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Monitoring International Borrowers: The IMF's Role in Bank and Bond Markets

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The IMF's Role in Bank and Bond Markets

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Abstract

The International Monetary Fund can help promote capital flows to emerging market economies by providing a public monitoring service and by reducing the likelihood of debtor default and associated costly creditor coordination and restructuring. We contrast the Fund's influence in bank and bond markets. Banks are thought to have a natural advantage in both monitoring and creditor coordination. Consistent with private monitoring, we do find banks lower spreads as they obtain more information through repeated transactions with borrowers; Fund programs are not associated with lower bank spreads. In contrast, repeated borrowing has little influence in bond markets, but spreads are lowered when bonds are issued in association with Fund programs. The Fund's influence in bond markets is observed especially when borrower countries have an external debt exposure that makes them vulnerable to liquidity crises. In this range, a monitoring rather than a lending (and hence creditor coordination) role for the Fund seems salient since the amount of lending has no statistical influence. As insolvency becomes more likely, larger Fund lending helps improve bond market access.

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Introduction

Catalyzing private capital flows to emerging markets has been a stated objective of the International Monetary Fund since the 1990s.[2] By this catalytic role is meant the IMF's ability to encourage capital to flow to countries that might be denied market access in the absence of its intervention. The Fund may achieve this function, first, by monitoring borrowers so as to better enable them to reveal their commitments to pursuing disciplined macroeconomic policies. The Fund, in this characterization, may have no informational advantage over private lenders; instead, the Fund's monitoring would be expected to limit deviations from prudent policies. Second, the Fund's lending could potentially help by, for example, providing bridge finance for creditworthy countries experiencing liquidity crises whose solution cannot be easily coordinated by atomistic lenders. Lending may also help if the additional available resources are seen as improving creditworthiness.

In this paper we are, of course, interested in asking if the Fund has been successful in catalyzing private finance. However, our greater interest is in the more ambitious task of identifying the channels through which the Fund can be catalytic. Is there empirical support for a monitoring role for the Fund? In what circumstances has the Fund's lending capability been most relevant for attracting new private capital?

To answer these questions, this paper studies the impact of IMF programs on market access and the cost of funds. To highlight the role of IMF monitoring, we pursue three perspectives. First, if banks, as "delegated monitors," are already engaged in substantial monitoring as a part of their normal operations, then IMF monitoring should have a more limited catalytic capacity in bank as opposed to bond lending. Indeed, if the

[2] See for example IMF (1999).

Fund monitoring role eliminates the advantage of conventional bank monitoring, then an IMF program may even render worse the terms of bank lending.

Second, we ask if the state of a country's external solvency has a bearing on the Fund's effectiveness. Reinhart, Rogoff, and Savastano (2003) have recently proposed that vulnerability to external debt grows non-linearly above a threshold "debt intolerance" level. As that vulnerability increases, we examine if Fund monitoring can continue to be sufficient for allaying the concerns of private lenders or whether private capital flows are particularly sensitive to the magnitude of IMF financial commitments when solvency risk is substantial. For this purpose, we distinguish between a range of external debt where the country may be vulnerable to liquidity shocks that could spiral it into insolvency and an even higher exposure to external debt where insolvency is likely to be perceived by markets as more imminent.

Finally, "precautionary" IMF programs are a mechanism through which countries primarily commit to prudent policies while placing the Fund's lending in a secondary role. Under these programs, the borrowing country volunteers to not draw on Fund resources although, should the need arise, the financial support becomes available. Precautionary programs can, therefore, further distinguish the monitoring from lending roles of the Fund.

Our empirical analysis is based on over 6,700 loan transactions between emerging market borrowers and international bank syndicates and some 3,500 new bond issues between 1991 and 2002. We examine the determinants of the frequency of transactions and also of the initial spread charged on the credit. Explanatory variables include high frequency measures of global conditions as well as country and issuer credit quality

measures. Included among our explanatory variables is a measure of repeat borrowing, which we use as a proxy for private monitoring. The presence of an IMF program is represented by a dummy variable and the size of IMF lending is normalized by the country's debt level. Because we analyze individual transactions, our findings are less subject to the concern of causality running from the transactional outcome to the country decision to initiate an IMF-supported program. High-frequency transaction-level data also allow us to capture the timing of programs more precisely than is possible in aggregate studies using annual data to analyze the influence of IMF programs.

We begin our analysis with the premise that international credit markets are segmented—a premise for which we provide empirical support. Thus, given asymmetry of information between borrowers and lenders, different borrower-lender pairs find it efficient to transact primarily through either bank and bond markets. Important differences between the two forms of lending have been documented in the domestic context. [3] Relevant for our purpose are two, possibly related, advantages of banks. First, banks act as "delegated monitors" on behalf of depositors who do not have the capacity to observe and discipline the ultimate borrowers (Diamond 1984). The information they thus acquire can be used to place limits on the use of funds and to price the loans. In contrast, dispersed bondholders lack the capacity and incentive to incur the considerable

[3] This difference between bank and capital markets has been well documented in the domestic US context (see, for example, Fama 1985 and James 1987). On the other hand, securitized debt instruments are generally thought to have superior risk-sharing characteristics. Credit risk can be diversified away to a considerable extent by spreading individual loans across a substantial number of investors and enabling those investors to hold diversified portfolios of loans. Banks cannot engage in this practice to the same extent without eroding their capacity to make sunk costs in dedicated monitoring technologies. This tradeoff is a way of understanding why lending takes place through both bank loans and bond markets. Banks are also thought to have a coordination advantage that helps in debt renegotiations and in limiting the possibility of liquidity crises where strategic uncertainty exists with regard to the behavior of other creditors. These coordination benefits arise on account of the smaller numbers of players, the relationships that develop among the members of long-lived loan syndicates, and contractual arrangements such as sharing clauses that provide incentives for cooperative behavior in the event of debt renegotiation and restructuring.

costs of attempting to secure private information about borrowers. Instead, public information—that assembled by credit rating agencies, for example—provides much of the basis for assessing risks and pricing the securities. Second, banks can better coordinate to deal with default and subsequent restructuring because typically substantially fewer creditors are involved and, moreover, contractual arrangements, such as syndicated lending and sharing clauses, reduce the incentives for individual creditors to hold out. Better creditor coordination by banks may reinforce their incentives to monitor their borrowers, implying that banks need not have information that is significantly different from that available to bond markets but may use the available information differently.

In an earlier paper concerned with international bank lending (Eichengreen and Mody 1998), two of us found that spreads on syndicated bank loans fell with the number of repeated loans to a particular borrower. An interpretation is that repeat borrowing is a channel for information about borrower characteristics, such that repeat interaction reduces uncertainty and in turn lowers the risk premium charged to that borrower. That paper did not, however, also consider the role of repeat borrowing in bond markets. Our hypothesis is that evidence of this effect should be weaker there.

Tirole (2002) has argued that the IMF can also act as a monitor in international capital markets. Such monitoring, he suggests, can reduce policy uncertainty and, hence, the uncertainty of repayment of private debts, thereby improving the market access of public and private borrowers. But this leaves open the question of, if banks already act as monitors, whether IMF monitoring can add value in the banking segment of the

international capital market. Thus, the comparison of bank loans and bonds suggests a test of the existence of the IMF's public monitoring role.

By putting a program in place, the Fund could acquire a better information-gathering technology than the private sector, which, in turn, would allow it to signal valuable information. However, the Fund may have an important informational role even when it does not have superior information. An IMF program may not principally be a device for the Fund to signal but could still be a useful way for a government to signal its type.[4] In this view, IMF monitoring works because the program is a mechanism by which the government commits to and reveals policies and intentions. This would be particularly so when governments ask or convert an existing lending arrangement to a precautionary program.[5] Such monitoring should be particularly important in bond markets, which are not inhabited by a small number of large investors ("banks") prepared to individually invest in ascertaining the government's type. At the same time, IMF lending, by reducing the probability of default, could nullify the creditor coordination advantage of banks.

Empirically, we find that repeat borrowing plays a more important role in reducing costs of borrowing in international bank lending than in international bond markets. In contrast, public monitoring through IMF programs is more important in reducing spreads in markets dominated by bonds than bank loans.

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[4] Bordo, Mody, and Oomes (2004) have argued that the IMF's monitoring role does not imply that the Fund has better information than the market. As such, the Fund adds value not through the mere signaling of new information. Rather, the Fund can monitor commitment to a policy program (see also Mody and Saravia 2003). In practice it is difficult to distinguish if it is content of the program or the monitoring that is relevant. However, because we do observe that programs (with widely varying conditionality) reduce bond interest rate spreads, it is possible to argue that the monitoring that accompanies the core conditionality in all IMF programs helps creditors gain confidence in the likelihood of reduced policy variability.

