The IMF in a world of private capital markets

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Abstract

In analyzing the IMF attempts to stabilize private capital flows, we contrast cases where banks and bondholders do the lending. Consistent with banks' natural advantage in monitoring, they reduce spreads as they obtain more information through repeat transactions with borrowers. By comparison, repeat borrowing has little influence in bond markets, where publicly-available information dominates. But spreads on bonds are lower when they are issued in conjunction with an IMF-supported program, as if the existence of a program conveys positive information to bondholders. The influence of IMF monitoring in bond markets is especially pronounced for countries vulnerable to liquidity crises.
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1. Introduction

Catalyzing private capital flows to emerging markets has been an objective of the International Monetary Fund since the 1990s, if not before.[1] The Fund provides public monitoring services and negotiates programs that enable the borrowers to reveal their commitment to sound macroeconomic policies. In addition, its own lending may stabilize capital flows by providing bridge finance for creditworthy countries experiencing liquidity crises, the resolution of which may be difficult to coordinate for atomistic lenders.

In this paper, we seek to better understand the roles of IMF monitoring and lending and provide new evidence of their effects. We analyze the impact of IMF-supported programs on market access and the cost of funds, building on three insights.

- First, if banks are already engaged in monitoring as part of their normal operation, then IMF monitoring should have a relatively limited impact when bank syndicates do the lending.
- Second, private capital flows should be particularly sensitive to the magnitude of IMF financial commitments when the likelihood of debt restructuring is high.
- Third, precautionary programs are a mechanism through which governments can use their relationship with the IMF to signal their commitment to strong policies. Differences in the impact of precautionary and regular IMF programs should therefore be useful for distinguishing the Fund's monitoring and lending roles.

Our analysis is based on more than 6700 loan transactions between emerging market borrowers and international bank syndicates and some 3500 new bond issues placed between 1991 and 2002. We analyze the frequency of transactions and the spreads charged. Among the explanatory variables are a measure of repeat borrowing that proxies for creditor learning about borrower characteristics, as well as the existence and size of IMF programs. Because we analyze individual transactions rather than aggregate capital flows or other macroeconomic conditions, our findings are less susceptible to causality running from the outcome to the decision to initiate an IMF program.[2]

Important differences between bank loans and bond issues have been documented in the domestic context.[3] Banks act as delegated monitors on behalf of investors who cannot easily observe and discipline borrowers (Diamond, 1984). The information they acquire can be used to limit the use of funds and for pricing loans. In contrast, individual bondholders lack the incentive to incur the costs of securing expensive private information about borrowers. Instead, public information – for example, the

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[1] See for example IMF (1999).

[2] High-frequency 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.

[3] This difference between bank and capital markets has been well documented in the domestic US context (see, for example, Fama, 1985; James, 1987, and Petersen and Rajan 1994 and 1995).

information assembled by credit rating agencies – dominates the market for debt securities.

At the same time, securitized debt instruments have superior risk-sharing characteristics. Credit risk can be diversified away, in part, by spreading individual loans across investors and enabling them to hold diversified portfolios. Banks cannot engage in this practice to the same extent without eroding their incentive to invest in dedicated monitoring technologies. This tradeoff is a way of understanding why lending takes place through both banks and bond markets.

Banks can also more easily coordinate their actions in response to default and restructuring. They are relatively few in number and contractual arrangements such as sharing clauses reduce the incentive to hold out. The advantages of creditor coordination may make it even more profitable for banks to monitor borrowers, as we explain below. Thus, it is not necessary to assume that banks have an intrinsically superior ability to monitor, in other words; they may simply have more incentive to invest in gathering and using relevant information.

Eichengreen and Mody (1998) find that spreads on syndicated loans fall with the number of loans extended to a borrower. An interpretation is that contact through repeat borrowing informs creditors about borrower characteristics, reducing uncertainty and risk premia. That earlier paper did not also consider repeat borrowing in bond markets. We do so here, hypothesizing that this effect is stronger for bank loans than bonds in part because coordination allows banks to make better use of any information thereby gleaned.

