due in 1988.
5/ Bond issued in 1978 with a 6 1/2 percent coupon and due in 1988.
6/ Bond issued in 1980 with a 9 3/4 percent coupon and due in 1990.

same currency can provide an estimate, albeit a very rough one, of the premium required to compensate bondholders for the expected default risk. 1/ It can be seen that these risk premia experience a considerable rise during times of increased uncertainty about the ability of the DC borrowers to service their bond obligations. Furthermore, while the banking markets have succeeded in barring DCs that were unable to service their interest obligations from refinancing their debt (rather than raise their interest spreads), the bond markets increased their premia to reflect the increased uncertainty.

A very similar picture emerges from the international dollar bond market (Table 8). The increase in the risk premium on Mexican dollar bonds between January 1982 and March 1983 was approximately 10 percentage points, while the increase in the risk spread on bank loans at those dates was less than 150 basis points. This evidence on the increase in the level and variability of risk premia lends support to the conclusion that interest rates on bank loans to DCs are less sensitive to considerations of loan-default risk than is bond debt. In other words, it provides evidence that the bond market faces different risks and is more responsive to risk, thereby providing more accurate information as to the cost of capital. Table 8 also suggests that from August 1982 to the end of 1983 Brazil's default risk was viewed by the bond market as smaller than that of Mexico. Brazil's risk premium increased by 4.5 percentage points from January 1982 to March 1983. It is interesting to note that in March 1984 the default premium for Mexico was 3 percentage points higher than it had been in January 1982, while for Brazil it was 3.8 percentage points higher, suggesting a market perception that Mexico had thus far made more progress in reforming economic policy than had Brazil.

If the lending rates on international bank loans to DC borrowers reflect the lender's expected cost of rescheduling a DC's debt--rather than the risk that individual investment projects or policies may not generate sufficient returns to service the loans--then such lending cannot be counted on to allocate credit through a price mechanism that matches risk premia embodied in lending rates with the riskiness of the bank-financed projects or policies. Instead of allowing the price mechanism to allocate bank loans, bank lenders have denied borrowers access to refinancing when it is expected that, on the basis of current policies, the borrower will experience difficulties in meeting interest payments out of current income. The resulting liquidity crisis then has induced such DCs to adopt stabilization programs so as to obtain bridging finance until they can return to the private markets. To recapitulate, instead of using risk premia to allocate credit (i.e., borrowers with low risk investment projects or high quality policies are charged lower interest rates than borrowers with investment projects or policies incurring greater risk of failure) the international banking markets

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1/ This simple measure, of course, tends to underestimate the true risk premium, since the benchmark is the average yield on all industrial country bonds, and not a risk-free bond.

Table 8: Default Risk Premia on Foreign Bonds Denominated in U.S. Dollars 1/

| | Returns on Foreign Bonds 2/ | | | Difference in Rates of Return 2/ | |
|---|---|---|---|---|---|
| | World Bank (1) | Mexico (2) | Brazil (3) | (2)-(1) | (3)-(1) |
| 1982 Jan. | 15.36 | 13.29 | 13.84 | -2.07 | -1.52 |
| Feb. | 15.64 | 13.33 | 13.88 | -2.31 | -1.76 |
| Mar. | 14.98 | 13.41 | 13.96 | -1.57 | -1.02 |
| Apr. | 14.96 | 13.51 | 14.03 | -1.45 | -0.93 |
| May | 14.56 | 13.55 | 14.09 | -1.01 | -0.47 |
| June | 15.22 | 13.62 | 14.17 | -1.60 | -1.05 |
| July | 15.11 | 13.69 | 14.24 | -1.42 | -0.87 |
| Aug. | 14.11 | 15.86 | 15.19 | 1.75 | 1.08 |
| Sept. | 13.30 | 17.15 | 15.59 | 8.85 | 2.29 |
| Oct. | 11.93 | 18.05 | 15.24 | 6.12 | 3.31 |
| Nov | 11.28 | 18.43 | 14.47 | 7.15 | 3.19 |
| Dec. | 11.26 | 18.36 | 12.94 | 7.10 | 1.68 |
| 1983 Jan. | 10.79 | 18.43 | 13.72 | 7.64 | 2.93 |
| Feb. | 10.79 | 18.59 | 13.79 | 7.80 | 3.00 |
| Mar. | 10.58 | 18.71 | 13.87 | 8.13 | 3.29 |
| Apr. | 10.49 | 18.63 | 13.58 | 8.14 | 3.09 |
| May | 10.31 | 16.93 | 13.41 | 6.62 | 3.10 |
| June | 10.65 | 17.05 | 13.59 | 6.40 | 2.94 |
| July | 11.10 | 17.17 | 13.96 | 6.07 | 2.86 |
| Aug. | 11.88 | 17.05 | 14.32 | 5.17 | 2.44 |
| Sept. | 11.47 | 17.12 | 14.42 | 5.65 | 2.95 |
| Oct. | 11.22 | 16.77 | 14.73 | 5.55 | 3.51 |
| Nov. | 11.40 | 15.77 | 14.72 | 4.37 | 3.32 |
| Dec. | 11.55 | 13.21 | 14.73 | 1.66 | 3.18 |
| 1984 Jan. | 11.44 | 13.27 | 14.71 | 1.83 | 3.27 |
| Feb. | 11.34 | 13.32 | 14.54 | 1.98 | 3.20 |
| Mar. | 11.56 | 12.51 | 13.88 | 0.95 | 2.32 |

Source: White Weld Securities; Division of Credit Suisse, International Herald Tribune (London), various issues.

1/ Medium-term seasoned bonds.

2/ Call provisions on the World Bank bonds raise rates of return on these relative Mexican or Brazilian bonds of same risk and maturity. Hence the changes over time of the differences in the rates of return are of interest.

have resorted to limiting the access to the refinancing of debt for those DCs whose current economic or social policy, or choice of investment projects, is such as to cast doubt on their ability to make interest payments out of current income. This mechanism for pricing and allocating credit is to be viewed as a direct outgrowth of the institutional evolution of development finance; an inadequate framework for sharing risk and enforcing contracts led to the replacement of default with rescheduling when debt could not be serviced on the original maturity schedule.

Having described the institutional developments and their effects on the pricing and allocation of credit, we turn now to a discussion of the determinants of demand for and supply of international bank credit, and an analysis of the nature of the market-clearing mechanism. We first analyze the external bank loan market in the case of a single DC facing the aggregate supply of a large number of bank lenders. The shape and position of a DC's credit demand schedule are determined by the portfolio behavior of the domestic private and public sector (including the demand for foreign reserves by the public sector). In turn, portfolio behavior is influenced by domestic monetary, fiscal, and exchange rate policy, as well as by structural variables such as the marginal product of domestic capital. At a given policy and structure of the economy, the demand curve is assumed to be a downward-sloping function of the cost of external credit. The channels through which policy and the structure of the DC economy affect the stock of foreign bank debt can be classified with the aid of the fundamental identity obtained by cumulating balance of payments flows over all past periods:

$$FB = \Sigma TB + \Sigma S + OR + GPC$$

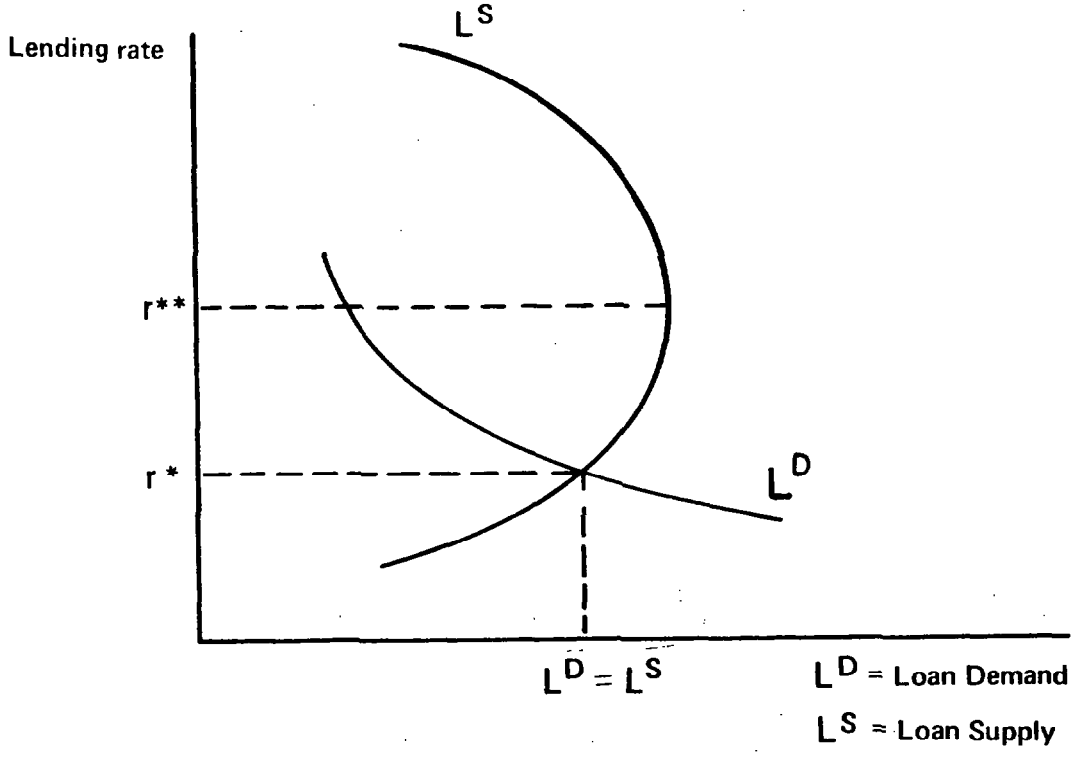
where FB is the stock of foreign borrowing, $\Sigma TB$ the cumulative trade deficit, $\Sigma S$ the cumulative service deficit, OR the stock of gross official reserves, and GPC is the stock of gross private claims on non-residents. There are three major channels through which the stock of foreign debt is affected; namely, the financing of the current account deficit (TB + S), the acquisition of reserves, and an increase in the gross stock of private claims on nonresidents. A larger current deficit or larger reserves can be financed through a reduction in private claims on non-residents or through an increase in gross (and net) foreign indebtedness. An increase in gross private claims on non-residents can be accomplished through a current account surplus or through a rise in foreign borrowing by the public sector, leaving the DC's net foreign indebtedness unchanged.

Graphically, any policy undertaken by an individual DC that raises its stock demand for debt shifts the demand curve $L^D$ in Figure 1 rightward. For example, an overvalued exchange rate, when combined with high levels of protection and unimpaired capital mobility, will create an incentive for capital flight. Similarly, an overvalued exchange rate, combined

with impediments to the flow of capital and low levels of protection, will result in a deterioration of the current account. In both cases, the demand curve $L^D$ will shift rightward. An increase in the government fiscal deficit that is unmatched by a corresponding increase in private saving will also raise the current account deficit and shift $L^D$ rightward. An increase in the the marginal productivity of capital would, ceteris paribus, increase investment and the current account deficit and shift $L^D$ rightwards. An upward valuation of natural resources, either through an improvement in their relative prices or the discovery of new resources, may lead to an increase in the desired stock of external debt as a means of monetizing a natural resource.

FIGURE 1

## EQUILIBRIUM IN THE EXTERNAL BANK LOAN MARKET WITHOUT CREDIT RATIONING



Over the period 1974-82, the causes for increases in external indebtedness varied markedly among DCs. 1/ For example, the rise in private claims on non-residents, often associated with capital flight, appears to have acccounted for about half of the increase in the external debt of Venezuela, Argentina and Mexico, and for about 20 percent or more of the increase in debt of the Philippines, Peru, and Korea. Chile and Brazil, on the other hand, experienced little or no capital flight. The increase in reserves was important for Chile, Korea, and Venezuela. The cumulative trade deficits of Brazil, Chile, Mexico, and Peru were less than 20 percent of the increase in external debt of these countries: together the six Latin American countries, Argentina, Brazil, Chile, Mexico, Peru and Venezuela, had a cumulative trade surplus.

The behavior of the total stock supply of external loans to DCs by the aggregate banking sector is relatively more important than the behavior of the demand for external credit, since many of the economically-important features of the market for external bank loans originate from the supply side. It was argued above that before the early 1970s the supply of credit was severely limited by a financial and institutional structure insufficiently developed to overcome the incentive and information problems associated with lending to DCs. The difficulties of monitoring and enforcing contracts, and of assigning property rights in cases of non-performing debtors, create incentives for borrowers to alter implicitly the terms of the loan contract in their favor, e.g., by undertaking actions or policies that alter the risk of the projects, or by limiting their efforts in securing a viable rate of return on the projects. The presence of an incentive for borrowers to alter the terms of a financial contract in their favor, once the contract has been concluded, is known as "moral hazard" in the literature on the economics of uncertainty. It was argued above that under the impetus of the payments imbalances created by the 1973 oil price increases, financial innovations and institutional developments went a long way toward reducing the problems of monitoring and enforcement that are inherent in lending to DCs. 2/ In particular, public guarantees and cross-default clauses on loans to the same DC, together with an almost market-wide participation in the syndication of loans to DCs, have the effect of raising the cost to DCs of defaulting on external bank loans. At the same time, national and international lending agencies have increased their ability and willingness to arrange stand-by programs and interim financing for DCs that experience difficulties in servicing their external debt.

Both developments have induced DCs to reschedule loans rather than default on external bank debt, and have caused the expected loan losses

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1/ See Dooley et al. (1983), for an analysis of the origins of the external indebtedness of selected DCs; also Dornbusch (1984).

2/ In domestic financial markets such incentives are avoided through restrictive covenants in the loan contract, and through monitoring provisions.

of bank lenders to decline, thus making possible an increase in the supply of external bank loans to DCs. As was indicated above, these financial and institutional innovations, with their improvements in contract enforcement and monitoring of the borrowers' efforts, should be viewed as increasing the lenders' ability to overcome the moral hazard problems associated with external lending. The supply of loanable funds to the banking sector and innovations designed to overcome monitoring and enforcement problems encountered in lending to DCs can be thought of as determining the position of the stock supply curve of loans by all banks active in the international credit market.

The shape of the aggregate supply curve of external bank loans faced by an individual DC is determined by the relation between the lending rate and the average risk of the projects financed. In cases where the banks' information about the risk of potential projects undertaken by a DC is incomplete, the interest rate itself has been used as a device for screening out risky projects. The higher the lending rates, the more risk borrowers will have to take on in order to generate a positive expected return. Hence lenders have refrained from raising lending rates to clear markets; instead they have excluded some borrowers from the international banking markets. When increases in interest rates induce borrowers to choose projects with higher risk, an "adverse selection" effect is said to be present. In this case, quantity rationing in the loan markets will be an optimal response by bank lenders.

Potential development projects and potential policies to be financed with external credit have different probabilities of yielding a return sufficient to service the credit. Since the expected return to the bank lender depends on the probability of repayment, the lender would like to be able to identify the riskiness of the financed project or policy, so as to charge a rate of interest that reflects such risk. However, it has generally not been possible for external lenders to identify individual projects and policies according to their probability of success. This is largely due to the borrower's ability to affect the yield of the project or policy after the loan has been made, whether by varying his efforts or by changing the nature of the project or policy itself. 1/ This inability of the lender to identify accurately the risk of individual projects and policies is directly responsible for the aggregation of risk of different loans through cross-default clauses, which implies that the credit risk of the country as a whole is reflected in the bank lending rate and not that of individual projects. The lenders' expected return on loans to an individual DC then depends on the expected loan losses incurred in a rescheduling. Such losses are, in turn, determined by the average risk of the projects and policies undertaken by the borrowing DC. The fundamental insight to be gained from the theory of adverse selection is that the average riskiness of the projects and policies the borrower chooses to finance with external loans rises with increases in the lending rate,

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1/ In the domestic bank loan market the lender attaches covenants and other legal restriction to prevent moral hazard problems.

i.e., the higher the lending rate, the higher the risk associated with the projects (or policies) for which the loan is being extended to the DC. 1/

The borrower's potential loss in undertaking a project is limited by the value of his equity in the project, and hence his expected profit would increase with a rise in the risk of the project chosen. 2/ At any given interest rate there is a level of risk such that development projects and policies with lower risk yield negative expected profits, while projects with higher risk yield positive expected profits and are chosen. Any increase in the lending rate will then cause lower risk projects to be abandoned, thus increasing the average risk of the remaining projects. 3/

The banks' profits from lending to a DC are limited by their interest income and hence their expected profit (i.e., interest income less the loss expected to be incurred in a rescheduling) decreases with a rise in the average riskiness of the DC's development projects and policies. The technical appendix shows that the increase in the bank lenders' expected profit from raising the lending rate may not be sufficient to make up for the decline of their expected profits due to an adverse selection of projects. For example, if all projects had only one of two risk levels, then expected profits per dollar of lending would drop once the class of projects with the lower risk level was abandoned by borrowers. Thus the bank lenders' expected profits are a backward bending function of the lending rate, 4/ and since the banks' cost of deposits is independent of their asset portfolio choices and their supply of funds can be assumed to increase with increases in expected profits per dollar of lending, we conclude that the supply of external bank loans to a DC is also a backward bending function of the lending rate. The type of equilibrium that will prevail in the international bank loan market then depends on the position of the demand schedule, as in Figures 1 and 2.