[5] For a more extended discussion of the channels through which IMF programs can influence international capital flows, see Cottarelli and Giannini (2002) and Bordo, Mody, and Oomes (2004).

In addition, we find that the IMF's presence and lending carry different weights for countries in different situations. In countries with serious problems of solvency even at very low debt ratios, neither IMF presence nor IMF lending enhance market access; such countries have deep structural problems that must be resolved before IMF intervention can catalyze private capital flows. For countries with external debt/GDP ratios in the 30 to 55 per cent range, it is the IMF's presence, as distinct from its lending, that appears to matter most, especially in the case of access to the bond market, a result that we interpret as consistent with monitoring/signaling arguments. IMF presence continues to lower spreads but at a diminishing rate as the debt ratio approaches 70 percent; in addition, in this high debt range, more IMF lending reduces spreads and improves market access, as if private capital flows are effectively catalyzed by the IMF's provision of credit to countries plausibly at risk of solvency crises. Finally, programs that turn precautionary, that is, those where the country voluntarily stops drawing on IMF resources, are associated with lower borrowing costs particularly in bond markets for countries in the intermediate debt range.

The rest of this paper is organized as follows. We begin, in the next section, with an eclectic overview of theoretical considerations the international debt contracts and liquidity crises literatures. The next two sections provide evidence of segmentation of bank and bond market lending. The description of the data highlights the higher frequency of bond issuance relative to international loans when countries were under IMF programs. To complement these "unconditional" findings, we report a more formal multinomial logit analysis of the choice between loans, bonds, and no international borrowing, which confirms that IMF programs facilitate more bond issuance than bank

borrowing while also suggesting that the ability to borrow from banks is less influenced by short-term developments in financial markets but is more sensitive to the borrower's credit quality. We then report the results on the pricing of loans and bonds, noting the importance of private monitoring in bank lending and of public monitoring (through IMF programs) in bond markets.

Theoretical Considerations

Our theoretical discussion of the impact of IMF programs on bond and syndicated bank loan terms combines the analysis of sovereign debt default and renegotiation and liquidity crises to highlight the IMF's borrower monitoring and creditor coordinating roles. Lenders and borrowers take account of the risk of default and subsequent debt restructurings when agreeing to the terms of debt contracts (Eaton and Gersovitz 1981, Bulow and Rogoff 1989, Kletzer and Wright 2000). Changes in this risk will be reflected in the interest spreads on debt and the issuance of debt in our empirical analysis. Our discussion is also informed by Tirole's (2002) exposition of dual and common agency problems in the context of international financial contracts. The government becomes an agent even when the contract is between a private borrower and lender, because government actions have a strong bearing on the private debtor's ability to repay. Sovereign risk can apply to private debt issues in emerging markets through explicit or implicit government guarantees or debtors' rights to appeal to domestic legal protection. We assume that the overall envelop of resources and government policies determine the ability and willingness of the government and private creditors to repay their debt.[6] Tirole (2002) further argues that the dual agency is converted, de facto, into common

[6] Even if a private borrower derives no protection from its home government's sovereignty, the analytics apply to any debtor that faces bounded penalties for defaulting.

agency, where, in effect, the sovereign becomes a common agent of many principals (different creditors).

The basic logic of our argument can be summarized as follows. First, country fundamentals and government policies determine the ability and willingness of the government and private creditors to repay their debt. This implies that when a country has a low level of external debt, an initial increase in debt may not hurt and may even be a healthy sign (as suggested, for example, by Pattillo, et. al 2003), but beyond a debt threshold access to international credit market weakens and spreads paid on new borrowing rise. Second, to mitigate information asymmetries, hence reduce uncertainty and risk premia, borrower-lender pairs sort themselves into different markets allowing for different types of monitoring. Monitoring, empirically represented in the analysis below as repeated borrowing, lowers spreads for bank borrowers but not for bond issuers. In contrast to private monitoring by banks, IMF programs reveal and provide confidence in debtor government policies and hence reduce the common agency problem. Banks have a comparative advantage in creditor coordination in the context of debt renegotiations and to limit strategic uncertainty that causes liquidity crises. IMF presence can offset this advantage but the empirical results are less supportive of this channel of influence.

We begin with a simple framework in which the debtor's resources are stochastic and all debt claims have the same maturity and priority for repayment. The debtor is willing to repay a maximal amount, V(y), in expected present value in equilibrium. The debtor's willingness to pay, V(y), is the value of repaying for the debtor in a forward-looking equilibrium that takes account of opportunities to renegotiate debt in the future. The function V(y) is increasing in the fundamental, y. For strong fundamentals, y, or low

debt levels, V(y) exceeds D, the debtor will repay. If, however, the outstanding debt, D, exceeds V(y), then the debtor is unwilling to meet its obligations as contracted and will seek to renegotiate debt repayments.

When borrowing and repayment are repeated over time, the debtor's willingness to pay can be written as

$$V(y_t) = w(y_t) + \frac{1}{1+r} E_t V_{t+1}, \tag{1}$$

where $w(y_t)$ indicates the debtor's equilibrium willingness to service debt today. In common parlance, $w(y_t)$ will be the debtor's liquid resources and V_{t+1} will measure solvency. Under perfect information, current debt service obligations that cannot be met by the debtor ($D_t > V(y_t)$) will be rolled over into new loans while debts that will not be repaid in present value will be renegotiated.

The expected net returns to creditors are given by

$$ER_t = E(V_t : V(y_t) \le D_t)\Pr(V(y_t) \le D_t) + D_t \Pr(V(y_t) > D_t) - (1+r)D_t, \tag{2}$$

where the opportunity return in alternative investments for lenders equals r. The interest rate spread, reflecting the risk premium, will be the difference between ER_t / D_t and (1+r). This spread is increasing with the debt level if the probability that $V(y_t)$ is less than D_t is positive. When the debt level is low, this probability can be zero so that the risk spread does not rise with the debt. As the level of indebtedness increases, the probability of default rises and so does the risk premium. Therefore, as the debt to GDP ratio rises, models of debt renegotiation with perfect information imply that the interest spread should not increase for low debt to GDP ratios and then rise at an increasing rate after the debt to GDP ratio passes a threshold. This is corroborated in our data.

To motivate the role of monitoring, the next step is to introduce information asymmetries into this simple framework. First, the debtor's willingness to pay is known by others with uncertainty. Suppose that lenders only know the distribution of the debtor's willingness to pay, $V(y_t)$, within an interval, $\left[\underline{V}(y_t), \overline{V}(y_t)\right]$. For simplicity, the distribution can be taken as uniform around a mean equal to $V(y_t)$. The debtor can offer repayments, $\hat{V}(y_t)$, less than its true willingness to repay. Consistent with standard analyses of this agency problem, the equilibrium renegotiation offer accepted by lenders will yield repayments $\hat{V}(y_t) = \underline{V}(y_t)$ when the debtor's willingness to pay equals $\underline{V}(y_t)$. For other realizations of $V(y_t)$, the debtor will pay less and realize a surplus given by $V(y_t) - \hat{V}(y_t)$. Because repayments, $\hat{V}(y_t)$, are typically less than the true capacity to repay, $V(y_t)$, the probability of default is higher—and creditor's expected returns are lower—with asymmetric information than under perfect information.

Thus, lenders' expected returns to lending will rise where monitoring helps them become better informed (less uncertain) about the debtor's future fundamentals. If lenders learn about the characteristics of borrowers from repeated lending, then as their ability to monitor the actions and circumstances of the borrower improves, interest spreads should fall. Similarly, if the IMF has an advantage monitoring the policy actions of the debtor, then an IMF program should lower interest spreads and increase debt issuance for a debtor facing a positive probability of debt renegotiation.

Differences between the impact of repeated lending and IMF programs on bank loan and bond spreads arise in our empirical analysis. One possible explanation is that bank lenders and bondholders have different monitoring abilities and, hence, in

equilibrium, banks and bond markets may lend to different market segments. Banks may cater more to smaller, more diverse borrowers, consistent with better monitoring technology, while bond markets focus on better known borrowers (see, for example, Petersen and Rajan 1994, 1995 for US evidence). The private information revealed by individual borrowers to their bank lenders would then make more precise the capacity of those borrowers to repay debt. If bankers have a monitoring advantage over bondholders, an improvement in public information, for example revealed by an IMF program, could reduce or remove that informational advantage, lowering bond spreads and raising bond issuance relative to bank loans.

We interpret an IMF program as revealing private information of the country willingness to pay or of country policies. This does not necessarily mean that the IMF has superior abilities to collect or interpret data but can instead mean that the IMF is able to commit the country's actions in a manner that supports policy reforms and, thereby, allow the country to better reveal its intentions.[7] For example, IMF programs sometimes turn precautionary, that is, borrowing stops but the sovereign authorities continue to pay a commitment fee that allows them the right to resume borrowing. In turning a program precautionary, the debtor country government reveals to private creditors.a diminished need for the Fund's financial support but a continuing commitment to prudent policies. The good news should be reflected in lower bond and bank loan spreads if IMF programs play an informational role.