The other potential monitor is the IMF.[4] By putting a program in place, the Fund may be able to acquire information not also available to the private sector, or to acquire it at lower cost. Indeed, the Fund may convey information to the markets when it does not have superior monitoring technology. Negotiating an IMF program may simply be a way for a government to signal its type.[5] Imagine that the standard conditions attached to Fund programs are easier to satisfy for either economic or political reasons by governments truly committed to strong policies and that violating that conditionality has significant costs. Then a country with strong policies will be more likely to sign up for a program, signaling its type and lowering its spreads.

A special case in point is when an IMF lending arrangement is converted into a precautionary program.[6] A country then volunteers to not draw on IMF resources

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[4] As posited by Tirole (2002), Mody and Saravia (in press) and Bordo et al. (2004).

[5] Bordo et al. (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, in press). 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.

[6] For more discussion of the channels through which IMF programs can influence international capital flows, see Cottarelli and Giannini (2002) and Bordo et al. (2004).

while still allowing itself to be subjected to Fund monitoring and conditionality.[7] The Fund's monitoring should be particularly important for bond markets 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.

Consistent with these hypotheses, we find that repeat borrowing is more important in reducing the costs of borrowing from bank syndicates than bond markets. In contrast, public monitoring through IMF programs has a larger impact on spreads in markets dominated by bonds than bank loans, again consistent with our priors. But the IMF's presence and lending have different effects in countries in different situations. For countries with external debt/GDP ratios below 60% range, it is the IMF's presence, as distinct from its lending, that matters for bond market access (see Pattillo et al. (2004) and Reinhart et al. (2003)). We interpret this as consistent with arguments emphasizing the Fund's monitoring and signaling roles. As debt rises from there, IMF presence is still associated with lower spreads but to a diminishing extent. The impact of IMF presence disappears when debt reaches 70% of GDP. Moreover, there is little evidence in this high debt range that additional IMF lending reduces spreads and enhances market access. For countries in this range, neither IMF presence nor IMF lending significantly enhances market access. Evidently, countries with such high debts have deep structural problems that must be solved before IMF intervention can catalyze external finance. Only programs that turn precautionary – that is, where the outlook improves sufficiently that the country can voluntarily choose to stop drawing on Fund resources – have a significant negative impact on borrowing costs at high debt levels. This finding is again consistent with our arguments regarding country signaling and IMF monitoring.

The next two sections provide evidence on differences in international lending through bank loans and bond markets. We then analyze the factors that go into the decision to borrow and the further choice between loans and bonds. The results confirm that IMF programs do more to facilitate bond issuance than bank lending. Finally, we document the importance for the pricing of loans and bonds of private monitoring in bank lending and of public monitoring through IMF programs in bond markets.

2. The setting

Although international lending through bond markets was prominent in the late 19th and early 20th centuries, from the 1960s through the 1980s private credit flows to developing and emerging economies took place mainly through banks. Lending via bond markets was about 10% of bank lending in the 1970s and early 1980s (Edwards, 1986). This changed following the debt crises of the 1980: between 1991

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[7] Although the financial support can still become available should the need arise.

Table 1
Trends in international bond and bank lending

Year	Number of transactions			Aggregate value of transactions (US$ billions)		
	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	1119	48	56	104
1996	522	1066	1588	81	83	164
1997	555	1248	1803	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	3729	6747	10,476	661	669	1331

and 2002, credit through banks and bonds was of about the same order of magnitude, just under $700 billion through each channel (Table 1).[8]

Differences persisted, however, in the characteristics of the typical bank loan and bond. To show this, for each loan and bond in our data set we extracted the initial price, the initial maturity, the amount, and the currency of denomination. Borrowers are also distinguished as sovereign, non-sovereign but public sector, and private sector.[9] On average, bank loans more numerous and 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.[10] On average, a bond issue was about 70% larger than a loan transaction.

Bank loans were not just smaller but less recurrent. We construct a measure of repeat borrowing, R, separately for bank and bond borrowing. Starting with January 1, 1991, the measure takes the value 1 the first time a borrower enters into an international debt contract. With each subsequent instance of borrowing we then increment the value of R by one. The results show that repeat borrowing is more common in bond markets, where the median number of borrowings over the period

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[8] While we include all bonds issued in our analysis, we restrict the sample of loans to those that were priced based on 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 believe that more precise estimates of loan pricing become possible.