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1/ See the appendix for a rigorous development of this proposition, and for bibliography.

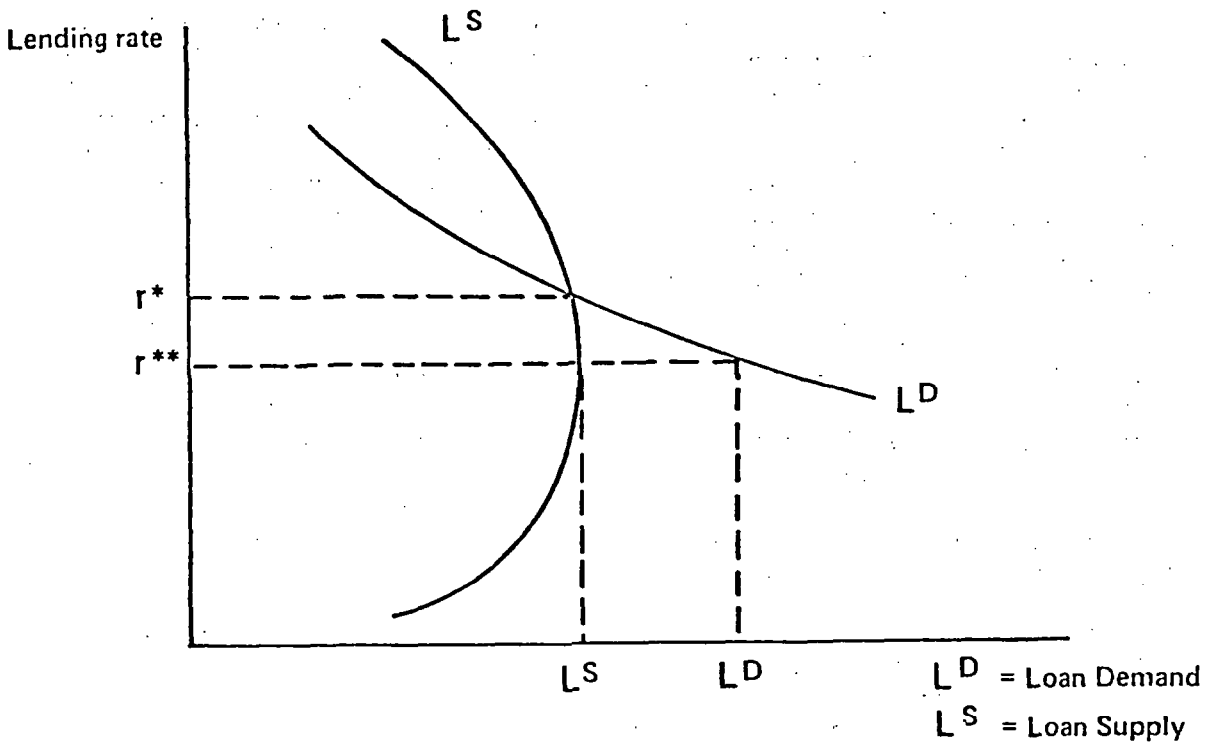
2/ This proposition is derived from the fundamental insight gained in the economics of uncertainty, namely that the expected value of a convex (concave) function of a random variable increases (decreases) with increases in the mean-preserving spread measure of risk (see appendix).

3/ These results are derived rigorously in the appendix. Also see the appendix for discussion of the concept of risk employed here. It is assumed that all projects and policies have the same expected return but different risk, and that borrowers and lenders are risk neutral. The first assumption is relaxed by sorting projects into risk classes with equal expected returns and then applying the argument to the individual risk classes, as done in the appendix.

4/ See appendix for proof of this proposition.

FIGURE 2

## RATIONING EQUILIBRIUM IN THE EXTERNAL BANK LOAN MARKET WITH CREDIT RATIONING




In Figure 1, the DC's demand schedule for the stock of credit intersects the backward bending supply schedule below the banking sector's optimal lending rate r** (the lending rate at which the banks' expected profits are maximized) at which supply begins to contract, so the market clears at interest rate r*, and $L^S = L^d$.

In Figure 2, the demand schedule intersects the supply schedule for loans above the banks' optimal interest rate r** and the equilibrium will entail excess demand for loans of $L^D - L^S$ at interest rate r**. The market will not move to r*, since at that rate the borrower would get less credit than $L^S$ at the higher interest rate r*, and the banks' expected profit would be less than its maximum at r**.

The analysis of the external bank loan market presented above was done for a single country facing a large number of bank lenders. We now turn to analyze the equilibrium in the aggregate international bank loan market with many DCs. For each DC borrower, the bank lenders face a backward bending relation between the lending rate and their expected profit per dollar of claims. Increases in lending rates to a particular country lead to an adverse selection of projects from among all potential domestic projects and thus to a decline in the banks' expected profit from lending more to that country once interest rates have been raised above the level that maximizes expected profits.

In Figure 3, $\beta_1(r)$, $\beta_2(r)$, and $\beta_3(r)$ represent the relations between the interest rate charged and the expected profit to the lender per dollar of loans made for countries 1, 2, and 3, respectively. If the cost of funds to the banks is $d_2$, then country 3 will be rationed out of the international bank loan market because the maximum expected return from loans to this country is less than the banks' cost of funds. Country 1 will get all the loans it desires at interest rate $r_4$, and country 2 will get some loans, but not necessarily all the loans it demands at interest rate $r_2$. 1/ For example, country 1 might represent some low-income DC unable to obtain private bank loans when the cost of funds for bank lenders is $d_2$, while country 2 might represent a middle income DC that is able to get some but not all the bank credit it desires, and country 1 might represent a newly industrialized DC.

The adverse selection model of the international bank loan market thus offers an explanation of the observed narrowness of the variations in the lending rates on loans to different DCs: The adverse selection among projects or policies which occurs in conjunction with an increase in the lending rate makes it preferable for the lender to limit the supply of credit to some DCs, rather than raise the lending rate whenever demand for credit exceeds supply of credit. In addition, if bank lenders believe that the mean return of development projects or policies does not differ much from one DC to another, 2/ then most of the variation in lending rates will originate with differences in the DC's expected profit-interest rate relation.

The analysis of the pricing and allocation of credit in the international bank loan market presented above also serves to focus attention on the bank lenders' expected profit-interest rate relation as the main analytical determinant of the type of equilibrium, i.e., clearing vs. rationing, and it is through this relation that institutional and financial innovations work their way into the international bank loan market. In particular, the financial innovations and institutional developments that reduced some of the difficulties in monitoring and enforcing the terms of loans had the additional effect of moving the expected profit-interest rate relation and the supply of credit schedule rightwards, as in Figure 4.