We next consider how coordination difficulties in the context of debt restructuring can give rise to differences between creditors. The ability of syndicated bank lenders to cooperate in renegotiations can give banks a strategic advantage over bondholders.

[7] Marchesi and Thomas 1999 offer a model in which Fund conditionality serve as a screening device.

Equation (1) separates current willingness to pay into the sum of current resources available for repayment, $w(y_t)$, and discounted expected future willingness to pay. If coordination failures hamper bondholders from restructuring debts as quickly as banks, banks can move first although all creditors have identical information and observe that the debt is unsustainable,

$$D_t = B_t + L_t > w(y_t) + \frac{1}{1+r} E_t V_{t+1}, \tag{3}$$

where B_t and L_t are outstanding bond and bank debt, respectively. Banks can reschedule their loans and avoid immediate default by reducing the total repayments currently due while increasing future repayments by rolling over the loans at a higher interest spread. Subsequent renegotiations in default incorporating equal sharing between bondholders and bank lenders will divide total settlements between banks and bondholders on the basis of the new bank share in the accumulated debt. For example, let the banks reschedule an amount ΔL_t of current debt repayments so that

$$w(y_t) = r^b B_t + r^l L_t - \Delta L_t, \tag{4}$$

where $r^b B_t$ and $r^l L_t$ are the interest payments due for bonds and loans, respectively. The banks then increase loans in period t+1, L_{t+1}, by an amount $r'\Delta L_t$. The bank share of future repayments increases to

$$\left(\frac{L_{t+1} + \Delta L_t}{B_{t+1} + L_{t+1} + \Delta L_t} \right) V_{t+1}. \tag{5}$$

The increase in the value of the bank claims comes out the expected returns to bondholders in the event that current total debt is unsustainable. The interest rate r' can be chosen to maximize the increase in expected returns,

$$(6) \qquad E_t\left(\frac{B_{t+1}\Delta L_t}{(B_{t+1}+L_{t+1}+\Delta L_t)(B_{t+1}+L_{t+1})}V_{t+1}\right)-(1+r)\Delta L_t .$$

If bank syndicates can reschedule a sufficient share of their debt, the banks can eliminate their current expected loss at the expense of bondholders. This strategic advantage for banks contrasts with a simple principal-agent model in which improved monitoring by banks would raise the probability of repayment and returns to all of a sovereign debtor's creditors.

Banks' strategic, or first-mover, advantage could, moreover, reinforce its incentives to use monitoring information available, for example, through repeated borrowing, more so than is the case for bondholders who are not nimble enough to respond to events of debt default. The banks' advantage, however, can be reduced or eliminated by the presence of a more senior official sector creditor. It can also be reduced by availability of financial support under an IMF program if such funding reduces the risk of renegotiation.

Thus, absent differences in bank and bond markets, the basic model of sovereign debt renegotiation with asymmetric information would imply that IMF monitoring and financial resources would lead to equivalent reductions in bond and bank loan interest spreads and rises in lending.[8] Similarly, if IMF conditionality improves fundamentals and growth prospects, then both bond and bank lending should improve.[9] However, if banks have a monitoring advantage over bondholders and can better manage creditor coordination and debt restructuring problems, then the need for an IMF program would

[8] Gai and Vause 2003 present a model in which the IMF acts as a delegated monitor motivated by private creditor coordination failures. Our emphasis on asymmetric private abilities to coordinate is very different.
[9] It should be possible to model the IMF as endogenously gaining a monitoring advantage through its ability to commit to lend only in a crisis in a repeated game. The approach of self-enforcing equilibrium taken by Kletzer and Wright (2000) in the sovereign debt context could be used to model de facto IMF seniority and why countries might meet IMF conditionality.

be less in bank lending. IMF monitoring that better reveals true debtor characteristics and lending that reduces the likelihood of default will redress the bondholders' disadvantage.

Lastly, we consider the role of liquidity crises by adapting the model of Morris and Shin (2003).[10] In their model, the fundamental has a distribution that is public knowledge but each lender in a continuum receives a privately observed noisy signal of its realization in the current period. They also distinguish between debt that amortizes in the current period (short-term debt) and the debt service on all outstanding debt. Private information in this setting generates coordination failures and allows liquidity crises to arise even though debt is sustainable.

We reinterpret their model by differentiating between bank and bond lenders, where banks coordinate while bond investors do not. If $V(y_t)$ exceeds the total debt but the debtor country's current liquid resources fall short of current debt amortization and net interest due, then a liquidity crisis is possible. Bond investors, facing uncertainty about the actions of other bondholders, do not reenter the market by purchasing new bond issues to replace amortizing bond debt if debtor liquidity falls below a critical level.[11] The incipient crisis, however, may be prevented if bank syndicates replace the retiring bond debt with an expansion in bank lending. Banks may be able to do so because they can coordinate among themselves.

Suppose that banks observe two things, a private signal drawn from the same distribution as those of bond investors and the failure of the debtor to launch new bond issues. The banks face strategic uncertainty about bond investors' actions but not about

[10] Similar models by Rochet and Vives (2001) and Corsetti, Dasgupta, Morris and Shin (2001) also take a global games approach to catalytic finance. Chui, Gai and Haldane (2002) also discuss the policy implications of sovereign liquidity crises.

[11] Morris and Shin (2003) detail the determination of the critical level of liquidity. For our interpretation, we leave out additive debtor effort in their model.

their own actions. Banks can stop an incipient liquidity-driven crisis by replacing bond borrowing one for one with additional bank loans. Banks can move after bond investors choose to exit and have an incentive to do so to avoid unnecessary defaults on their long-term loans. In this interpretation, liquidity crisis models imply that bank and bond lending should be negatively correlated if all crises are caused by illiquidity.

Two empirical implications follow for our analysis. First, an adverse turn in market liquidity or increased market uncertainty that reduces bond lending can be mitigated by the presence of bank lending. Second, the IMF, as a lender in a liquidity crunch, can also prevent costly debt default and renegotiation.[12] In our interpretation of the Morris and Shin model, we assume that potential bond purchasers are equally uninformed about what banks will do as they are about what other bond investors will do. The banks move on the basis of their private information and the reluctance of bond investors to enter again. Both bond investors and banks, however, should anticipate the IMF's strategy when a program is in place. In the case of this difference in the knowledge of bond investors, the presence of the IMF program should raise bond issuance relative to bank lending for countries susceptible to liquidity-driven crises. We examine this proposition empirically by identifying countries in an intermediate external debt range as most susceptible to liquidity-driven crises.

Bank and Bond Borrowing: Trends and Associations with IMF programs

Though lending to the then emerging markets through bond markets was prominent in the late 19th and early 20th centuries, bond lending declined sharply and in the 1960s through the 1980s, private credit flows to developing and emerging economies

[12] Jeanne (2001) among others discusses the lender of last resort role of the IMF.

were mainly through banks. As Edwards (1986) notes, in the 1970s and 1980s, the size of bond lending was about 10 percent of bank lending. That changed after the debt crises of the 1980s. Banks became more conservative in their lending and bond markets grew to match flows through banks. Between 1991 and 2002, credit through banks and bonds was of about the same order of magnitude, just under $700 billion through each channel (Table 1).[13]

Important distinctions between bank and bond lending, however, continued into the 1990s and beyond. Bank loans more numerous and hence smaller. Between 1991 and 2002, Loanware reports 6747 Libor-based syndicated loan transactions; during the same period, Bondware reports the issuance of just over 3700 bonds (of which spreads are available for about 3500). On average, a bond transaction was about 70 percent larger than a loan transaction.

Bank loans were not only smaller, they were more episodic. We constructed a measure of repeated borrowing (R), separately for bank and bond borrowing. Starting on January 1, 1991, the measure takes the value 1 the first time the borrower enters into an international debt contract. Thereafter, each subsequent borrowing increases the value of R by one. Repeated borrowing is more frequent in the bond market, where the median number of borrowings over the period 1991 to 2002 is 3 (the 75th percentile is 8 and the 90th percentile is 27); for banks, the median is 2 (the 75th percentile is 4 and the 90th percentile is 8). Thus, it appears that banks, consistent with their role as delegated monitors, allow a diverse set of borrowers to episodically enter international credit

[13] While we include all bonds issued in our analysis, we restrict the sample of loans to those that were priced on the basis of Libor. These form the vast majority of international syndicated loans, both in terms of numbers and in the amount borrowed. By limiting the loans to those priced off Libor, we be believe that more precise estimates of loan pricing become possible.

markets. In contrast, bond market appears to favor borrowers with relatively high name recognition, who return frequently. The presumption underlying the construction of this variable is that as the number of repeated borrowings increases, more information is made available, reducing uncertainty about the borrower and, hence, the risk premium charged.