[9] We use these distinctions 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. For more on this, see below.

[10] Of which spreads are available for about 3500.

Table 2
Number of transactions, by debt category and IMF program

Type of credit	Debt/GDP range (0–30%)	
	No program	IMF program
Bonds	1244	57
Loans	2606	99
	Debt/GDP range (30–40%)	
	No program	IMF program
Bonds	680	453
Loans	1375	240
	Debt/GDP range (40–60%)	
	No program	IMF program
Bonds	380	595
Loans	999	775
	Debt/GDP range (more than 60%)	
	No program	IMF program
Bonds	151	169
Loans	309	344
	Full sample	
	No program	IMF program
Bonds	2455	1274
Loans	5289	1458

1991–2002 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, compared with banks, which allow a diverse set of clients to episodically borrow, the bond market caters to borrowers with name recognition who return frequently.

Relative to bank loans, bonds were more likely to be issued when the issuing country was under an IMF-supported program. About 22% of all loans were contracted when a country had a Fund program in place (Table 2). In contrast, just over a third of bonds were issued during the tenure of a program. To put the point another way, when countries were under an IMF program they were about as likely to borrow through a loan or a bond, but a loan was more than twice as likely when there was no program.

While IMF programs appear to shift borrowing toward bonds, this shift does not occur uniformly. Table 2 shows that countries with external-debt-to-GDP ratios below 30% had few bond or loan transactions while under IMF programs. When the debt-ratio between 30% and 40%, more borrowing occurred under IMF programs, especially through bonds; however, the number of credit contracts was still higher in countries without, rather than with, IMF programs. Countries with debt/GDP ratios in the range of 40–60% play an important role in our analysis. In this category, the distribution of credit contracts between program and no program is more even: indeed, more bonds are issued under a program than when there is no program. Finally, when external debt exceeds 60% of GDP, countries once again limit their

international borrowing. When they do borrow, loans and bonds are equally favored.

3. Patterns of borrowing

In this section, we analyze the determinants of the borrowing decision and the choice between bank loans and bonds. The first probit equation (Table 3) estimates the correlates of borrowing by sovereign, non-sovereign/public, and private entities in each country-quarter. The second equation reports the likelihood of bond issuance rather than a bank transaction. Throughout, we report the change in the probability for an infinitesimal change in each independent, continuous variable at its mean and the discrete change in the probability for dummy variables. Standard errors are adjusted for clustering since the number of borrowing transactions varies from country to country.[11] Explanatory variables include issuer characteristics (in this regression, the borrower type, with sovereign as the omitted category), global variables (US growth, the swap rate, EMBI volatility), and a vector of country characteristics.[12]

Among the global variables, US growth appears to facilitate borrowing, especially by bond issuers in the medium-debt range (debt/GDP ratio between 40% and 60%). An interpretation is that global growth acts as collateral that supports additional borrowing. If the average monthly growth of US industrial production rises from its mean of 0.3–0.4%, the probability of borrowing increases by just over 1%.[13]

Higher volatility of J.P. Morgan's Emerging Market Bond Index, reflecting greater uncertainty about pricing, is associated with reduced borrowing. If daily volatility increases from its monthly mean of about 2–3%, borrowing probability declines by between $1\frac{1}{2}\%$ and 2%.

Higher bond-market volatility lowers the frequency of bond issuance relative to bank loans by borrowers from countries with debt/GDP ratios below 60%.[14] A one-percentage point increase in daily volatility reduces the likelihood of bond issuance relative to a bank transaction by $2\frac{1}{2}$–4%. An interpretation is that sort-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. In contrast, banks, which are better able to coordinate among themselves, may continue to lend.[15]

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[11] This same correction for clustering is made throughout.

[12] More detail on variable definitions and sources can be found in the Appendix A, below.

[13] The measure of US growth used in the regressions is the average of monthly growth rates in the quarter in which the transaction occurred.