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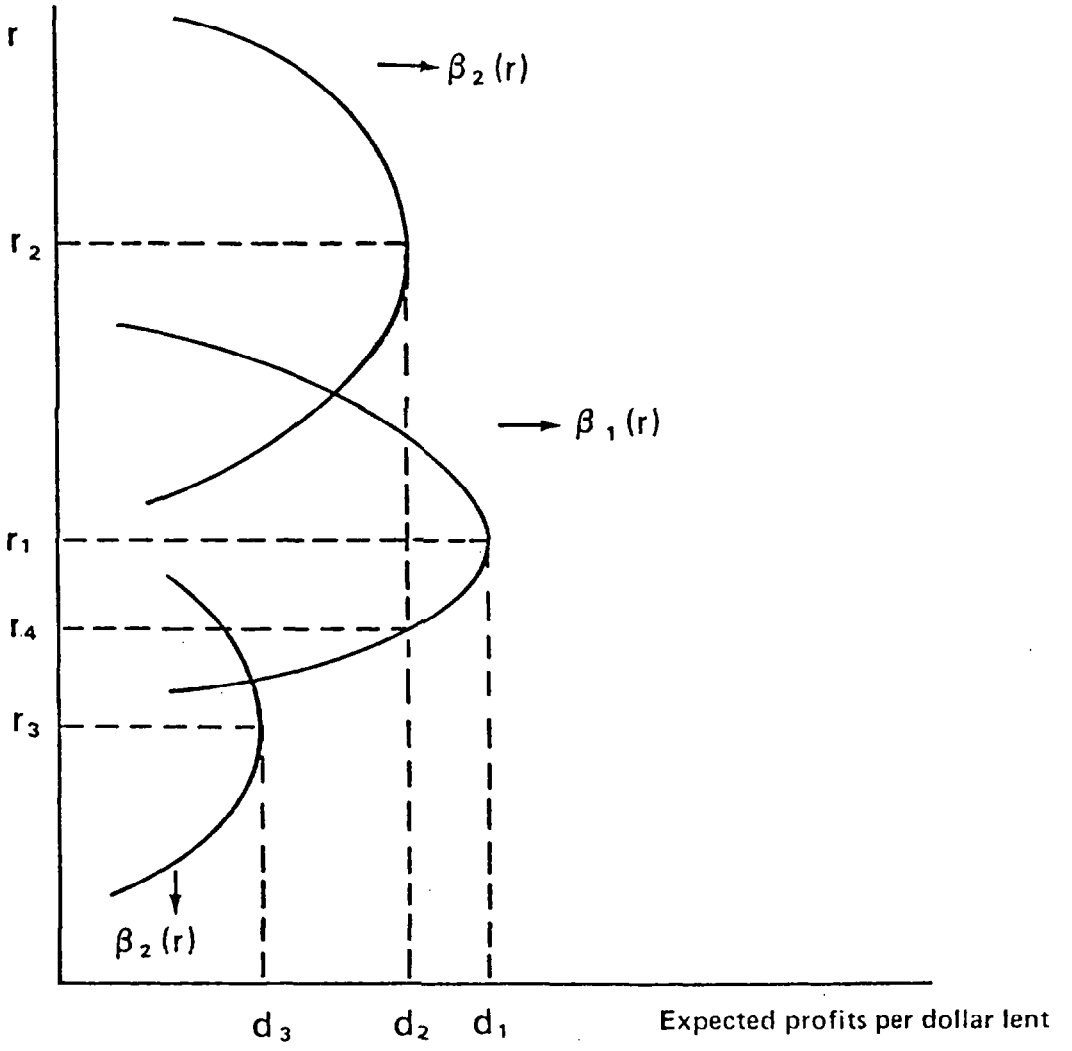
1/ This analysis can be extended by assuming that bank lenders can divide borrowers in the same DC into risk classes each with its own expected profit-interest rate relations. In this case Figure 3 can be reinterpreted as depicting the behavior of bank lenders toward borrowers in one country.

2/ It is assumed that difference in the mean return will always be fully incorporated in lending rates.

FIGURE 3

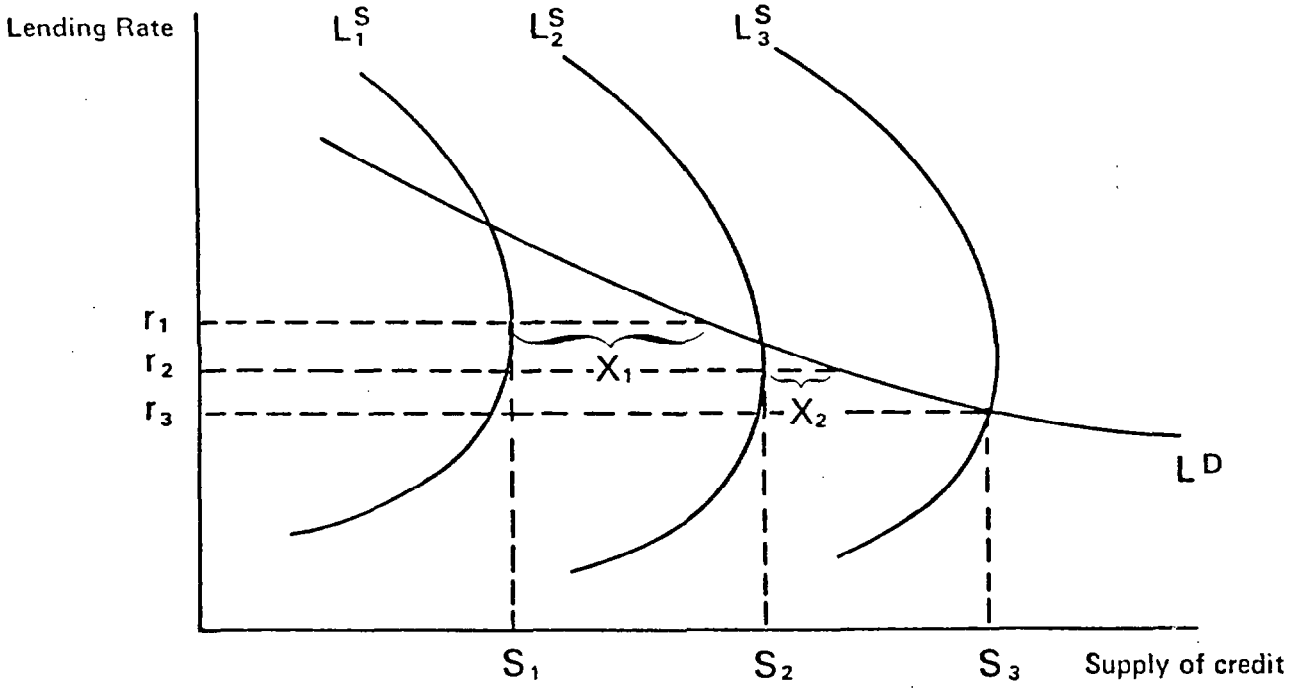
## EQUILIBRIUM IN THE EXTERNAL BANK LOAN MARKET WITH MANY RISK-CLASSES OF BORROWERS




In Figure 4 the supply curve shifts from $L_1^s$ to $L_2^s$ and then to $L_3^s$, and the amount of excess demand for external credit is reduced from $R_1$ to $R_2$ and to zero. The lending rate declines from $r_1$ to $r_3$; if the demand schedule $L^d$ shifts upwards, in addition to shifting rightwards, then interest may not decline. Figure 4 might be taken as a stylized representation of the developments in international bank loan markets up to 1981. Growth of credit took place without increases in interest rates because the expected profit-interest rate relation (and hence the supply curve) shifted rightward due to institutional and financial innovations. From end-1981, the improvement in the expected profit-interest relations can be presumed to have slowed and may have been somewhat reversed, though the positive experience with rescheduling over the past two years may have prevented a substantial leftward shift of the supply curve for credit.

FIGURE 4

## INCREASE IN THE SUPPLY OF EXTERNAL BANK LOANS TO DEVELOPING COUNTRY BORROWERS




### IV. Some Implications of the Current Mechanism for Pricing and Allocating International Bank Credit to DCs

It was argued above that the institutional innovations which took place in the international credit markets during the late 1960s achieved a consolidation of the individual bank loans to a DC into a single liability, and then achieved a reduction in the risk of this liability through the replacement of default with the rescheduling of debt. Hence the lending rate reflects the lenders' expected cost of rescheduling the total bank debt of the DC rather than the risk of failure of individual projects or policies financed with bank loans. The problem that arises with such risk-invariant pricing of international bank loans is that bank lending rates do not fully and immediately reflect the risk of the project or policy financed; thus they understate the true cost of credit.