Finally, relative to bank loans, bonds were more likely to be issued when the issuing country was under an IMF-supported program. About 22 percent of all loans were contracted when the country had an IMF program in place (Table 2). In contrast, just over one-third of bonds were issued during an IMF program. Alternatively, when countries were in an IMF program, they were about as likely to borrow through a loan or a bond. However, when there was no IMF program, a loan was more than twice as likely. Thus, IMF programs appear to have shifted international borrowing in favor of bonds.

However, the shift towards bonds under IMF programs did not occur uniformly across countries and country conditions appeared to matter. In this paper, we use the external debt position of the country as a summary measure of its external vulnerability. Reinhart, Rogoff, and Savastano (2004) have argued that markets become "intolerant" of country debt at relatively low thresholds. Thus, as countries approach external debt of about 30 percent to GDP, the likelihood of unsustainable debt default rises rapidly. The question of policy interest is whether IMF monitoring helps as countries cross this threshold and, if it does, whether the benefit is more likely to accrue in bond or bank markets.

Table 2 shows that countries with low external debt to GDP ratios, ratios below 30 percent, had few loan or bond transactions while under IMF programs. Indeed, when

countries with low debt had an IMF program, they were more likely to not borrow at all than borrow through either loans or bonds. In contrast, when countries were in a medium debt range, with debt ratios between 30 and 55 percent, they appeared to be under pressure to access international funds, but especially through bonds. Thus, it is in this middle range that IMF programs were most likely to facilitate international bond issuance. When external debt was above 55 percent of GDP, the propensity to borrow internationally fell once more and the difference between loans and bonds narrowed.

Choice of Borrowing through Loans and Bonds

Our core data is obtained from Loanware and Bondware, commercial data sources that record all international lending transactions. For each transaction, among several characteristics reported are the initial pricing of the loan or bond, its expected maturity, amount of borrowing, and currency of denomination. Borrowers are also distinguished in various ways, including by economic activity and, in particular, by three broad categories: sovereign, non-sovereign but belonging to the public sector, or from the private sector. We use the distinction between borrowers to also construct an estimate of the numbers that did not borrow. Thus, for a given country in a given quarter, the absence of borrowing by the sovereign implied that the sovereign had either forgone the opportunity to borrow or had not had access to international funds. Similarly, we identify country-quarters where no public (non-sovereign) and private borrowing occurred.

In this section, we present a more formal analysis or the choice to borrow internationally or not and the further choice of borrowing through bank loans or bonds. Table 3 presents results from a multinomial logit regression, with no borrowing by a

borrower type (sovereign, non-sovereign/public, or private) in a particular country-quarter as base, or the omitted choice. The explanatory variables are of three kinds: issuer characteristics (in this regression, the borrower type, with sovereign as the omitted category), global variables (US growth, the swap rate, and EMBI volatility), and several country variables. Definitions of variables and their sources are in the data appendix.

Before focusing on IMF programs, notice, first, some general findings. Among "global" variables, US industrial growth appears to stimulate international borrowing, especially by borrowers who are above the debt/GDP threshold of 30 percent, as if for such borrowers US (and hence world growth) acts as a collateral that supports additional borrowing. Differentiating between bank and bond markets are two financial market variables. The swap rate is the spread paid by high credit quality corporate borrowers in the United States and this rate is thought to summarize market liquidity conditions and the state of risk aversion. A higher swap rate reduces the likelihood of borrowing but mainly from international bond markets. Even more decisively, higher volatility of J.P. Morgan's Emerging Market Bond Index, reflecting greater uncertainty in the pricing of bonds, sharply lowers new bond issuance; and while higher volatility, on average, also reduces the number of bank loans, that effect is statistically insignificant. A test of the hypothesis that the coefficients on EMBI volatility are equal for bank loans and bonds is rejected at least at the 2 percent confidence level for all three debt groups. Thus, it appears that bank lending is less influenced by short-term developments in financial markets, consistent with bank decisions based on direct monitoring of their clients. This finding is also consistent with our interpretation of the Morris and Shin (2000) liquidity crisis model where short-run liquidity concerns and financial market disorder are more

likely to generate strategic uncertainty among bondholders, who may then withdraw to the sidelines on the fear that others are doing so; banks, who are better able to coordinate among themselves, may continue to lend.

Improved country credit quality (proxied here by the *Institutional Investor's* credit rating, from a low of zero to a maximum of 100) allows for more borrowing, both in the form of loans and bonds. The importance of the overall credit rating increases, the higher is the external debt-range in which the country finds itself. For the two lower debt categories, the number of bank loans respond more to improved credit rating than do the number of bonds, while for the highest category, the effect on loans and bonds is statistically indistinguishable. While credit rating influences the willingness of lenders to lend, the country's demand for foreign exchange determines how much it wishes to borrow. Thus, a higher debt service/exports ratio increases current demand for external resources and, hence, raises the likelihood of international borrowing; however, the ability to borrow in response to larger current needs diminishes as the country's external debt levels rise. Similarly, larger foreign exchange reserves (especially in relation to short-term debt) reduce the propensity to borrow, more so for bonds than for loans.

IMF programs have limited influence on international borrowing when countries have low debt levels. Table 2, discussed above, showed that very few borrowing transactions occur when countries in the low debt range also have an IMF program. Possibly, some factors not identified here cause countries to seek IMF assistance but those factors also reduce the ability to borrow abroad, with the IMF program thus providing no additional value in terms of market access. In contrast, in the medium debt range, IMF programs are associated with increased borrowing, especially from the bond

market. A test of the equality of coefficients on the IMF program dummy for banks and bonds shows the coefficient for bonds to be larger than that for bank loans at the 1 percent significance level. For high debt levels, IMF programs continue to induce more borrowing, though there is no statistically significant difference now between bonds and loans. Thus, as the descriptive statistics in Table 2 suggested, an IMF program is associated with greater market access, especially for potential bond issuers and especially for those bond issuers who have crossed the threshold identified by Reinhart, Rogoff, and Savastano (2004) into the medium debt category.

We also considered Fund programs that were of a precautionary nature. Here, two types of programs need to be distinguished. Programs are designated as *precautionary at outset* when country authorities declare that they do not intend to draw on resources made available; this declaration, however, is not binding. For such programs, the clear evidence is that international borrowing is reduced, through both loans and bonds, with no statistical difference between the two forms of borrowing. Thus, it would appear that countries that choose to approach the Fund for precautionary reasons also tend to behave conservatively in their borrowing from private bank and bond markets. Programs are deemed to have *turned precautionary* when a Fund member stops drawing on resources available through a program but continues to pay the commitment fee to retain access to Fund resources rather than canceling the program. Such programs are associated with somewhat greater international borrowing.

Pricing of Loans and Bonds

This brings us to the pricing of loans and bonds and the role played by IMF programs in this context. The transactional data used reduce the severity of the traditional reverse-causality problem—that is, the possibility that observed outcomes influence the likelihood of Fund programs. To analyze pricing, we use an empirical model developed by Eichengreen and Mody (2000, 2001) and extended by Mody and Saravia (2003) to jointly evaluate the determinants of issuance and the initial spreads charged. The spreads equation is a linear relationship:

$$\log (\text{spread}) = \beta X + u_1 \qquad (1)$$

where the dependent variable is the logarithm of the spread; X is a vector of issue, issuer, and period characteristics; and u_1 is a random error. The X vector contains a dummy variable for an IMF program, other program characteristics, and also interactions between the program and country characteristics, as we discuss below in detail. Since the spread will be observed only when the decision to borrow and lend is made, we correct for this sample selection problem. Assume that spreads are observed when a latent variable B crosses a threshold B' defined by:

$$B' = \gamma Z + u_2 \qquad (2)$$

where Z is the vector of variables that determines the desire of borrowers to borrow and the willingness of lenders to lend (and will also contain the IMF program variables and their interactions), and u_2 is a second error term. We further assume that: $u_1 \sim N(0,\sigma)$, $u_2 \sim N(0,1)$, *and corr* $(u_1, u_2) = \rho$. This is a sample selection model à la Heckman (1979) and equations (1) and (2) can be estimated simultaneously by a maximum likelihood procedure. Estimating the determinants of market access requires information on those

who did not issue bonds. As noted above, for each country we consider three categories of issuers: sovereign, (other) public, and private. For each quarter and country where one of these issuers did not come to the market, we record a zero, and where they did we record a one.[14]

We use our measure of repeated borrowing (R) to proxy for private monitoring. It is likely that the additional information declines as R increases; indeed, since R is, in practice, highly correlated with the number of debt obligations outstanding, a larger value of R may also be associated with concerns about coordination of restructuring of the various obligations if a default were to occur. For this reason, in the regressions, we use the log of R as the variable of interest (the log of R also has a distribution that is much closer to normal than the distribution of R, which is highly skewed).

