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WP/94/79

INTERNATIONAL MONETARY FUND

Policy Development and Review Department

Information Asymmetries in Developing Country Financing

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July 1994

Abstract

This paper assesses the impact of information asymmetries on developing country financing and considers alternative techniques to reduce the adverse implications of such asymmetries. Following an introduction, Section II examines in general terms the role of information in financial markets and analyzes the incentive and risk sharing properties of alternative financial contracts. Information asymmetries which are present in domestic finance are more prevalent in international finance, in particular in developing country financing. Section III reviews measures aiming to resolve information asymmetries. Borrowing and creditor country regulations and policies, as well as innovative contractual agreements help to resolve a range of issues related to information asymmetries. However, despite their contribution, residual problems remain unresolved. The international financial institutions, and in particular the Fund, have an important role to play in alleviating information asymmetries.

JEL Classification Numbers:

D81 F33 F34 G15

WORKING PAPER
IMF 94-92
001

^{1/} The author would like to thank Peter Clark, Charles Collyns, Steven Dunaway, Victor Ng, and Robert Rennhack for helpful comments and suggestions. The views expressed in the paper and any remaining errors are the author's.

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Summary

This paper assesses the impact of information asymmetries between lenders and borrowers in developing country external financing and considers alternative techniques to reduce the adverse implications of such asymmetries. Information asymmetries arise when lenders cannot fully observe or verify borrowers' actions.

The second section of the paper examines the role of information in financial markets and analyzes the incentives to borrowers provided by alternative financial contracts and the risk-sharing properties of these contracts, particularly of state contingent (equity-type) contracts. It shows in a simple framework that in the presence of asymmetric information between lenders and borrowers, there is an inevitable trade-off between efficient risk sharing and incentive provision. It also argues that information asymmetries that are present in domestic finance are more prevalent in international finance, in particular in developing country external financing.

The third section reviews measures designed to resolve information asymmetries, including regulations and policies in borrowing and creditor countries, as well as innovative contractual agreements. However, despite the contribution of these measures, residual problems remain unresolved. Additional measures are suggested, including the enhancement of investment incentives within a conducive macroeconomic environment, which could be achieved through sound economic policies, and the improvement of the flow of information by establishing a set of regulations for channeling information.

International financial institutions, especially the IMF, are in a unique position through their relations with member countries to help alleviate some information asymmetries. By facilitating the design and monitoring the implementation of solid economic policies, the international financial institutions contribute to the resolution of problems associated with the overall macroeconomic environment. Furthermore, in the context of their catalytic role, these institutions can contribute to the sustainability of other capital flows.

I. Introduction

One of the most important impediment to a sustained flow of capital to developing countries relates to information asymmetries among lenders and borrowers in international capital markets. Combined with substantive risks associated with factors which lie beyond the immediate control of the directly involved suppliers and receivers of capital, information asymmetries may inhibit external financing. Furthermore, the evolution of existing financial relations relies heavily on the availability of information relevant to the potential outcomes of such relations.

Experience with debt flows to developing countries has shown that a crisis could emerge if financial contracting does not adequately account for potential outside risks and if it does not provide sufficient incentives for policy implementation. With the resumption of private market flows to developing countries--the expansion of bond financing and the increasing role of portfolio and foreign direct investment flows--it is important to examine whether the framework under which these new flows are taking place promotes adequate dissemination of information and matching of risk and returns.

Section II of this paper, examines the role of information in financial markets and analyzes the incentive and risk sharing properties of alternative financial contracts, particularly of state contingent (equity type) contracts. It shows in a simple framework that in the presence of asymmetric information between lenders and borrowers, there is an inevitable trade-off between efficient risk sharing and incentive provision. It also argues that information asymmetries which are present in domestic finance are more prevalent in international finance, in particular in developing country financing. Section III reviews measures aiming to resolve information asymmetries. Borrowing and creditor country regulations and policies, as well as innovative contractual agreements, help to resolve a range of issues related to information asymmetries. However, despite their contribution, residual problems remain unresolved. The international financial institutions, and in particular the Fund, have an important role to play in alleviating information asymmetries. Section IV summarizes the conclusions.

II. The Role of Information in Financial Markets

1. Asymmetric information and financial contracting

Whether a borrower can meet its contractual obligations to a lender depends on the returns to investment, which in turn reflect both the behavior of the borrower, as well as exogenous factors that lie beyond the immediate control of either the supplier or receiver of capital. Financial

contracts must allocate risks between lenders and borrowers efficiently and provide incentives to borrowers to undertake actions which increase the probability of being able to meet contractual obligations. By incorporating provisions which account for risks generated by exogenous factors and by allocating those risks in accordance to each party's preference for bearing risk, contracts help to minimize the possibility of repudiation of the terms of the contracts.

Asymmetric information between the lender and the borrower is defined in terms of the inability of the lender to observe or verify the borrower's actions. When the outcome of the relationship is only determined by the borrower's behavior--such as how borrowed funds are used--and the outcome is easily observed and verified by both parties, then the asymmetric information problem does not arise. However, when the outcome is stochastic, and the borrower's behavior affects its probability distribution, observation of the outcome can not reveal information about the borrower's behavior. Under these circumstances, asymmetric information prevents contracting directly on the borrower's actions and a moral hazard problem arises. The borrower may have an incentive to undertake actions which are in its own best interest but not in the interest of the lender.