A DC that experiences difficulties in servicing its external bank debt will seek to avoid default by negotiating a rescheduling of its debt and implementing a stabilization policy. Since the aim of such stabilization policies is to enable the borrower to resume debt service, they usually involve a reduction in private and public consumption and an adjustment of relative prices and wages. Such an adjustment toward

growth paths that allow the DC to service its external debt involves costs which arise from the necessary changes in production techniques, consumption patterns, investment behavior and employment patterns. 1/ Thus, while a rescheduling cum stabilization policy may involve losses for the lenders, and such losses are anticipated in the spread above LIBOR, it also involves costs for the borrower. If the likelihood of a debt rescheduling or the cost incurred by the DC with the implementation of a stabilization program is assumed to rise with increases in the stock of external debt issued by a DC, then the borrower's expected cost of rescheduling debt accompanied by a stabilization program increases with increases in its external debt. The DC's full economic cost of a given stock of external debt thus consists of the market interest rate plus the expected cost incurred with the implementation of the stabilization program accompanying a debt rescheduling.

In Figure 5, we have added such costs to the market supply curve $S_0$ to obtain the DC's schedule $S_1$, i.e., its average cost of credit. 2/ The assumption that the borrower's cost of a debt rescheduling cum stabilization policy increases with increases in the stock of external debt leads to the upward-sloping supply of credit schedule $S_1$; that is, the borrower is a quasi-monopsonist in the bank loan market. 3/ The curve $S_2$ is marginal to the curve $S_1$; it indicates the marginal cost of an increase in bank loans. Since the demand for external debt schedule is the marginal revenue product of capital, the welfare-optimizing DC would endeavor to equate the marginal cost of borrowing, as given by $S_2$, with the marginal benefits as given by D. Under these assumptions the optimal stock of debt would be $L_2$; the DC would be charged a spread of $r_4r_0$ and its marginal economic cost of debt would be $r_2$. 4/

If the DC has many public or private borrowers, as is the case with large DC borrowers, then the individual borrowing agent in the DC must be expected to act in his own best private interest. In so doing, he does not recognize, nor should he be expected to recognize, that an increase in his bank debt increases the likelihood that the DC's total debt becomes unserviceable, i.e., the private borrower recognizes only the private cost, as given by the market interest rate, of acquiring more debt and does not recognize the total economic cost that arises from the externality associated with increases in his debt. Thus the DC with

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1/ Bridging finance advanced by international financial organizations assists DCs in minimizing such costs by allowing borrowers to adjust gradually toward a new growth path.

2/ This analysis of the cost of credit for the DC is of relevance only for DCs who are not quantity constrained in the international bank loan market.

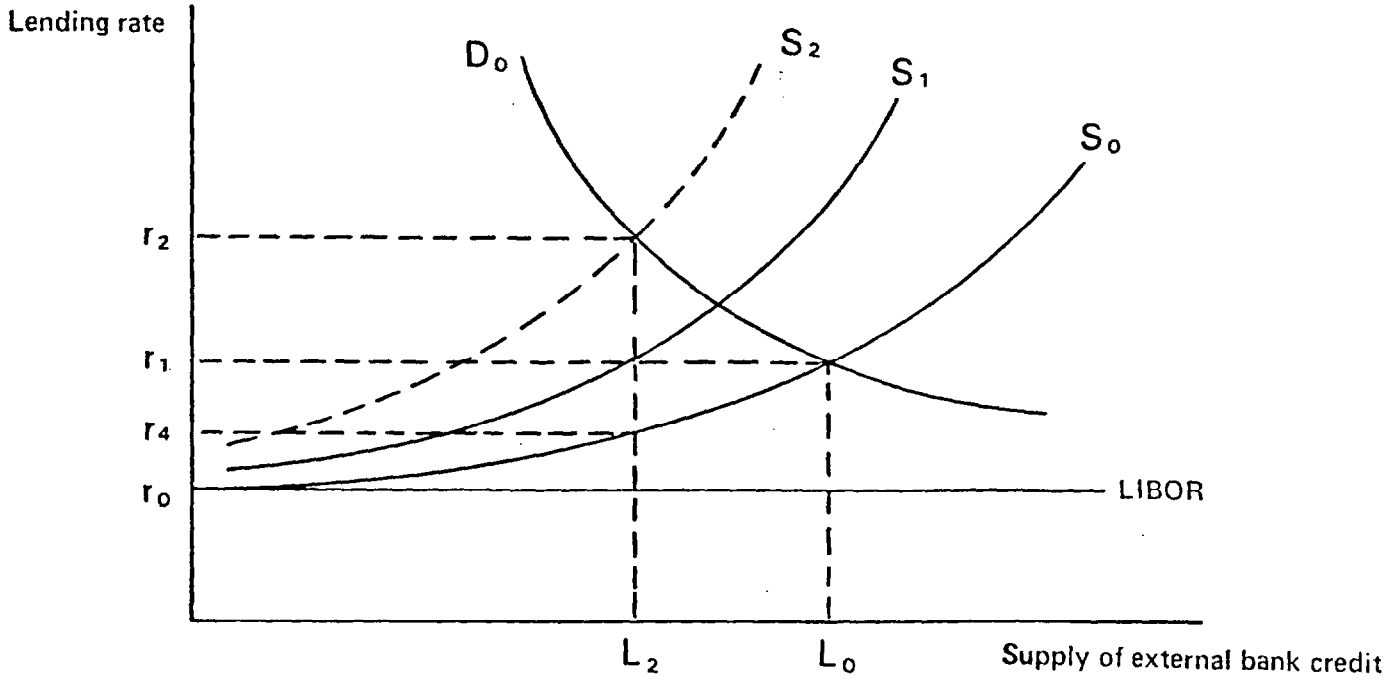
3/ Since the DC's demand for external debt does not increase the interest rate paid by other borrowers but only its own interest cost, it has been termed a quasi-monopsonist.

4/ See Harberger (1976) for an application of this reasoning in the analysis of country risk.

many borrowers will issue $L_0$ of external debt and thus exceed its optimal stock of debt by $L_2L_0$ of debt. The optimal level of debt can be attained in this case by the imposition of a tax of $r_2r_4$ on capital inflows from the international banking market. This tax $r_2r_4$ plays the same role as the optimal tariff on commodity imports, but presumably with fewer danger of retaliation by the supplier, which tends to negate the effects of an optimal tariff on commodity imports. Thus a DC with many public and private sector borrowers that does not impose a tax on capital inflows in the form of bank loans may acquire "too large" a stock of external bank debt. Similarly, a DC with only a single state borrower who chooses to ignore the social cost of increased borrowing and who takes the market rates as its marginal cost of capital will acquire debt beyond the optimal level of $L_2$.

FIGURE 5

DETERMINATION OF THE OPTIMAL STOCK OF EXTERNAL DEBT




It is important to note that, while the overborrowing results in an inefficient allocation of capital with respect to the demand and supply curves as given in Figure 5, it may well be that improvements in policy, contract monitoring and enforcement, etc., would shift the bank lenders' expected profit-interest rate relation rightwards and thus increase the supply of loans at each interest rate, thereby increasing the optimal stock of external debt for this DC. 1/

1/ Criteria for the optimality of a contractual framework of the international bank loan market, or for any market, have not been developed except to the extent reported in this paper.

## V. Conclusion

This paper has argued that the international payments imbalances caused by oil price increases in the early 1970s brought about financial and institutional innovations in the international credit markets that substantially affected the supply, demand, and pricing of development credit. We have also attempted to show that the recent increase in debt rescheduling is at least partially an outgrowth of these developments. Before the 1970s, the main obstacle to private market funding of development projects or policies had been the problem of monitoring and enforcing contracts and the assignment of property rights in cases of nonperforming debtors, i.e., moral hazard problems. In the 1920s, a limited amount of private development finance had flowed through the international bond market, where default was a common occurrence and lending rates tended to reflect the default risk. Subsequently, there was little private financing of development until the early 1970s, when oil price rises greatly increased the supply of loanable funds and the need to finance oil imports or monetize newly valued resources led to increased demand for credit by DCs.

Institutional developments in the 1970s fostered the perception of an increased tendency of national financial authorities to assume the risk of deposit liabilities of money-center banks, thus freeing the rates paid on deposit liabilities from considerations relating to each bank's specific portfolio of loans. International banking markets were thus able to attract a greatly increased supply of funds. This institutional development was accompanied by financial innovations designed to overcome the moral hazard problems in the development credit markets. In particular, the risks of individual loans in a DC were tied together through public guarantees and cross-default clauses, while at the same time the lending side of the market became concentrated through the syndication of loans. Both innovations had the effect of making it more difficult for DCs with loans in default to obtain further access to the international bank credit markets. This in turn meant that, in an environment of increasing economic and financial integration, the cost of default had risen. In addition, there was an increased willingness and ability of national and international lending agencies to assist DCs with payments difficulties by financing stabilization programs. For these reasons, default was replaced by the rescheduling of loans. The ability of the international banking market to deny DCs that were experiencing difficulties servicing their external bank debt access to refinance their existing debt acted as an incentive device analogous to an increase in the risk premium in traditional lending markets.