In Table 4, we present our results on the pricing of loans and bonds. Throughout we present allow all coefficients—not just the variables of immediate interest, R and the IMF program dummy—to vary by debt category. The IMF dummy appears in both the selection and spreads equations but R appears only in the spreads equation (and not in the selection equation, since for those who did not borrow are not identified). Other variables in the selection equation are the "global" and country variables, as in Table 3. In addition, transaction-specific variables, such as maturity and amount of the credit transaction (shown in the results presented) and dummy variables for currency of issue and production sector of issuer (not shown to conserve space) are also included in the spreads equation. For details of variables and their sources, see the data appendix.

[14] Leung and Yu (1996) note that the estimation does not require the variables in the selection equation and the spread equation to be different but rather the variables not be concentrated in a small range and truncated observations (no bond issuance) should not dominate the set of observations. We do include in the selection equation (the probit), the ratio of debt service to exports, which appears to influence the issuance decision but not the determination of spreads.

Some general results are worth noting.[15] US industrial growth is associated with lower spreads, especially in bond markets, where growth also a significantly raises the likelihood of bond issuance. Thus, in periods of high US growth, better prospects of world growth and export opportunities act as collateral, reducing the risk of emerging market bonds. Working in the opposite direction, a rise in the swap rate, lowers the frequency of borrowing of loans and, even more so, of bonds while raising spreads. EMBI volatility appears to hurt issuance more than spreads. Improved credit rating increases the probability of issuance, while lowering spreads: note, though that the sensitivity of spreads to credit rating is smaller in bank lending than in bond markets, as if the public credit rating information while relevant to access in both markets conveys less information for pricing of individual bank lending transactions. After controlling for credit rating, higher external debt relative to GDP hurts once countries cross the 30 percent threshold. Higher GDP growth, on the other hand, typically increases the frequency of borrowing and always significantly reduces spreads.

Our main result—one we believe is new in the literature—is that repeated borrowing reduce spreads mainly for syndicated loans while IMF programs are more likely to reduce spreads in bond markets. Thus, for each of the three debt categories, the coefficient on the log of repeated bank borrowing is negative and highly significant and, moreover, is substantially larger than the corresponding coefficient for bond markets. For bond markets, only low-debt issuers appear to gain from repeated borrowing.

In contrast, on average, IMF programs play a more important role in reducing spreads and increasing access in the bond rather than in the loan market. In the low-debt

[15] For a more extended discussion of the joint interpretation of the selection and spreads equation, see Eichengreen and Mody (2000).

range, for loans and bonds, as noted in Table 2, very few borrowings are associated with IMF programs. This is consistent with the presumption that borrowers with such low debt would not normally need the IMF. However, the few who do need an IMF program appear to have unobserved characteristics that raise—rather than lower—their spreads, with the rise in spreads much larger for banks rather than for bonds.[16] In the medium-debt category, IMF programs induce more loans but spreads on these loans are also raised, as if the comfort of the IMF loan generates greater access, but the informational/creditor coordination advantage of banks is negated, leading to a general rise in spreads. In contrast, for bonds issuance by countries in the medium-debt category is sharply raised under an IMF program and, at the same time, spreads fall (though the spread coefficient is significant mainly only at the 10 percent level). Finally, spreads decline in the high debt category is larger for bonds than for loans.

Thus, it appears that repeated transactions have an economically and statistically significant effect mainly in the syndicated loan market while IMF programs help improve the terms of access to a greater extent for bonds than for loans. In the rest of this section, we explore these differences to further interpret this principal result.

We first examine if the results presented so far are conditioned by the cut-off points we have imposed on the debt/GDP ratio. In Table 5, we report results for overlapping debt/GDP ratios, starting with the 25 to 45 percent range and then increasing the end by points by 5 percentage points for 9 intervals, ending with the 65 to 85 percent range. We exclude here the very low and very high ends of debt/GDP, where the likelihood of outliers driving the results is likely to be high (thus, for example, some of

[16] It could also be that for these countries with low likelihood of Fund programs, presence of the Fund sends a signal of trouble.

the transition countries had very low levels of debt in the mid-1990s, which may not have been an accurate reflection of their external obligations). Panel A, for loans, confirms strongly the value of repeated borrowing, which is highly significant in all the 9 intervals. The result suggests that this value rises till debt reaches about the 70 percent to GDP range, before falling somewhat. Panel A also confirms that IMF programs do not lower spreads significantly in any segment—and are apparently associated with higher spreads till about debt/GDP of 50 percent. IMF programs are, however, associated with a higher frequency of borrowing from banks.

Panel B of Table 5, shows once again that repeated borrowing has limited value in the bond market and may even raise spreads where several outstanding bonds raise coordination concerns. The contrasting importance of IMF programs is also evident. At the low end of the debt/GDP range, the effect on lowering spreads is small, but it rises rapidly till the debt/GDP range reaches 45 to 65 percent. Beyond that, the influence of IMF programs on spreads falls sharply. IMF programs are also associated with more bonds, with the effect declining as external indebtedness increases. These results support those obtained by Mody and Saravia (2003).

In Table 6, we examine the influence of IMF lending amounts, as distinct from its mere presence proxied by the IMF dummy. Also, to avoid excessively detailed results, we return to presenting results by three (low, medium, and high) debt categories, but based on the findings reported in Table 5, we allow for the effect of programs and repeated borrowing to vary by the level of indebtedness. Accordingly, we add three new variables: (1) an interaction of the IMF program dummy with the country's Debt/GDP ratio; (2) an interaction of the log of repeated borrowings also with the country's

Debt/GDP ratio; and (3) the amount of IMF lending, normalized by the country's external debt.

Consider, first, the evidence for syndicated loans. In the low-debt group, IMF programs were observed above to be associated with higher spreads: the additional evidence here suggests that the larger the loan, the greater the trouble the country is in and the higher the spreads. For loans, in this debt-range, it is likely that the few transactions under IMF programs are characterized by some unobserved variables that result in the country contracting an IMF program while, at the same time, raising spreads. In the medium-debt range, the adverse effects of rising debt levels from 30 to 55 percent of GDP are mitigated both by the presence of an IMF program and by repeated borrowing. It appears, as though, the two influences are complementary. However, while both influences move in the same direction as the debt ratio increases, the point estimates of the two effects are quite different. Thus, when the Debt/GDP ratio is 0.4, the coefficient on the log of repeated borrowing is -0.10 and when Debt/GDP rises to 0.5, the coefficient on repeated borrowing is -0.14. In contrast, the coefficient on IMF programs at these two debt levels, for the median amount of IMF lending (5 percent of country debt) is 0.14 and -0.02. Note that a key reason why IMF programs do not have a deeper effect on spread reduction is that greater availability of Fund resources, while associated with more loans, is also associated with higher spreads, as if availability of larger IMF resources allows for more international borrowing but the creditor coordination advantage is eliminated, resulting in a higher premium. Finally, in the high-debt range, the coefficients on IMF programs and their interactions are not highly significant because of multicollinearity; however, at the low-end of this high range, programs seem most

likely to lower spreads. Access to syndicated loans falls and spreads increase as the debt level rises; and the size of the IMF lending continues to raise both borrowing and spreads, though the effect on the spreads is now quantitatively and statistically less significant.

For bonds, the IMF variables are not significant in the low-debt range. However, in this debt range, as in the other two, rising debt levels interact with repeated borrowing to *raise* spreads. It is as if in bond markets the value of repeated borrowing declines with more external debt. We had noted above that repeated borrowing is highly correlated with more outstanding bonds. The result suggests that the greater coordination problems in the resolution of bonds under default strongly counteract the information value of repeated borrowings in bond markets.

For bond markets, the role of the IMF seems particularly important in the middle-debt zone. Here, as in the loan market, the influence of the IMF in lowering spreads increases with the debt level, from almost no effect at the 30 percent debt ratio to about a 25 percent reduction in spreads at the 55 percent end of that range. At the same time, unlike in the loan market, the size of IMF lending has no bearing on either spreads or bond issuance. As noted, moreover, repeated borrowing does not help counteract the effect of rising country debt levels—rather more frequent borrowing hurts, making the presence of the IMF even more important. These results reaffirm the proposition that IMF programs have an important influence in the "intermediate" vulnerable zone where liquidity shocks can be transformed into solvency crises (similar results are obtained by Mody and Saravia 2003 and Bordo, Mody, and Ooomes 2004). However, because IMF lending does not appear to play a role in this range, the interpretation of the result is more consistent with the Fund's value as a monitor, rather than as a potential provider of

liquidity that prevents the occurrence of a financial crisis on account of strategic uncertainty among creditors who refuse to rollover credit.