Results from the principal-agent literature and its application on domestic credit markets suggest that in the presence of asymmetric information between lenders and borrowers--because of the inability to contract upon borrower's actions--there is an inevitable trade-off between efficient risk sharing and incentive provision. ^{1/} Provision of incentives requires that the borrower's return varies depending on what outcome occurs. But this means that the borrower will bear the risk associated with variations in the final outcome. Clearly, a type of contract which would give to the borrower an incentive to ensure a "good" outcome is a debt contract which simply requires a fixed payment to the lender. However, except in the special case when the borrower is risk neutral, this will imply an inefficient distribution of risk between the two parties. Therefore, there is a trade-off between gains from the provision of extra incentives and losses from inefficient risk sharing.

Lenders may choose to hold debt contracts in order to receive a predetermined payoff over the period of the loan, based on the assumption that borrowers maintain the financing and investment strategies stipulated at the time of borrowing and that they will honor their contractual

^{1/} The result holds when both parties are risk averse. Grossman and Hart (1983), Holmstrom (1979) and Shavell (1979) analyze the trade-off between incentive provision and efficient risk sharing in contract theory. Stiglitz and Weiss (1981) and (1983) apply principal-agent models in domestic credit markets. They explain credit rationing in markets with incomplete information, and they investigate the incentive effects of contingent contracts that take into account the possibility of the termination of the relationship between the two contracting parties.

obligations. However, as borrower's opportunities change, they have an incentive to reassess their investment strategy in ways that may benefit themselves to the detriment of the lenders. In particular, given that the borrower's expected return increases by undertaking riskier projects, they have an incentive to substitute projects with uncertain payoff schedules for projects with certain payoffs. ^{1/} Furthermore, borrowers have an incentive to continue to borrow more to finance additional risky projects and increase their expected return. Although lenders have some information about the borrowers' behavior and take it into account in requesting a risk premium, this information is typically incomplete. The incentives to the borrowers to engage in high-risk projects and to increase their financial leverage, increases the possibility of default and shifts risk to the lenders.

To compensate for the higher default probability, which arises under asymmetric information, lenders may require a higher interest rate in debt contracts which in turn discourages borrowers from undertaking capital investment projects which would have been profitable at lower interest rates. Therefore, higher interest rates in debt contracts are considered inadequate for solving the borrower's incentive problems to undertake risky projects and fail to fully resolve the information asymmetry problem. Furthermore, by requiring a fixed repayment irrespective of output, debt contracts fail to provide risk sharing between lenders and borrowers. The borrower is required to honor its contractual obligations even if the project fails, therefore bearing the entire risk associated with the variations of the final outcome.

Compared to debt contracts, which generate incentives for the borrowers to undertake risky projects and which fail to provide risk sharing between lenders and borrowers, equity contracts reduce the incentive problem and provide for risk sharing. By relating the return to the providers and receivers of capital to the outcome of the investment, equity contracts provide the receiver of capital with the incentive to undertake output increasing actions. Thus the moral hazard problem which arises in the

^{1/} This is known in the corporate finance literature as the "asset substitution problem" which arises because lenders, in general, know less about the riskiness of the projects than borrowers. When the lender determines a certain fixed interest rate, the spread between this rate and the risk free rate (the risk premium) is set to reflect the default probability based on the information available to the lender at the time when the loan is initiated. A problem arises because the default probability, after the loan is granted, is affected by the actions of the borrower. If the contract permits the borrower some flexibility in terms of its investment decision, then the borrower may have the incentive to undertake a more risky project (but with a higher expected return) than the one based on the original understanding of the lender. By doing so, the borrower essentially obtains the funds for a riskier project at a lower risk premium.

presence of asymmetric information is reduced. In addition, by linking returns to the outcome of the investment, equity contracts provide for sharing of risks between the two parties.

To illustrate the risk sharing and investment incentive properties of state contingent (equity type) contracts in an environment characterized by uncertainty, a simple model is constructed. The results are derived in a model with two states of the world, under the assumptions of full and asymmetric information. In the case of asymmetric information, the analysis focuses on the moral hazard problem which arises in the relationship between the lender and the borrower. In both cases, results are presented using Edgeworth box diagrams to characterize contracts and interpret their risk sharing and incentive properties.

The main feature of the state contingent contract considered in the following model is that both the expected return to the lender and the expected level of consumption of the borrower depend upon the realized level of output. The two crucial determinants of the level of output are the state of the world and the portion of borrowed funds invested. Output is chosen as the variable to contract upon since it could be observable by both parties at the end of the period, and more important its level could be verified easily by the lender.

Let

x_1 : be the level of output the lender and borrower will share in a good state of the world, and

x_2 : be the level of output the lender and borrower will share in a bad state of the world. It is assumed that

$$x_1 > x_2.$$

Let

α : be the probability that x_1 occurs which crucially depends on the portion of borrowed funds invested,

$(1-\alpha)$: be the probability that x_2 occurs, and

$x_1 - c_1$: be the repayment to the lender if x_1 occurs,

$x_2 - c_2$: be the repayment to the lender if x_2 occurs.

c_1 and c_2 are the levels of consumption that the borrower enjoys in the two states of output x_1 and x_2 , respectively.