International bank loans in this institutional environment are priced so as to reflect the new institutional features described in this paper. The relatively low spreads above the banks' cost of funds charged to DC borrowers reflect the reduced expected loss incurred by bank lenders in rescheduling debt. The relatively small variations in spreads charged to individual borrowers within a DC reflect the consolidation of risk achieved through public guarantees and cross-default clauses. The

rationing of loan credit to some DCs can be explained by the need to avoid an adverse selection among potential projects and policies in the presence of asymmetric information, which arises from the banks' inability to distinguish accurately the risk of individual projects and policies within a particular DC. The presence of public guarantees and cross-default clauses has served to equalize the lending rates for projects or policies of differing risk in a DC, and an increase in the lending rate tends to result in an increase in the average risk of projects and policies adopted by borrowers in the DC, owing to the phenomenon of adverse selection.

The individual borrower's liability is limited by his equity, while his returns on a project are not subject to a predetermined limit; hence an increase in the risk of the projects chosen increases the borrower's expected return on the investment. Thus, increases in lending rates require projects to have a higher level of risk in order to yield positive expected returns. However, since the lenders' profits are limited by the contractual interest rates, an increase in the average risk of all projects and policies undertaken in a DC reduces the bank lenders' expected profit per dollar lent to this DC. Thus an increase in the lending rate has two effects. First, the increase in the price of the loan makes a positive contribution toward expected profits, second the increase in average risk contributes negatively toward expected profits. Hence the supply of credit schedule for a DC is a backward-bending function of the lending rate, and for each DC there is a lending rate and loan amount that maximizes lenders' expected profits. A DC willing to offer a higher lending rate for more credit will be rationed. Thus lending rates exhibit less variability than would be the case if they fully reflected the risk of individual loans. In these circumstances, some countries will be able to satisfy their demand for credit completely, while others will obtain some credit but not all, and again others will be unable to obtain any credit.

Foremost among the consequences of replacing default with the rescheduling of debt cum stabilization programs--and of pricing credit so as to represent the expected loss in a rescheduling--has been the failure of the supply of credit schedule facing a DC to reflect fully the cost of external credit. At each level of debt, the expected cost incurred by the DC in case it has to undergo a rescheduling with a stabilization program must be added to the market cost of debt. As a result, DCs that take the supply curve to reflect the true cost of credit may have borrowed more external funds than optimally warranted.

This analysis of the history of development finance over the past decade is based upon the institutional and financial evolution of the international bank loan market. It indicates that the ability to overcome the traditional shortcomings of development lending represents a fundamental change in development finance. It represents an example of how an unexpected disturbance to an established order, in this case large international payments imbalances, can generate institutional innovations with far-reaching consequences.

## Technical Appendix

This appendix demonstrates that an "adverse self-selection" among borrowers in a DC, or among the projects or policies undertaken by a DC, may cause the credit supply schedule facing a particular DC to be backward bending with increases in lending rates. An equilibrium in which credit is rationed will ensue when the demand for credit exceeds the supply of credit at the lending rate where the supply of credit begins to contract with further increases in the lending rate. We then show that an equilibrium in the international banking market may be such that some DCs obtain all credit desired, while others obtain only some of the credit desired, and still others are altogether excluded from the market.

We shall assume that lenders are able to recognize differences in the expected rates of return on projects and policies potentially financed with international bank loans. We further assume that bank lenders can sort potential projects and policies into broad risk classes, but that lenders are unable to distinguish among projects and policies according to their riskiness within the same risk class. A risk class of borrowers may contain all borrowers in several DCs or all borrowers within a single DC, or only a subset of borrowers within a DC; but to simplify the exposition, we shall assume that all borrowers in a given DC are viewed as being in the same risk class.

We denote an external loan to a borrower in a particular risk class by L and the gross return on this loan by R, and we write the distribution of gross returns and its density as $F(r, \xi)$ and $f(R, \xi)$, respectively. The variable $\xi$ denotes the risk associated with this particular loan and the larger $\xi$, the larger the risk. The measure of increasing risk employed here is that of a mean-preserving spread. 1/ In particular, let F and G be the two distributions of returns to two different loans. Then G is more risky than F if G can be derived from F by adding an uncorrelated random term. Equivalently, G is more risky than F if G can be derived from F by taking probability mass from the center of the distribution and adding it to the tails, so as to keep the mean constant (Figure A1). 2/ The advantage of this method of defining risk is that it allows

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1/ Rothschild and Stiglitz (1970a).

2/ See Rothschild and Stiglitz (1970a) for a proof of the equivalence of these two definitions. The condition for a loan $L_1$ with distribution of return $F_1(R_1, \xi_1)$ to be more risky than a loan $L_2$ with distribution $F_2(R_2, \xi_2)$, i.e., $\xi_1 > \xi_2$, can be expressed mathematically as

$$\int_0^t F_2(R_2, \xi_2)dR_2 \leq \int_0^t F_1(R_1, \xi_1)dR_1 \qquad \text{for all } t,$$

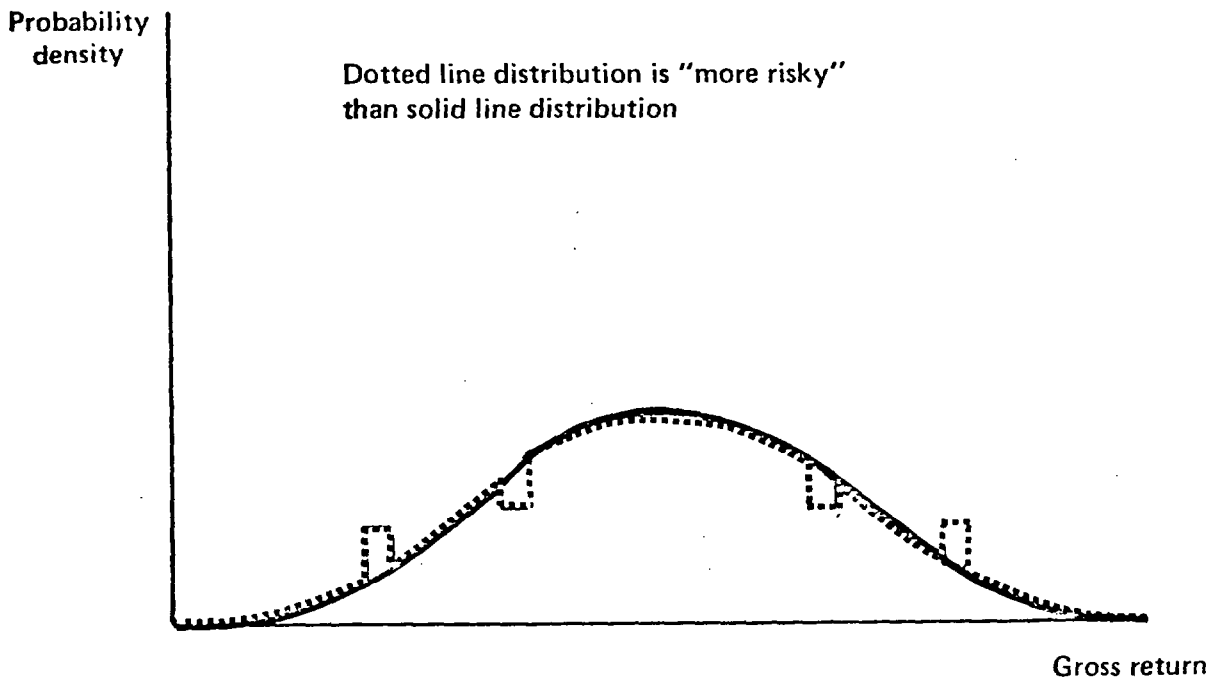
and $$\int_0^\infty R_2 f_2(R_2, \xi_2)dR_2 = \int_0^\infty R_1 f_1(R_1, \xi_1)dR_1,$$

where the first condition says that the density of returns on $L_1$ has more weight in the tails, while the second condition implies equality of expected value of returns on $L_1$ and $L_2$.