In the high debt range, the influence of the IMF program starts with a spread reducing effect at the low-end of this range (consistent with the end of the medium debt range, though the point estimates differ somewhat). However, as debt levels rise, the influence of the IMF program on spreads declines rapidly by the 70 percent Debt/GDP level. In this range, however, more IMF lending is associated with both more bonds and lower spreads, with a spread reduction of almost 10 percent at the median value of the IMF lending relative to the country's outstanding external debt. In other words, the effectiveness of IMF programs declines with increasing debt in this high debt range but a larger amount of lending can compensate.

Finally, consistent with the findings above, IMF precautionary programs play an important role in determining access and pricing. For programs that are precautionary at outset, the effect in all segments appears to be to reduce issuance and also reduce spreads, reinforcing the suggestion from the multinomial analysis above that when the country is in a precautionary mode, borrowers from that country are also more conservative in seeking access to international credit markets but because their loan quality is perceived favorably and hence lenders would like to acquire more of the asset, spreads are lowered.

The strongest effect of turned precautionary programs is for bonds in the medium-debt zone: access is significantly increased and spreads are substantially lowered. As discussed above, this is also the "vulnerable" zone where countries potentially face liquidity problems; Fund programs in this zone have a significant impact in improving access and reducing spreads as debt levels rise above 30 percent, but the size of Fund

lending is not a significant influence. While the influence of turned precautionary programs is particularly strong for bonds in the medium-debt range, the general effect is similar in most of the other situations. Thus, when a country is coming off a period during which it drew on Fund resources, a continued precautionary relationship with the Fund appears to create favorable access for needed international capital.

Pulling together the main findings, on average, repeated borrowing, and the implied private monitoring, is more salient for syndicated loans, whereas IMF programs have a more significant influence in the less personalized bond markets. Bank loans thus appear to benefit from repeated borrowing and a modest influence from IMF programs, derived largely from "precautionary" programs, with larger IMF lending raising rather than lowering spreads in this credit channel. Precaution also seems central for bond issuers vulnerable to liquidity crises. Larger Fund resources are helpful principally for bond issuers in the high debt range, where solvency crises with possibly complex debt restructuring issues become more likely.

Conclusions

International borrowing from banks presents lower entry barriers than issuing a bond. More borrowers are able to obtain syndicated loans than bonds—and bank borrowing is transacted more episodically in smaller average amounts. Though bank borrowing shrunk after the East Asian crisis in the second half of 1997 along with a similar contraction of bond issuance, bank loans have been substantially less subject to short-term fluctuations in indicators of financial market sentiments (reflecting risk aversion and pricing uncertainty), providing, therefore, steadier market access.

We find that the ability of banks to thus lend to a diverse set of borrowers is, in part, supported by the use of information that is made available through repeated borrowing. When borrowers return for credit, they provide more information about themselves, reducing the uncertainty in lending to them and, hence, reducing the risk premium charged.

In contrast, bond issuers are, on average, better known and hence, the value of private information derived from repeated borrowing is less important in this market. Indeed, to the extent that repeated borrowings result in several outstanding bonds, and given the greater coordination difficulties in bond markets in resolving potential debt defaults, more frequent borrowing may sometimes actually hurt rather than help bond issuers, as our results show.

Instead, a more public monitoring of economic conditions in the borrowing country, assessing and reinforcing the commitment to a course of economic policy that is best likely to allow repayment of debts, appears more valuable to bond markets. IMF programs appear to serve this role of monitoring combined with policy commitment. We find, moreover, that this role attributed to the IMF is most effective when countries have crossed the threshold of "debt intolerance," (about 30 percent of GDP) and are, therefore, vulnerable to liquidity shocks that could spiral into full blown solvency crises. The evidence also suggests that once the risk of insolvency is high, the effectiveness of the IMF in performing the monitoring/commitment role declines. At that point, more IMF lending becomes more salient in helping market access and reducing spreads.

Thus, more speculatively, monitoring provided by the Fund contributed in the 1990s to the revival of the international bond market for channeling resources to

emerging economies. Consistent with the theory and the evidence that banks have a natural monitoring and creditor coordination advantage, banks had been the dominant lenders to emerging markets. But following the debt crises in the 1980s, banks had scaled back their lending to emerging markets and, hence, the renewal of the bond market was crucial to keep capital flowing to these economies. To the extent the Fund helped, it did so by redressing the bond market's disadvantage, particularly in its monitoring capabilities. The evidence especially favors the monitoring interpretation for the Fund's role in countries with a vulnerable exposure to external debt. Lowering the likelihood of outright default and hence the possible costs of creditor coordination may have been more salient for countries with a higher likelihood of insolvency. The flip side of reducing the costs of creditor coordination is the possible increase in moral hazard in lending to emerging economies. We have not addressed the moral hazard issue in this paper. That debate is ongoing.

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Table 1: Trends in International Bond and Bank Lending

	Number of Transactions			Aggregate Value of Transactions (US$ billions)		
Year	Bonds	Loans	Total	Bonds	Loans	Total
1991	81	209	290	10	24	34
1992	177	252	429	21	18	39
1993	357	376	733	45	27	73
1994	307	508	815	39	40	79
1995	369	750	1,119	48	56	104
1996	522	1,066	1,588	81	83	164
1997	555	1,248	1,803	100	125	225
1998	234	550	784	52	62	114
1999	334	402	736	65	47	113
2000	284	532	816	59	81	141
2001	290	470	760	78	62	140
2002	219	384	603	63	44	107
Total	3,729	6,747	10,476	661	669	1,331

Table 2: Number of Transactions, by Debt Category and IMF Program

Type of Credit	**Low Debt/GDP Range (0-30 percent)**	
	No Program	**IMF Program**
None	1,301	389
Bonds	1,244	57
Loans	2,606	99
	Medium Debt/GDP Range (30-55 percent)	
	No Program	**IMF Program**
None	973	561
Bonds	958	1,000
Loans	2,094	898
	High Debt/GDP Range (more than 55 percent)	
	No Program	**IMF Program**
None	675	808
Bonds	253	217
Loans	589	461
	Full Sample	
	No Program	**IMF Program**
None	2,949	1,758
Bonds	2,455	1,274
Loans	5,289	1,458

Table 3: Choice of Loans and Bonds, Relative to No Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)
	Debt/GDP<=0.3		**0.3<Debt/GDP<=0.55**		**Debt/GDP>0.55**	
	Bonds	Loans	Bonds	Loans	Bonds	Loans
US Industrial Growth	–22.978	–24.841	86.267	84.450	73.747	–1.892
	[1.30]	[1.50]	[6.18]**	[6.30]**	[3.69]**	[0.11]
Log of Swap Rate	–0.824	–0.687	–0.414	0.050	–1.086	–0.320
	[4.99]**	[4.48]**	[3.12]**	[0.40]	[5.80]**	[2.01]*
EMBI volatility	–22.322	–4.702	–19.533	–4.290	–17.253	–4.929
	[5.29]**	[1.24]	[5.60]**	[1.38]	[3.26]**	[1.15]
Credit Rating	0.039	0.053	0.053	0.082	0.126	0.117
	[7.11]**	[10.58]**	[10.08]**	[15.82]**	[13.41]**	[15.45]**
Debt/GDP	7.819	14.675	–5.245	0.034	–0.758	–0.220
	[5.52]**	[11.22]**	[8.19]**	[0.06]	[1.31]	[0.47]
Debt Service/Exports	7.911	4.502	4.479	3.305	–0.117	1.746
	[11.90]**	[6.90]**	[15.35]**	[11.66]**	[0.27]	[4.46]**
Real GDP growth	22.212	55.205	–10.809	–7.151	–2.570	6.654
	[3.35]**	[8.57]**	[2.58]**	[1.74]	[0.39]	[1.15]
Export Volatility	–6.302	–3.801	–5.547	–3.247	0.291	0.640
	[6.63]**	[5.24]**	[8.24]**	[5.55]**	[0.68]	[1.85]
Short-term/Total Debt	–2.312	–2.111	–0.432	1.209	–0.840	0.676
	[5.65]**	[5.91]**	[0.96]	[3.06]**	[1.44]	[1.29]
Reserves/Imports	0.011	0.045	0.045	-0.131	0.198	0.053
	[0.18]	[0.83]	[0.98]	[2.98]**	[2.75]**	[0.80]
Reserves/ST Debt	–0.227	–0.100	–0.283	–0.054	–0.214	–0.142
	[5.07]**	[2.65]**	[6.98]**	[2.41]*	[3.73]**	[2.84]**
Private Credit/GDP	0.998	0.897	0.282	–0.141	–0.647	–0.224
	[15.61]**	[14.94]**	[4.29]**	[2.25]*	[5.79]**	[2.46]*
Public Issuer	1.438	4.257	0.437	2.580	-0.795	2.633
	[9.44]**	[16.74]**	[3.85]**	[17.45]**	[4.93]**	[11.05]**
Private Issuer	2.516	5.335	1.111	3.813	-0.111	3.624
	[16.23]**	[20.64]**	[10.09]**	[26.21]**	[0.76]	[15.48]**
IMF Program	0.308	0.146	0.827	0.369	0.674	0.894
	[1.19]	[0.61]	[6.41]**	[2.88]**	[3.79]**	[5.71]**
Precautionary	–0.335	–1.001	–0.963	–0.758	–0.519	–0.756
	[0.51]	[1.69]	[4.75]**	[3.89]**	[2.34]*	[3.83]**
Turned Precautionary			0.340	0.211	0.204	0.314
			[1.93]	[1.20]	[0.80]	[1.42]
Constant	–2.363	–7.635	0.706	–6.624	0.335	–7.121
	[2.57]*	[8.40]**	[1.00]	[9.55]**	[0.32]	[7.43]**
Observations	5,153	5,153	6,373	6,373	2,829	2,829