The preferences of the borrower and the lender are given by the borrower's utility function:

$$(1) \quad \alpha U(c_1) + (1-\alpha)U(c_2) - g(\alpha)$$

and the lender's utility function:

$$(2) \quad \alpha V(x_1 - c_1) + (1-\alpha)V(x_2 - c_2)$$

$g(\alpha)$ is the cost to the borrower if it abstains from using borrowed funds for immediate consumption and puts a proportion equal to α into investment from which it expects future returns. In constructing the expected utility functions it is not misleading to identify the probability of high output with the proportion of borrowed funds invested. As the borrower increases the proportion of funds invested, the probability of x_1 occurring also increases. $V(\cdot)$ can be either linear (implying risk neutrality) or concave (implying risk aversion); $U(\cdot)$ is assumed to be strictly concave (risk aversion); $g(\cdot)$ is convex so that $-g(\cdot)$ is concave and therefore the borrower's utility function is concave.

We first consider the case without asymmetric information. In a full information environment it is assumed that the borrower has complete control over the level of investment which it will undertake. This determines the probability α . Also, it is assumed that α can be credibly communicated to the lender. Under these assumptions the borrower maximizes utility by choosing c_1 , c_2 and α subject to a minimum expected return level guaranteed to the lender. This recognizes the fact that in this principal-agent relationship, the agent can have control of the final output x_1 or x_2 and the levels of consumption c_1 or c_2 that it will enjoy. Consequently, the borrower could be considered as the one who also has control over the residual $x_1 - c_1$ and $x_2 - c_2$ state contingent expected return to the lender. The consumption-investment decision of the borrower will simultaneously determine repayment to the lender. Under the full information assumption, the result of efficient risk sharing between the two contracting parties is derived, by solving the following program:

$$\begin{aligned} & \max_{(c_1, c_2, \alpha)} \quad \alpha U(c_1) + (1-\alpha)U(c_2) - g(\alpha) \\ (3) \quad & \text{subject to} \quad \alpha V(x_1 - c_1) + (1-\alpha)V(x_2 - c_2) \geq \bar{V} \end{aligned}$$

where \bar{V} represents the lender's minimum utility (opportunity cost or market return) required to ensure release of the loan. This can be determined by bargaining power or by market forces. In the latter case, it is the utility level that the lender could achieve by lending the money to another party, in other words, it represents the opportunity cost of the lender by releasing this specific loan. The analysis here is a partial equilibrium one because \bar{V} is taken as exogenously specified.

We form the following Lagrangean and derive the first order conditions:

$$(4) \quad \max_{(c_1, c_2, \alpha)} \quad L = \alpha U(c_1) + (1-\alpha)U(c_2) - g(\alpha) + \lambda [\alpha V(x_1 - c_1) + (1-\alpha)V(x_2 - c_2) - \bar{V}]$$

The first order conditions are:

$$(5) \quad L_{c_1} - \alpha U'_1 - \lambda \alpha V'_1 = 0$$

$$(6) \quad L_{c_2} - (1-\alpha)U'_2 - \lambda(1-\alpha)V'_2 = 0$$

$$(7) \quad L_{\alpha} - (U_1 - U_2) - g'(\alpha) + \lambda(V_1 - V_2) = 0$$

where $U_1 = U(c_1)$, $U_2 = U(c_2)$, $V_1 = V(x_1 - c_1)$, $V_2 = V(x_2 - c_2)$

The solution of (5) and (6) yields

$$(8) \quad \frac{U'_1}{U'_2} = \frac{V'_1}{V'_2}$$

which indicates that the marginal rate of substitution, of consumption and repayment for the borrower and the lender respectively, between the two states of the world are equal. This is the condition for efficient risk sharing in this simple model. ^{1/} The solution of the maximization problem under full information is a first best solution, involving both efficient risk sharing among the two parties and provision of incentives to the borrower to invest a greater portion of funds.

The result can be represented with an Edgeworth box (Figure 1) as the points on a contract curve reflecting different allocations contingent on a particular level of investment α . The dimensions of the Edgeworth box are x_1 and x_2 , and the 45° lines are the certainty lines for each party. A solution (optimal allocation) cannot lie outside the area OCO'C' because if a point like A is considered, then