us to draw unambiguous comparative static conclusions about the effects of an increase in lending risk on the banks' expected profits, and it permits an analysis of the relation between the borrower's expected benefit from the policy or project for which the loan is used and changes in the risk associated with the policy or project. 1/

FIGURE A1

INCREASING RISK




The individual borrower maximizes his expected returns from the projects or policies financed with the loan. Let R denote the gross return to the borrower of using a bank loan of size L to finance this project, and let r denote the interest rate charged by the banking market for loans to the DC. The net benefit to the borrower of using a loan of size L for a policy or project with return R is given by:

1/ Despite the fact that the mean-preserving-spread method of defining increasing risk induces only a partial ordering on uncertain return streams it has proved to be a powerful tool in the modern theory of uncertainty in economics. In particular, it permits us to conclude that the expected value of any concave function of return will decrease as risk increases and the expected value of any convex function of return will increase as risk increases. See Rothschild and Stiglitz (1970a, 1970b, 1976) for proofs and other applications.

$$(1) \quad U(R,r) = \begin{cases} R-(1+r)L & \text{when } R > (1+r)L \\ 0 & \text{when } R \leq (1+r)L \end{cases}$$

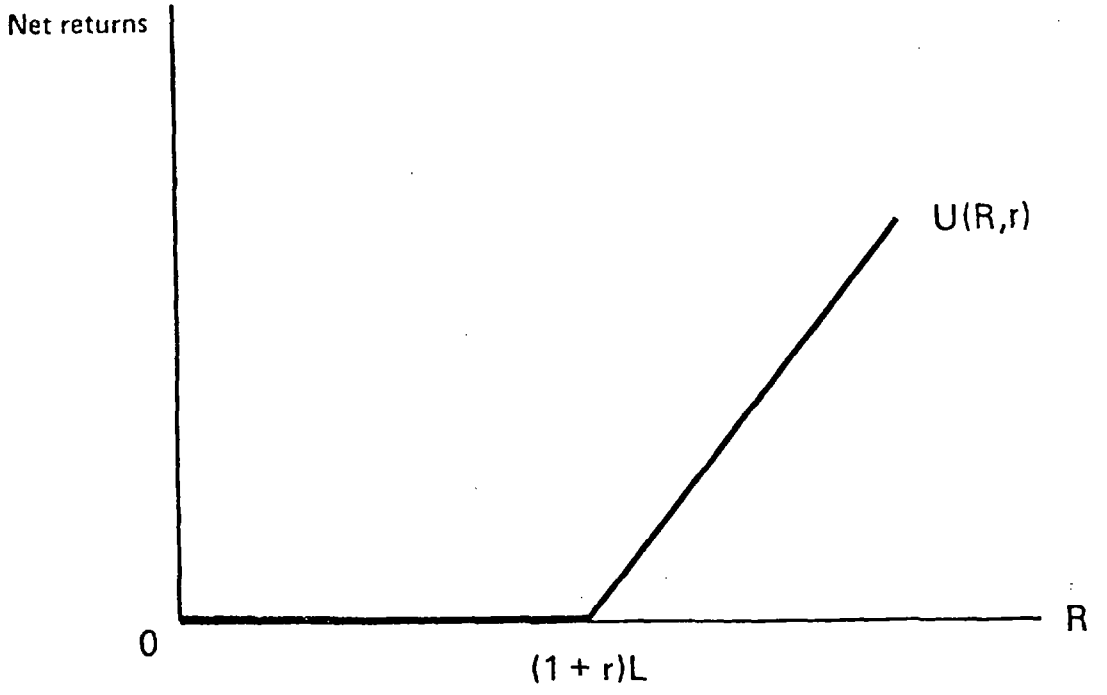
The borrower will be in default on this loan if:

$$(2) \quad R < L(1+r). \ 1/$$

Figure A2 shows that the borrower's net benefits U(R,r) from the policy or project financed with bank loans is a convex function of the gross return of the policy or project. Hence any change to a more risky policy or project, i.e., an increase in $\xi$, results in an increase in expected net benefits to the borrower. 2/ Only policies or projects with risk greater than some risk level $\xi^*$ will be undertaken, where $\xi^*$ is the risk at which the borrower's expected net benefits from a loan are zero:

FIGURE A2

NET RETURNS TO BORROWERS




1/ There is a presumption here that the lender has first claim on the returns R.

2/ This conclusion follows from the fundamental comparative static result in the economics of uncertainty, namely, the expected value of a convex (concave) function of a random variable increases (decreases) with increases in the mean-preserving spread measure of risk (Rothschild and Stiglitz, 1970).

$$(3) \quad E[U(R,r)] = \int_0^{\infty} U(R,r)dF(R, \xi^*) = 0$$

An increase in r, the rate of interest charged by the bank, reduces the expected net benefit of loans to the borrower and hence requires an increase in the cut-off level of risk $\xi^*$ necessary for policies or projects to have a positive expected net return. 1/ This conclusion then establishes the possibility that the interest rate itself can be used by the lending bank to screen borrowers: the risk of any given amount of lending to finance policies or projects in a particular risk class will increase with a rise in the interest rate charged, because some of the less risky projects or policies are no longer profitable at the higher interest rate. An increase in the interest rate produces an adverse selection among potential borrowers; that is, the bank's composition of borrowers becomes more risky.

The concentration of risk within a DC, which arises from explicit or implicit public guarantees for private borrowing and cross-default clauses, implies that the total external bank debt of a DC, denoted by $\Sigma L$, is the variable of interest to the bank lenders. Let $\Sigma R$ be the total return on all projects and policies financed with external bank loans. When total returns fall below $(1+r)\Sigma L$ then the country will be induced to undertake a stabilization program in order to obtain a restructuring of its debt. We shall assume that debt restructuring is such that the bank-lenders' loss increases proportionately to the shortfall in total return, i.e., the bank's net return is given by:

$$\rho(\Sigma R, r) = \begin{cases} (1+r)\Sigma L & \text{when } \Sigma R > (1+r)\Sigma L \\ \Sigma R & \text{when } \Sigma R \leq (1+r)\Sigma L \end{cases} \quad \text{(see Figure A3)}$$

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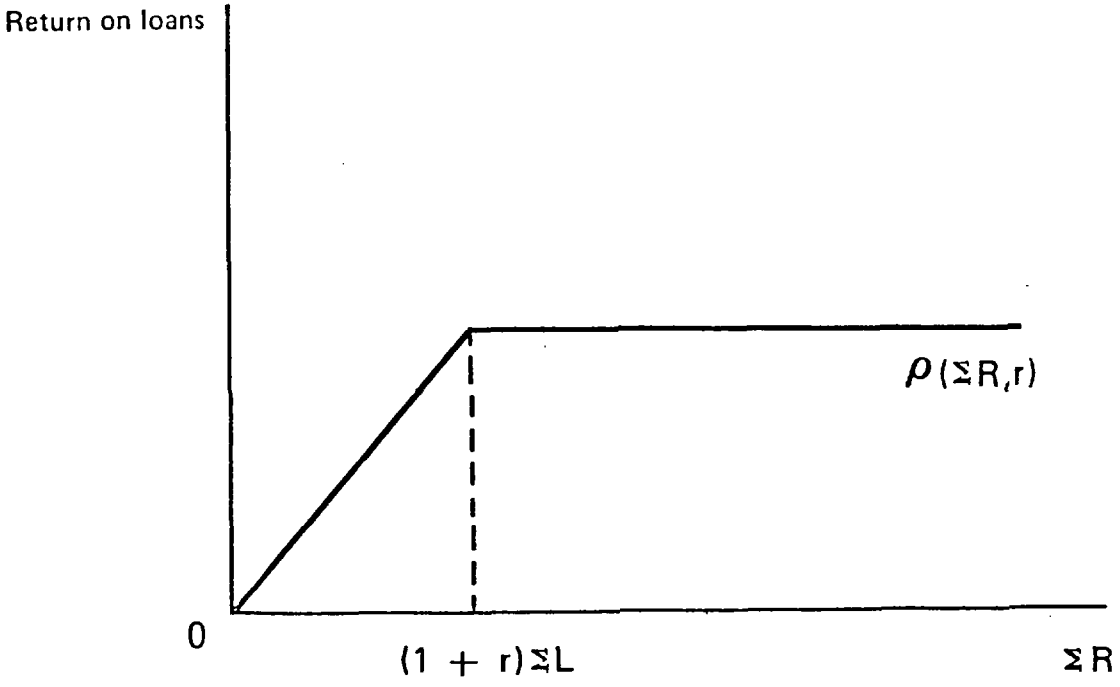
1/ This conclusion can be established rigorously by differentiating (3):

$$\frac{d\,E[U(R,r)]}{dr} = -L \int_z^{\infty} dF(R,\xi^*) < 0 \quad \text{where } z = (1+r)L; \text{ and}$$

since $\dfrac{d\,EU(R,r)]}{d\xi^*} > 0$ we get $\dfrac{d\xi^*}{dr} > 0.$

FIGURE A3

RETURN TO BANK LENDERS




The international banking market is taken to be competitive in the sense that there are many non-collusive bank lenders and borrowers. The banks are price takers in the deposit markets, while they set their lending rates so as to maximize expected profits. Since monetary authorities have assumed most of the risk of banks' deposit liabilities, the banks' choice of assets does not influence their cost of deposits. The interest rate on deposits is determined by the assumption that banks do not earn excess profit from external lending.