Absolute value of z statistics in brackets, * significant at 5%; ** significant at 1%.

Table 4: Pricing of Loans and Bonds

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			**Bonds**		
Debt/GDP range	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
			Spread Equation			
Log of Amount	0.086	–0.100	–0.099	0.073	–0.057	0.044
	[7.39]**	[7.59]**	[4.76]**	[2.99]**	[3.09]**	[1.43]
Maturity	0.042	0.028	0.005	0.023	0.006	0.010
	[10.63]**	[7.42]**	[0.67]	[6.26]**	[2.01]*	[2.40]*
US Industrial Growth	–14.551	–8.175	–8.412	–16.493	–24.592	–44.804
	[3.57]**	[2.16]*	[1.14]	[2.54]*	[5.15]**	[4.64]**
Log of Swap Rate	0.166	0.273	0.117	0.230	0.299	0.613
	[3.96]**	[6.65]**	[1.80]	[3.38]**	[7.16]**	[5.87]**
EMBI volatility	–0.878	–0.771	0.361	–0.960	3.584	3.692
	[1.16]	[0.88]	[0.23]	[0.66]	[2.38]*	[1.13]
Credit Rating	–0.014	–0.027	–0.023	–0.035	–0.038	–0.066
	[8.31]**	[13.23]**	[5.52]**	[16.54]**	[18.43]**	[9.16]**
Debt/GDP	–0.492	0.529	0.316	–0.883	1.638	2.213
	[1.66]	[2.88]**	[1.39]	[1.59]	[7.19]**	[5.88]**
Real GDP growth	–3.727	–6.417	–6.396	–8.619	–5.292	–8.458
	[2.09]*	[2.74]**	[2.75]**	[3.22]**	[2.80]**	[2.40]*
Export Volatility	–0.079	–0.765	0.281	–0.221	–0.166	–0.265
	[0.31]	[3.11]**	[2.51]*	[0.67]	[0.51]	[1.21]
Short-term/Total Debt	–0.260	0.158	0.442	–0.104	–0.126	0.406
	[4.06]**	[1.10]	[2.01]*	[0.79]	[0.54]	[1.20]
Reserves/Imports	0.041	–0.023	–0.049	0.037	0.033	–0.096
	[4.00]**	[1.25]	[1.23]	[1.90]	[2.15]*	[1.68]
Private Credit/GDP	0.008	–0.011	–0.021	–0.001	–0.032	–0.018
	[0.53]	[0.51]	[0.56]	[0.03]	[1.46]	[0.22]
Public Issuer	0.459	–0.171	–0.020	0.049	–0.101	0.558
	[2.61]**	[1.86]	[0.11]	[0.46]	[1.45]	[4.97]**
Private Issuer	0.516	0.043	0.065	0.276	0.137	0.993
	[2.93]**	[0.47]	[0.37]	[3.06]**	[2.07]*	[3.97]**
IMF Program	0.529	0.152	–0.130	0.018	–0.096	–0.233
	[5.98]**	[4.33]**	[2.13]*	[0.20]	[1.88]	[3.03]**
Log of Repeat Borrowing	–0.192	–0.079	–0.162	–0.081	0.003	0.003
	[14.57]**	[6.06]**	[5.60]**	[3.36]**	[0.16]	[0.13]

Table 4: Pricing of Loans and Bonds (continued: selection equation)

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			**Bonds**		
Debt/GDP range	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
			Selection Equation			
	[0.79]	[10.87]**	[0.18]	[0.84]	[6.96]**	[4.92]**
Log of Swap Rate	–0.472	–0.101	–0.283	–0.630	–0.134	–0.582
	[8.43]**	[2.32]*	[4.27]**	[8.43]**	[2.50]*	[7.60]**
EMBI volatility	–1.627	0.808	–2.657	–14.983	–14.678	–9.084
	[1.21]	[0.63]	[1.38]	[8.17]**	[7.89]**	[3.15]**
Credit Rating	0.035	0.043	0.055	0.018	0.025	0.056
	[16.73]**	[26.22]**	[19.50]**	[6.85]**	[11.96]**	[16.91]**
Debt/GDP	8.158	–0.699	–0.096	3.494	–3.267	–0.224
	[15.50]**	[3.26]**	[0.48]	[5.97]**	[12.11]**	[1.17]
Debt Service/Exports	1.211	1.075	0.944	3.303	2.348	0.157
	[8.64]**	[13.47]**	[5.82]**	[18.53]**	[18.07]**	[0.96]
Real GDP growth	31.842	–2.866	8.184	9.715	–1.900	7.206
	[14.20]**	[1.93]	[2.81]**	[4.01]**	[1.64]	[2.05]*
Export Volatility	–3.447	–2.188	0.230	–1.615	–2.807	0.146
	[8.38]**	[8.66]**	[1.46]	[2.01]*	[8.08]**	[0.62]
Short-term/Total Debt	–1.130	0.407	0.590	–1.522	0.035	0.145
	[8.43]**	[2.98]**	[2.56]*	[6.55]**	[0.16]	[0.61]
Reserves/Imports	–0.007	–0.083	–0.008	–0.047	–0.013	0.056
	[0.28]	[5.45]**	[0.31]	[1.46]	[0.69]	[1.91]
Reserves/Short-term Debt	–0.062	–0.060	–0.110	–0.134	–0.143	–0.072
	[4.09]**	[4.83]**	[4.09]**	[4.68]**	[3.87]**	[3.70]**
Private Credit/GDP	0.451	0.022	0.023	0.483	0.217	–0.200
	[23.30]**	[0.89]	[0.69]	[19.46]**	[7.42]**	[4.48]**
IMF Program	–0.067	0.148	0.372	0.168	0.421	0.186
	[0.64]	[3.72]**	[6.81]**	[1.35]	[9.20]**	[2.65]**
Public Issuer	2.493	1.597	1.580	0.520	0.036	–0.494
	[18.59]**	[21.58]**	[13.36]**	[7.09]**	[0.69]	[5.97]**
Private Issuer	3.095	2.373	2.185	0.955	0.476	–0.167
	[22.73]**	[32.99]**	[19.00]**	[13.93]**	[10.46]**	[2.68]**
Lambda	0.084	0.057	0.010	0.043	–0.261	–0.866
	(3.23)	(2.28)	(0.169)	(1.13)	(–2.86)	(–11.86)
No. of Transactions	2,672	2,980	1,045	1,173	1,813	419
Observations	4,022	4,729	2,523	2,635	3,711	1,998

Robust z statistics in brackets, * significant at 5%; ** significant at 1%.

Note: Among issuer types, sovereign is the omitted category. The spreads equation also has dummy variables for sector of issuer (e.g., manufacturing, services, finance) interacted with issuer type (public, private). Also included are dummy variables for currency of issue and, for bond markets, a dummy variable for fixed rather than a floating rate of interest.