$$(9) \quad \frac{c_1}{c_2} > 1 > \frac{x_1 - c_1}{x_2 - c_2}$$

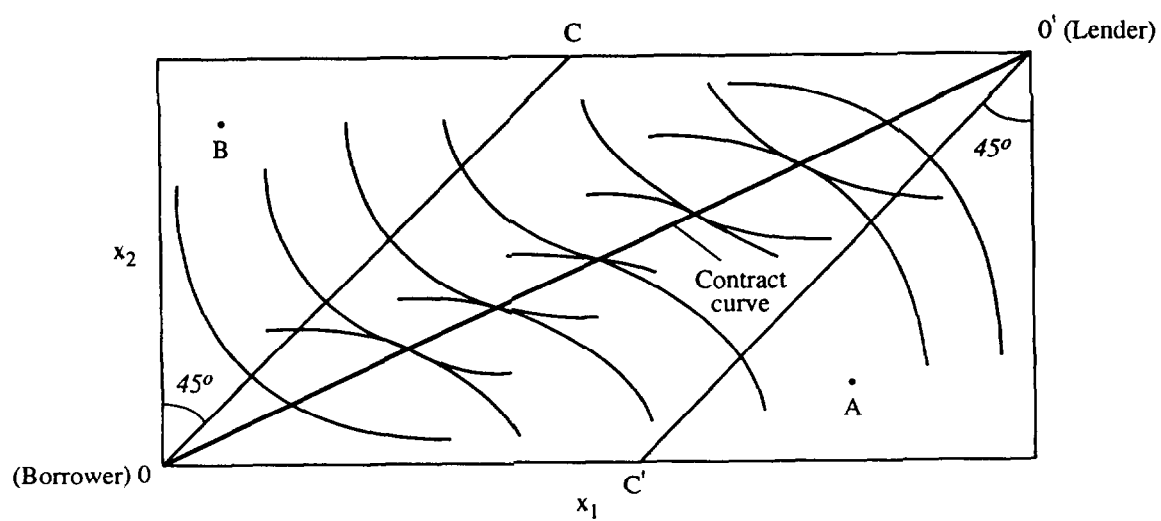
which contradicts (5) and (6). Similarly at a point like B

$$(10) \quad \frac{c_1}{c_2} < 1 < \frac{x_1 - c_1}{x_2 - c_2}$$

which again contradicts (5) and (6). Thus the contract curve has to lie within the area ODO'D' between the two certainty lines. If the lender is risk neutral, its indifference curves are straight lines and the borrower

^{1/} Condition (8) implies Pareto optimality from a risk sharing point of view. From Borch (1962), we know that the contract is Pareto optimal from a risk sharing point of view if the ratio of the two marginal rates of substitution is constant.

Figure 1. Efficient Risk Sharing Under Full Information



will be able to force the lender to the borrower's 45° line and thus obtain full insurance. Suppose that

$$(11) \quad U(c) = \frac{c(1-\gamma)}{(1-\gamma)} = V(c) \quad \text{so that} \quad \frac{-cU'(c)}{U'(c)} = \frac{-cV'(c)}{V'(c)} = \gamma$$

where $0 < \gamma < 1$ i.e., the two utility functions exhibit a constant degree of relative risk aversion equal to γ , using the Arrow-Pratt measure. Then the indifference curves are homothetic and the contract curve will be the diagonal OO' . At any point along the contract curve, the marginal rates of substitution between the two parties are equal and are determined by the slope of the indifference curves which remains constant (equal to $-\lambda$) at all points along the contract curve.

Using equation (7), since $\lambda = U'_1/V'_1$ from (8), a the second result obtains for the full information case:

$$(12) \quad \frac{U_1 - U_2}{U'_1} + \frac{V_1 - V_2}{V'_1} = \frac{g'(\alpha)}{U'_1}$$

where $\frac{U_1 - U_2}{U'_1}$: is the additional utility the borrower would like to get in terms of its marginal utility of consumption in state one, if the proportion of money invested is increased by one unit.

$\frac{V_1 - V_2}{V'_1}$: is how much additional utility the lender would get in terms of its marginal utility in state one if the borrower increases α by one unit.

$\frac{g'(\alpha)}{U'_1}$: is the marginal cost to the borrower for an increase in the proportion of money invested in terms of its marginal utility in state one.

Now the assumption that the borrower has full control over the level of investment is relaxed. It is considered here that the borrower cannot commit itself to a certain level of investment that the lender can observe or verify. That is, α cannot be used credibly to contract upon. The borrower's choice of c_1 and c_2 is not only subject to the constraint that provides a minimum utility to the lender, but also to the additional constraint that guarantees maximization of its own utility with respect to α . The program to be solved in this case is:

$$(13) \quad \max_{(c_1, c_2, \alpha)} \quad \alpha U(c_1) + (1-\alpha)U(c_2) - g(\alpha)$$

subject to:

$$(14) \quad \alpha V(x_1 - c_1) + (1-\alpha)V(x_2 - c_2) \geq \bar{V}$$

and

$$(15) \quad \alpha = \arg \max_{\{\alpha^*\}} \alpha^* U(c_1) + (1-\alpha^*)U(c_2) - g(\alpha^*)$$

The relationship between the lender and the borrower is modeled as a non-cooperative game, using the solution concept of perfect equilibrium (Selten 1975). The two parties' decision problem is to choose and accept a contract that guarantees to the lender at least a minimum amount of utility \bar{V} , and which is also compatible with whatever incentives the borrower has in terms of allocating the borrowed funds. These incentives could not be included in the contract because they are directly related to the management of the borrowed funds, they are not observed at the time the loan is agreed, and they can not be communicated credibly to the lender. Equation (15) of the maximization problem reflects the incentive compatibility constraint for the borrower. It recognizes that the borrower will undertake a level of investment that maximizes its own expected utility.