Thus an increase in the interest rate charged on loans to a particular risk class has two effects on the banks' expected profits. First, there is the usual direct effect resulting in an increase in expected profits when the composition (and hence the risk) of the borrowers is held constant. Second, an increase in the interest charged by bank lenders has an indirect negative effect on the banks' expected profits, owing to the adverse selection it produces among borrowers. The higher the interest rate, the more likely it is that the adverse selection effect will dominate the direct effect of an increase of the interest rate on the banks' expected profit.

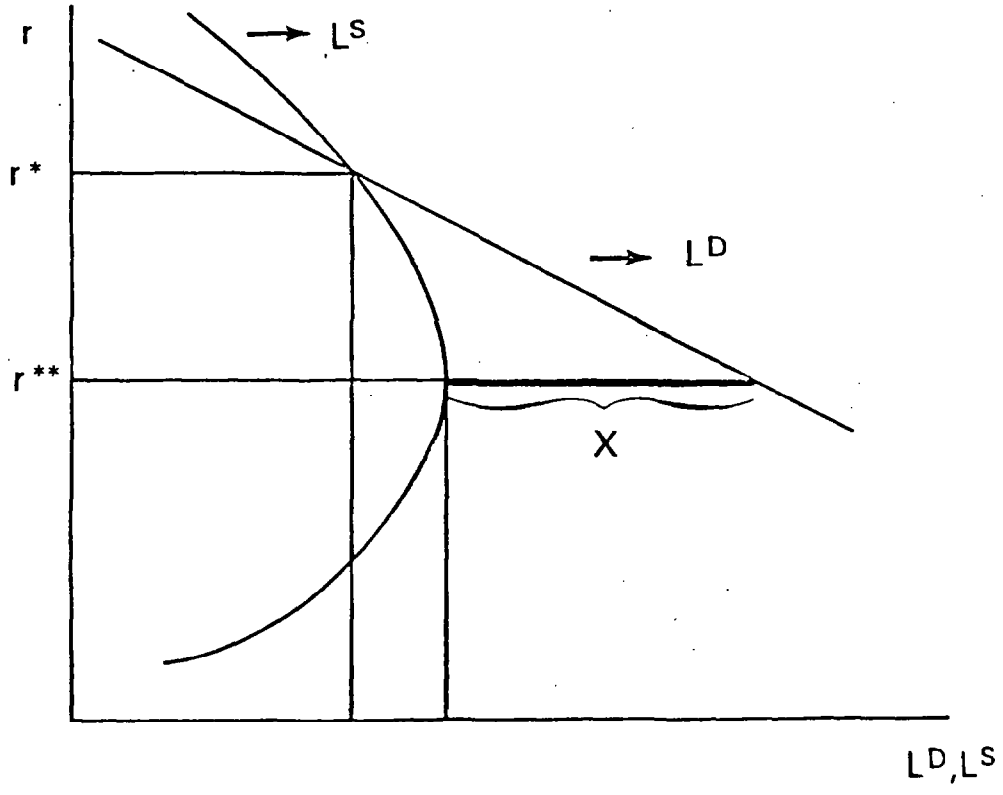
Since the supply of external loans by banks can be assumed to rise with increases in expected profits, we can translate the relation between the interest rate charged and the expected profits into a relation between the interest rate charged and the supply of loans by the banks. Thus $L^S$

in Figure A4 represents the backward-bending relation between the supply of loans and the interest rate charged by international bank lenders for loans financing policies and projects in a particular risk class.

The demand curve for bank-financing of development policies and projects is assumed to be downward sloping, as discussed earlier. Hence it is easily seen (Figure A4) that when the aggregate demand curve for loans, $L^D$ in this particular risk class, intersects the backward bending aggregate supply of loans, $L^S$, curve then there will exist an excess demand for loans equal to X. Any increase in the interest rate r beyond r** will reduce the banks' expected profit. Thus there is no incentive mechanism to clear the external loan market if there exists excess demand for loans at the interest rate r*, and some potential borrowers will be rationed. On the other hand, if the aggregate demand curve for loans intersects the aggregate supply curve below r**, then the loan market will clear. An increase in the supply of loanable funds to the banking sector will leave the interest rate-expected profit relation unchanged and hence will cause the supply curve $L^S$ in Figure A4 to shift rightward. From this figure it is apparent that such an increase in the supply of loans will first reduce X, the size of the rationed portion of the market, and only then reduce the rates charged to borrowers.

FIGURE A4

EQUILIBRIUM IN THE EXTERNAL BANK LOAN MARKET WITH A SINGLE RISK-CLASS OF BORROWERS



So far we have dealt with the case where all borrowers appear identical to the bank lender; that is, borrowers are all in the same risk class. We now assume that the bank can sort potential international borrowers into risk classes, such that borrowers are known to differ across risk classes, but appear identical within each risk class. 1/ For each risk class there exists a backward-bending relation between the interest rate charged and expected profits from loans to this risk class. In Figure 3 in the text we have drawn the interest rate-expected profit (per dollar lent) relation for three different risk classes, $\beta_1(r)$, $\beta_2(r)$, and $\beta_3(r)$ From this figure, it is clear that if the bank's cost of deposits exceeds $d_3$ then no borrower in risk class $\beta_3(r)$ will obtain loans from this bank. This is so despite their possible willingness to pay interest charges above the cost of deposits to the bank. For example, if the cost of deposits to the bank is $d_2$, then no borrower in risk class $\beta_3(r)$ will obtain loans, while some, but not necessarily all, borrowers in risk class $\beta_2(r)$ will be able to borrow at interest rate $r_2$, and all borrowers in risk class $\beta_1(r)$ can borrow at interest rate $r_4$. Competition among banks assures that the interest rates charged are such as to equate the expected profits per dollar lent to the various risk classes. Furthermore, profit-maximizing behavior of the individual banks implies that loan credit is available to risk class $\beta_1(r)$ only if risk classes $\beta_2(r)$ and $\beta_3(r)$ are not rationed.

The shape of the interest rate-expected profits relation for a particular risk class of borrowing countries will be determined by the risk and the distribution of risk among the borrowers in a risk class. For example, if there are only two risk classes, one safe and one risky, then the expected profits will decline steeply once the interest rate is such as to drive the safe borrowers out of the loan market. The position of the interest rate-expected profits relation is determined by the expected return on the total of loans to this particular risk class. Banks will always demand to be compensated for any expected shortfall in loan repayment by raising the contractual interest rate charged. While the lender has no information about the differences in risk among borrowers in a particular risk class, he has knowledge of the interest rate-expected profits relation which permits him to make the kind of lending and interest rate decisions described above.

The argument developed above demonstrates that if the international bank lenders have sufficient information about their borrowers and their projects or policies to sort these into risk classes, but not enough information to discriminate among borrowers in the same risk class, then:

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1/ The borrower is not able to estimate the second moments of the joint distribution of returns to loans in different risk classes. Hence the usual diversification argument in terms of covariances does not apply.

(i) an entire risk class of borrowers may be denied access to the international bank loan market,

(ii) there may be one risk class of borrowers some of whom obtain bank financing while others in the same risk class will not obtain any loans,

(iii) all other borrowers will obtain loans at rates reflecting their risk class,

(iv) the banks will not accept offers from the rationed borrowers to pay higher interest charges on loans.

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