Table 5A: Loans: Impact of IMF Programs and Repeat Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Debt Range (% of GDP)	25-45	30-50	35-55	40-60	45-65	50-70	55-75	60-80	65-85
					Spread Equation				
IMF Program	0.259	0.279	0.135	–0.041	–0.054	–0.018	–0.046	–0.019	0.095
	[6.88]**	[7.39]**	[3.10]**	[0.77]	[0.85]	[0.29]	[0.57]	[0.20]	[1.08]
Repeat Borrowing	–0.073	–0.058	–0.064	–0.149	–0.162	–0.158	–0.174	–0.144	–0.111
	[5.22]**	[4.02]**	[3.59]**	[6.81]**	[7.10]**	[6.38]**	[5.54]**	[3.64]**	[2.41]*
					Selection Equation				
IMF Program	0.191	0.115	0.287	0.299	0.415	0.408	0.449	0.408	–0.103
	[2.79]**	[1.66]	[4.03]**	[4.24]**	[5.51]**	[5.39]**	[5.09]**	[4.26]**	[0.83]
No. of Transactions	2,477	2,426	2,057	1,771	1,556	1,355	887	571	358
Observations	3,941	3,804	3,354	3,102	2,899	2,647	1,970	1,471	949

Absolute value of z statistics in brackets, * significant at 5%; ** significant at 1%.

Table 5B: Bonds: Impact of IMF Programs and Repeat Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Debt Range (% of GDP)	25-45	30-50	35-55	40-60	45-65	50-70	55-75	60-80	65-85
					Spread Equation				
IMF Program	–0.045	–0.080	–0.161	–0.315	–0.367	–0.262	–0.149	–0.02	0.038
	[1.09]	[1.75]	[2.91]**	[4.41]**	[4.67]**	[2.70]**	[1.45]	[0.33]	[0.48]
Repeat Borrowing	–0.012	–0.008	0.001	0.027	0.048	0.049	–0.018	0.011	0.006
	[0.79]	[0.55]	[0.04]	[1.28]	[2.08]*	[1.39]	[0.51]	[0.36]	[0.16]
					Selection Equation				
IMF Program	0.748	0.610	0.329	0.315	0.270	0.073	0.258	0.131	–0.13
	[10.49]**	[8.58]**	[4.35]**	[4.02]**	[3.24]**	[0.88]	[2.67]**	[1.26]	[1.02]
No. of Transactions	1,497	1,539	1,116	899	707	580	352	272	200
Observations	3,068	3,038	2,537	2,351	2,170	1,973	1513	1,212	814

Absolute value of z statistics in brackets, * significant at 5%; ** significant at 1%.

Note: Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that Table.

Table 6: Does the Amount of IMF Lending Matter?

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			**Bonds**		
Debt/GDP range	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
	Spread Equation					
IMF Program	0.479	0.589	–0.362	–2.101	0.311	–2.041
	[0.45]	[2.68]**	[1.18]	[1.17]	[1.91]	[4.11]**
IMF*Debt/GDP	–2.759	–1.688	0.245	7.088	–1.049	2.927
	[0.83]	[3.72]**	[0.54]	[1.18]	[2.70]**	[4.03]**
IMF Amount/Debt	26.396	4.874	2.146	5.139	0.012	–3.505
	[3.63]**	[6.61]**	[1.73]	[1.34]	[0.02]	[2.08]*
Log of Repeat Borrowing	–0.164	0.070	–0.167	–0.156	–0.088	–0.243
	[5.75]**	[1.14]	[0.87]	[3.28]**	[1.38]	[1.75]
Repeat*Debt/GDP	–0.153	–0.400	0.006	0.433	0.245	0.370
	[1.01]	[2.47]*	[0.02]	[2.03]*	[1.71]	[1.90]
	Spread Equation					
IMF Program	0.991	–0.516	0.787	1.066	2.842	2.077
	[1.09]	[2.58]**	[2.51]*	[1.14]	[12.16]**	[6.15]**
IMF*Debt/GDP	–3.158	1.019	–0.811	–3.605	–5.883	–3.225
	[0.93]	[2.29]*	[1.78]	[0.99]	[10.51]**	[6.77]**
IMF Amount/Debt	–5.336	4.794	3.610	1.047	0.605	7.200
	[4.51]**	[8.88]**	[3.70]**	[0.44]	[0.75]	[5.68]**
Observations	4,022	4,729	2,523	2,635	3,711	1,998

Robust z statistics in brackets, * significant at 5%; ** significant at 1%.

Note: Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that Table.

Table 7: Is Precaution Valuable?

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			**Bonds**		
Debt/GDP range	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
			Spread Equation			
IMF Program	0.552	0.283	–0.021	0.038	0.006	–0.119
	[5.95]**	[6.41]**	[0.28]	[0.39]	[0.12]	[1.42]
Precautionary	–0.389	–0.374	–0.202	–0.293	–0.172	–0.205
	[2.64]**	[5.36]**	[2.13]*	[2.51]*	[3.11]**	[1.51]
Turned Precautionary		–0.100	–0.149		–0.212	–0.270
		[1.78]	[1.60]		[4.97]**	[1.52]
Log of Repeat Borrowing	–0.191	–0.081	–0.166	–0.082	0.005	–0.001
	[14.55]**	[6.25]**	[5.73]**	[3.39]**	[0.30]	[0.03]
			Selection Equation			
IMF Program	0.003	0.236	0.433	0.191	0.403	0.206
	[0.03]	[4.52]**	[6.27]**	[1.46]	[7.70]**	[2.52]*
Precautionary	–0.446	–0.377	–0.415	–0.141	–0.419	–0.196
	[1.83]	[5.38]**	[4.38]**	[0.43]	[5.35]**	[1.83]
Turned Precautionary		–0.010	0.218		0.261	0.188
		[0.17]	[2.61]**		[4.42]**	[1.50]
Observations	4,022	4,729	2,523	2,635	3,711	1,998

Robust z statistics in brackets, * significant at 5%; ** significant at 1%.

Note: Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that Table.

Data Appendix

Bond characteristics

The bond dataset, obtained from Loanware and Bondware covers the period 1991 to 2002 and includes: (1) launch spreads over risk free rates (in basis points, where one basis point is one-hundredth of a percentage point); (2) the amount of the issue (millions of US$); (3) the maturity in years; (4) whether the borrower was a sovereign, other public sector entity, or private debtor; (5) currency of issue; (6) whether the bond had a fixed or floating rate; (7) borrower's industrial sector: manufacturing, financial services, utility or infrastructure, other services, or government (where government, in this case, refers to subsovereign entities and central banks, which could not be classified in the other four industrial sectors).

Global variables

(1) United States industrial production growth rate: average of month-month growth rate over a quarter. (2) United States ten-year swap spread. (3) Emerging Market Bond Index: standard deviation of difference in log of daily spreads.

Country Characteristics

Variable	(Billions)	Periodicity	Source	Series
Total external debt (EDT)	US$	Annual	WEO	D
Gross national product (GNP, current prices)	US$	Annual	WEO	NGDPD
Gross domestic product (GDPNC, current prices)	National	Annual	WEO	NGDP
Gross domestic product (GDP90, 1990 prices)	National	Annual	WEO	NGDP_R
Total debt service (TDS)	US$	Annual	WEO	DS
Exports (XGS)	US$	Annual	WEO	BX
Exports (X)	US$	Monthly	IFS	M#c|70__dzf
Reserves (RESIMF)	US$	Quarterly	IFS	q#c|_1l_dzf
Imports (IMP)	US$	Quarterly	IFS	q#c|71__dzf
Domestic bank credit (CLM_PVT)[1]	National	Quarterly	IFS	q#c|32d__zf
Short-term bank debt (BISSHT)[2]	US$	semi-annual	BIS	

Total bank debt (BISTOT)[3]	US$	semi-annual	BIS	
Credit rating (CRTG)	Scale	semi-annual	Institutional Investor	

Constructed Variables

Debt/GNP	EDT/GNP
Debt service/exports	TDS/XGS
GDP/growth	0.25*ln[GDP90_t/GDP90_{t-1}]
Standard deviation of export growth	Standard deviation of monthly growth rates of exports (over six months)
Reserves/imports	RESIMF/IMP
Reserves/GNP	RESIMF/GNP
Reserves/short-term debt	RESIMF/BISSHT
Short-term debt/total debt	BISSHT/BISTOT
Domestic credit/GDP	CLM_PVT/(GDPNC/4)

Sources: International Monetary Fund's *World Economic Outlook (WEO)* and *International Financial Statistics (IFS)*;IMF program data from the IMF's Executive Board Documents and Staff Estimates; World Bank's *World Debt Tables (WDT)* and *Global Development Finance (GDF)*; Bank of International Settlements' *The Maturity, Sectoral, and Nationality Distribution of International Bank Lending.* Credit ratings were obtained from *Institutional Investor's* Country Credit Ratings. Missing data for some countries was completed using the US State Department's Annual Country reports on Economic Policy and Trade Practices (which are available on the internet from http:www.state.gov/www/issues/economic/trade_reports/). U.S. industrial production was obtained from the Federal Reserve and Swap rates and EMBI from Bloomberg.

[1]Credit to private sector.
[2] Cross-border bank claims in all currencies and local claims in nonlocal currencies of maturity up to and including one year.
[3] Total consolidated cross-border claims in all currencies and local claims in nonlocal currencies.