Since (15) has to be satisfied, we can take the first order condition and impose it as a further constraint in the maximization problem and then apply standard calculus of variations. William Rogerson (1985) has shown that this first order approach is valid to use. Using it here we substitute equation (15) with

$$(16) \quad (U_1 - U_2) - g'(\alpha) = 0$$

and we form the Lagrangean for maximizing (13) subject to (14) and (16) as:

$$(17) \quad \max_{(c_1, c_2, \alpha)} \quad L = \alpha U(c_1) + (1-\alpha)U(c_2) - g(\alpha) + \lambda[\alpha V(x_1 - c_1) + (1-\alpha)V(x_2 - c_2) - \bar{V}] \\ + \mu[U_1 - U_2 - g'(\alpha)]$$

where the first order conditions are:

$$(18) \quad L_{c_1} = \alpha U'_1 - \lambda \alpha V'_1 + \mu U'_1 = 0,$$

$$(19) \quad L_{c_2} = (1-\alpha)U'_2 - \lambda(1-\alpha)V'_2 - \mu U'_2 = 0,$$

$$(20) \quad L_{\alpha} = U_1 - U_2 - g'(\alpha) + \lambda(V_1 - V_2) - \mu g''(\alpha) = 0.$$

Solving (18) and (19) simultaneously we get:

$$(21) \quad \frac{(\alpha + \mu)U'_1}{[(1-\alpha) - \mu]U'_2} = \frac{\alpha V'_1}{(1-\alpha)V'_2}$$

$$(22) \quad \frac{V'_1}{V'_2} = \frac{(1 + \frac{\mu}{\alpha})}{[1 - \frac{\mu}{(1-\alpha)}]} \frac{U'_1}{U'_2}$$

Equation (20) is the same as equation (8) if $\mu = 0$, i.e. constraint (15) is not binding and thus we have the full information solution. For $\mu \neq 0$, equation (20) implies that the marginal rates of substitution among the borrower and the lender are not equal and the efficiency in terms of risk sharing is not obtained.

To prove that $\mu > 0$, we use equation (20) from which $(U'_1 - U'_2) - g'(\alpha) = 0$ and

$$(23) \quad \lambda(V'_1 - V'_2) = \mu g''(\alpha).$$

If $\mu \leq 0$, we get $V'_1 \leq V'_2$ which implies

$$(24) \quad V'_1 \geq V'_2 \text{ and } V'_1/V'_2 \geq 1$$

and because $c_1 \geq c_2$, we get

$$(25) \quad U'_1 \leq U'_2 \text{ and } U'_1/U'_2 \leq 1.$$

From (20) if $\mu \leq 0$, then

$$(26) \quad \frac{V'_1}{V'_2} \leq \frac{U'_1}{U'_2}.$$

Now combining (24), (25) and (26), we get

$$(27) \quad 1 \leq \frac{V'_1}{V'_2} \leq \frac{U'_1}{U'_2} \leq 1$$

which implies a contradiction. Thus $\mu > 0$ and

$$(28) \quad \frac{V'_1}{V'_2} \geq \frac{U'_1}{U'_2}.$$

In the Edgeworth box, the contract curve (making the same assumptions as before about preferences) will shift towards the creditor's certainty line as illustrated in Figure 2. Unlike the full information case, the ratio of marginal rates of substitution of the two parties is not constant but varies along the contract curve. This indicates that risk is not shared optimally between the two parties. In this case, the borrower bears more risk than the lender because c_1 and c_2 are output contingent rewards that the borrower gets. The Pareto efficient contract, is only a second best contract which involves the sacrifice of efficient risk sharing for the sake of inducing the borrower to invest a greater portion of funds.

It is possible to believe that such output contingent contracts are in the lender's interest because of its inability to observe or monitor α . By designing this type of contract, in which the level of consumption of the borrower depends upon the level of output, the borrower has an incentive to undertake a higher level of investment which increases the probability of high output and alleviates the moral hazard problem. The unfortunate result of this is that risk sharing efficiency is sacrificed and the borrower bears a disproportionate amount of risk. As a consequence of this inefficiency in risk sharing, the borrower might choose not to meet contract requirements, when the level of output is low and its consumption falls below some critical level.

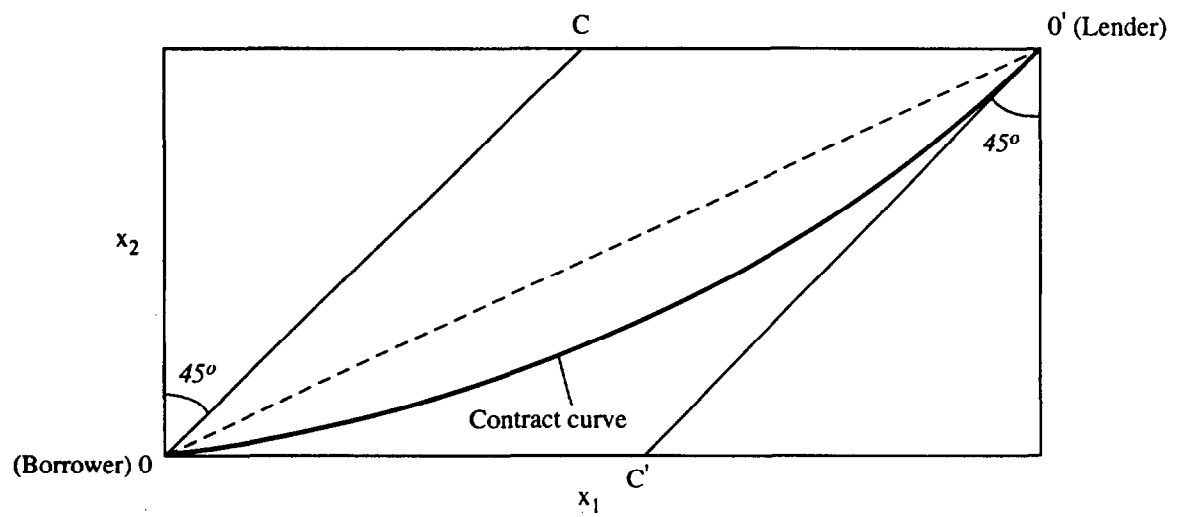
Clearly, debt and equity contracts have distinct risk sharing and incentive characteristics, and by shifting the mix between the two it is possible to vary the balance of incentives and risk sharing between lenders and borrowers. In addition, by incorporating complex features in financial contracting, a better balancing of incentives and risk sharing may be achieved.

In domestic financial markets, the trade-off between provision of incentives (aiming to resolve the moral hazard problem) and efficient risk sharing (aiming to distribute risks in accordance with attitude for risk) which arises in the presence of asymmetric information may be partially resolved through a mix of debt and equity finance complemented by complex financial contracting such as callable and convertible securities. ^{1/} Complex features such as protective covenants, call provisions in corporate debt, conversion privileges, and executive stock options coexist with straight debt and equity contracts in corporate finance, and along with bankruptcy procedures and other contract-enforcing legal and institutional mechanisms alleviate risk sharing and incentive problems.

Protective covenants require borrowers to undertake certain actions which are beneficial to the lenders, and to avoid actions perceived as detrimental to lenders. Positive covenants specify certain actions that borrowers must take, including the provision of financial information to the

^{1/} Barnea, Haugen and Senbet (1985) present a detailed analysis of the importance of agency problems in corporate finance in domestic markets.

Figure 2. Inefficient Risk Sharing Under Asymmetric Information



lenders. Negative covenants limit or prohibit actions by borrowers unless the lenders provide their consent. By stipulating the borrower's actions and by requiring the provision of information to lenders, covenants contribute to the solution of the moral hazard problem.

Call provisions allow convertibility of debt into equity, thereby reducing the incentives of borrowers to undertake high-risk projects because in such case the option to convert a loan into equity becomes more valuable to the lenders. Conversion privileges and executive stock options tied directly to the profitability of the firm provide incentives to borrowers to undertake profit maximizing projects.

In addition, in domestic financial markets, information asymmetries are alleviated through regulatory requirements for borrowers to provide a substantive amount of information about their characteristics to lenders before receiving financing, and through risk assessments by third parties which may possess additional information compared to information available to individual lenders. This additional information, which includes required audited accounting statements and credit ratings by reputable credit agencies, even if incomplete about borrower's actions, is valuable and could improve the design of contracts.

2. Information barriers in developing country financing

Moving from a domestic to an international framework, the solution of risk and incentive problems becomes even more difficult. In addition to more prevalent information asymmetries about borrowers' actions, the lack of bankruptcy procedures and of enforceability of contracts complicates further the task of financial contracting to balance risks and incentives. Furthermore, and to a greater extent than with domestic financial markets, there is limited information to lenders and borrowers about exogenous factors which--although they may lie beyond their immediate control--affect their actions and jointly determine the outcome of their relationship.

The availability of information to international investors on the basis of which they can assess potential risks and returns from financial investments in developing countries is limited. Unlike domestic financial markets where information on the characteristics of borrowers is widely available, standards of accounting and information disclosure for developing country borrowers are typically low. In addition, in developing country finance, there is limited information to lenders and borrowers about exogenous factors, such as government policy implementation, which influence the borrower's actions and jointly determine the borrower's income and its

decision to honor external obligations. ^{1/} While institutional and contractual mechanisms which can absorb exogenous shocks have started to develop, sovereignty, by definition, precludes direct contractual commitments with respect to government policy choices. If the sovereign itself is the borrower it becomes more difficult to contract explicitly upon actions. If the borrower is in the private sector, its actions could be influenced by the government's policy implementation which is beyond the direct control of private lenders and borrowers.

Incentive and risk sharing inefficiencies resulting from asymmetries of information between lenders and borrowers are exacerbated in the international context by the lack of bankruptcy procedures and enforceability of contracts. Although complex financial contracts have started to develop in international transfers of capital (see section III.1 below), their effectiveness in solving repayment problems is limited by the presence of sovereign risk. When repayment problems emerge, they are difficult to solve due to the lack of clear provisions and contingency clauses in the contracts and the absence of established institutional mechanisms on how to handle these problems.

Experience with the debt crisis of the 1980s has shown how costly and prolonged was the renegotiation of debt contracts aiming to resolve repayment problems. Failing to build risk sharing contingencies into financial contracts, which were predominantly in the form of syndicated loans in the 1970s, necessitated the renegotiation of these contracts when adverse developments led to the debt crisis in the early 1980s. ^{2/} Ex-post rewriting of loan contracts in debt reschedulings, debt-equity swaps, and other changes in original contractual commitments became necessary and helped to share losses after the outcome turned out to be worse than expected by either the lenders or the borrowers.

III. Resolving Information Asymmetries

1. Borrowing and creditor country regulations and policies and innovative financial contracting

Developing countries are initiating institutional and regulatory reforms in their domestic capital markets in order to improve availability of information and to provide greater foreign investor protection against

^{1/} Atkeson (1991), Gertler and Rogoff (1990) and Kletzer (1989) provide a theoretical analysis of the importance of asymmetric information in various aspects of international lending, including the moral hazard problem, the risk of repudiation, and the possibility of contract renegotiation. Grossman and Van Huyck (1988) consider sovereign debt default as a contingent claim resulting from adverse external developments.

^{2/} See Ahmed and Summers (1992).

risks arising from asymmetric information. 1/ Reforms include seeking to improve accounting standards and disclosure requirements comparable to those in sophisticated capital markets in industrial countries. Furthermore, borrowing countries have undertaken actions to remove obstacles to foreign direct investment and other portfolio inflows, thus helping to achieve a better mix between debt and equity finance. This facilitates a balanced provision of incentives for actions by borrowers and more efficient sharing of risks between lenders and borrowers. More important, perseverance with sound and sustainable macroeconomic policy implementation in many developing countries is helping to establish a credible track record that reduces perceptions of the degree of sovereign risk.

The investors' ability to assess price risks related to investing in developing country securities is enhanced in creditor countries through new regulations and through increased dissemination of information regarding borrowers' creditworthiness. 2/ Increased availability of information regarding borrowers' creditworthiness is provided by the private sector in creditor countries. Mechanisms include developing country credit ratings by reputable agencies, the establishment in stock exchanges of developing market sectors that trade developing country equities, the issue of guidelines calling for greater disclosure by lead managers for developing country issues, and the growing availability of financial information through indices tracking price developments in developing country bonds and widely available market reports.

Furthermore, as in domestic financial markets, innovative contractual agreements have been developed also in international financial markets aiming to alleviate risk sharing and incentive problems. They include-- along with complex financial features and enhancement provisions similar to those developed in domestic financial markets 3/--a wide variety of securitization and collateralization techniques which aim to shift part of the risks arising from borrower's actions and from exogenous factors to other parties, and a more direct involvement of export credit agencies and

1/ See Chapter V in Private Market Financing for Developing Countries, IMF, (Washington, December 1993), Chapters IV and V in Private Market Financing for Developing Countries, IMF, (Washington, December 1992), and the report on Developing Country Access to Private Capital Flows, EB/CW/DC/93/2 (March 15, 1993), prepared as background for the spring 1993 meeting of the Development Committee.

2/ See Chapter III in Private Market Financing for Developing Countries, IMF, (Washington, December 1993), and Chapter VIII in International Capital Markets--Developments and Prospects, and Key Policy Issues, Part II-Background Material on Systemic Issues in International Finance, (Washington: IMF, 1993), for details on recent efforts in creditor countries to improve the flow of financial information about developing country securities.

3/ See Chapter III in Private Market Financing for Developing Countries, IMF, (Washington, December 1993).

multilateral agencies in providing guarantees and cofinancing. In addition, particularly for long-term project financing, performance agreements and limited recourse financing structures provide ways of monitoring project implementation and distributing risks among many lenders. However, only some of these techniques address directly the informational asymmetry problems.

Converting loans into securities sold to other investors diversifies default risk among many lenders. However, this innovation falls short in directly addressing risk sharing inefficiencies among lenders and borrowers. In fact, securitization and diversification of lending among many lenders--e.g., many individual bondholders--could exacerbate informational asymmetries compared to the case of a single lender who could have closer relations with the borrower.

Using export revenues as collateral may shield individual borrowers and lenders from foreign exchange, transfer, and sovereign risks. However, a requirement to deposit export revenues in escrow accounts may give rise to macroeconomic problems related to low levels of international reserves and, in particular, debt servicing difficulties for creditors with subordinated claims. By generating these problems, they fail to address incentive and risk sharing problems arising from informational asymmetries.

Provision of guarantees and insurance facilities by export credit agencies encourage financing by reducing commercial and political risks to the lender. ^{1/} However, they could contribute to an inappropriate pricing of risks and to moral hazard problems on the part of the lenders. Under the expectation that they will be bailed out, lenders may engage in riskier financing. Conversely, cofinancing by multilateral agencies could facilitate investment appraisal and provide additional valuable information to lenders.

Including performance agreements in financial contracts helps to resolve the moral hazard problem associated with the actions of individual borrowers. The financing and ownership structure of innovative types of contracts, such as built-operate-transfer contracts provide for better management of capital inflows through direct control by the lender in project development and operation and increase efficiency of investment through technology transfer. In addition, their risk structure aims to separate project risks from country risk by providing finance against the cash flow of the project rather than the government's sovereign guarantee.

^{1/} See Chapter VI in Private Market Financing for Developing Countries, IMF, (Washington, December 1993).

2. Fund's role for improved policies and dissemination of information

International financial institutions, especially the Fund, are in a special position in helping to overcome some impediments to capital flows due to information asymmetries. By facilitating the design and by monitoring solid economic policy implementation in developing countries, the Fund helps to create a macroeconomic environment conducive to the solution of the moral hazard problem in borrower's actions which arises in the presence of asymmetric information between lenders and borrowers. The greater credibility of policy commitments and enhanced sustainability of policies, achieved through Fund conditionality and through program monitoring of Fund lending to sovereign countries, helps to establish an economic environment which enhances private borrowers' incentives.

The role of the Fund has already proven valuable in helping countries to re-enter private capital markets. Table 1 depicts Fund involvement with countries which have regained access to private market financing following a long period during which private external borrowing was essentially absent or limited to concerted bank financing. Market re-entry has occurred along with the adoption and successful implementation by countries of Fund programs. Improved macroeconomic conditions have affected market perceptions and their sustainability contributed to better market borrowing terms.

Mexico and Venezuela regained access to bond and equity markets in 1989, and adopted Fund programs the same year. Argentina and Brazil established strong footholds in the markets in 1991 and 1992 respectively, along with reaching stand-by agreements with the Fund. Chile's successful implementation of a three-year Fund program adopted in 1985 and extended for a fourth year helped the country to regain access to voluntary private financing. The Philippines, which re-entered the bond market in February 1993, has raised small amounts of equity financing since 1990 following a Fund agreement reached in 1989.

Since market re-entry, borrowing terms (reflected by bond yield spreads) have significantly improved for Mexico, Argentina, and Chile, reflecting among other things the sustained implementation of Fund programs. However, yield spreads of Brazilian bond issues which declined during the first half of 1992--following an IMF agreement in January--increased during the second half of year and during 1993 following slippages in policy implementation since June 1992. Yield spreads of bond issues by Venezuela declined during 1989-1991 when sound macroeconomic policies were implemented within the framework of a Fund program. However, following a deterioration in the macroeconomic environment since December 1991, yield spreads started to rise during 1992 and increased significantly in 1993.

Private financial markets have placed considerable importance in the Fund's role in helping countries to implement sustainable macroeconomic programs. Information to the markets about reaching agreement on Fund

Table 1. Capital Market Re-entry and Fund Relations

	Fund Involvement Since 1989	Capital Market Financing ^{1/} (in million of U.S. dollars)					Developments in Market Terms
		1989	1990	1991	1992	1993	
Argentina	SBA approved July 1991, on track during the year. EFF approved March 1992 on track, reviews completed on time.	--	21 (21) (--)	1,151 (795) (356)	1,942 (1,570) (372)	9,026 (6,233) (2,793)	Yield spreads declined during the second half of 1991 and continue to drop in 1992 and 1993.
Brazil	19-month SBA approved January 1992. June 1992 mid-term review not completed. Discussions on a program have been taking place since early 1993.	--	--	1,837 (1,837) (--)	3,788 (3,655) (133)	6,679 (6,679) (--)	Yield spreads declined in first half of 1992, but increased in second half of 1992 and during 1993.
Chile	Three-year EFF approved in 1985, remained on track and extended for a fourth year. Expired in mid-1989. Drawing of first credit tranche 1989-90. Subsequent Article IV consultations with semi-annual visits.	--	98 (--) (98)	200 (200) (--)	249 (120) (129)	704 (4,331) (271)	Low yield spreads in 1991, 1992 sovereign issues. Yield spreads on private sector issues declined during 1993.
Mexico	Three-year EFF approved May 1989, on track during the year. EFF augmented by 40 percent of quota in January 1990, and extended for a fourth year in May 1992 on a precautionary basis.	570 (570) (--)	2,306 (2,306) (--)	7,137 (3,373) (3,764)	8,974 (5,916) (3,058)	12,658 (10,165) (2,493)	Yield spreads declined during 1989-1992 and continued to drop in 1993.
Philippines	Three-year EFF approved May 1989, review completed December 1989. EFF offtrack during 1990, replaced by SBA in February 1991. Delays in completion of reviews and extension of program. SBA expired March 1993. Discussions on a successor are continuing.	--	53 (--) (53)	159 (--) (159)	392 (--) (392)	1,357 (1,293) (64)	Yield spreads declined steadily during 1993.
Venezuela	Three-year EFF approved June 1989, on track during the year. Augmented and extended to March 1993 in December 1990. No review completed since last purchase in December 1991.	263 (263) (--)	262 (262) (--)	578 (578) (--)	1,215 (932) (283)	2,390 (2,348) (42)	Yield spreads declined during 1989-1991, started to rise in 1992 and increased significantly in 1993.

^{1/} Includes international bond and equity issues. Figures for bond and equity issues in first and second parenthesis respectively below totals.

programs and about programs remaining on track have been proven valuable by catalyzing financing to developing countries. In addition, in cases of sudden erosion of confidence due to uncertainties about the continuity of effective domestic policy implementation, Fund arrangements have helped to avoid disruptions in the flow of private market financing. At a time of uncertainty associated with the dissolution of the former Czechoslovakia 1993, the Czech Republic adopted a stand-by arrangement with the Fund which catalyzed private market borrowing on favorable terms.

IV. Conclusions

The analysis of the effects of exogenous uncertainty combined with information asymmetries under alternative forms of financial contracting--debt, portfolio, foreign direct investment--suggests the following necessary measures in order to sustain capital flows: First, the development of institutional mechanisms which could absorb exogenous shocks, e.g., variations in commodity prices, interest rates and fluctuations in global economic activity. Second, the enhancement of investment incentives within a conducive macroeconomic environment which could be achieved through sound economic policies. Third, the improvement of the flow of information by establishing of a set of regulations helping to channel information.

International financial institutions, especially the Fund, are in a unique position through their relations with member countries, in particular through their lending activities, to help overcome impediments in capital flows due to information asymmetries. By facilitating the design and monitoring the implementation of solid economic policies the IFIs contribute to the resolution of problems associated with the overall macroeconomic environment. Furthermore, in the context of their catalytic role they contribute to the sustainability of capital flows by disseminating information.

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