[14] Where debt ratios are higher, such compositional shifts are not statistically significant.

[15] The Korean crisis in 1997–1998, and other similar episodes, remind us that there may be limits to such coordination. But an important fact about the Korean crisis is that, in the end, the banks did roll over their loans, albeit at high interest rates. See for example Goldstein (1998).

Table 3
The decision to borrow and the choice between bonds and loans

	(1)	(2)	(3)	(4)	(5)	(6)
	Debt/GDP ⩽ 0.40		0.40 < Debt/GDP ⩽ 0.60		Debt/GDP > 0.60	
	To borrow or not to borrow	Bond versus loan	To borrow or not to borrow	Bond versus loan	To borrow or not to borrow	Bond versus loan
Log of amount		0.103 [2.38]*		0.095 [5.78]**		0.130 [6.45]**
Maturity		0.020 [2.48]*		0.021 [3.46]**		0.020 [3.99]**
US industrial growth	2.242 [1.29]	−2.405 [0.69]	11.433 [2.07]*	4.283 [0.82]	5.643 [0.87]	23.516 [2.44]*
Log of swap rate	−0.062 [2.10]*	−0.170 [1.40]	−0.051 [0.83]	−0.023 [0.42]	−0.135 [1.33]	−0.303 [3.77]**
EMBI volatility	−1.367 [3.68]**	−3.757 [4.67]**	−1.478 [1.85]	−2.449 [2.46]*	−2.021 [1.82]	−0.984 [0.88]
Credit rating	0.005 [3.00]**	−0.002 [0.39]	0.016 [3.60]**	0.002 [0.56]	0.025 [5.31]**	−0.001 [0.28]
Debt/GDP	0.332 [1.44]	−0.430 [1.51]	−1.094 [2.15]*	−0.739 [1.57]	−0.207 [0.70]	−0.113 [0.34]
Debt service /exports	0.682 [5.17]**	0.509 [2.89]**	0.416 [2.21]*	0.284 [2.70]**	0.164 [0.44]	−0.770 [3.38]**
Real GDP growth	0.639 [0.49]	−5.670 [1.70]	3.174 [1.81]	1.330 [0.50]	0.880 [0.26]	2.058 [0.72]
Export volatility	−0.309 [2.56]*	−0.663 [1.90]	−0.974 [3.20]**	−0.252 [1.33]	0.133 [0.71]	0.011 [0.12]
Short-term /total debt	−0.163 [1.17]	−0.099 [0.43]	0.331 [1.05]	0.035 [0.14]	−0.387 [1.06]	−0.165 [0.57]
Reserves/imports	−0.011 [0.67]	0.035 [0.92]	0.009 [0.29]	−0.027 [0.64]	0.043 [1.00]	0.106 [3.81]**
Reserves/ST debt	−0.016 [1.72]	−0.029 [1.34]	−0.014 [1.44]	−0.008 [0.54]	−0.075 [2.07]*	−0.013 [0.36]
Private credit /GDP	0.071 [3.44]**	0.071 [2.19]*	−0.044 [0.67]	0.009 [0.23]	−0.068 [1.02]	−0.097 [1.96]
Public issuer	0.218 [4.90]**	−0.393 [4.90]**	0.104 [1.91]	−0.316 [6.64]**	0.100 [1.42]	−0.477 [5.24]**
Private issuer	0.424 [6.80]**	−0.457 [5.07]**	0.312 [5.87]**	−0.514 [7.17]**	0.303 [3.66]**	−0.688 [4.44]**
IMF program	0.027 [0.54]	0.290 [3.29]**	0.141 [3.45]**	−0.024 [0.36]	0.084 [1.02]	−0.008 [0.14]

Table 3 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)
	Debt/GDP $\leqslant 0.40$		$0.40 <$ Debt/ GDP $\leqslant 0.60$		Debt/GDP > 0.60	
	To borrow or not to borrow	Bond versus loan	To borrow or not to borrow	Bond versus loan	To borrow or not to borrow	Bond versus loan
Precautionary	−0.069 [1.08]	−0.073 [0.32]	−0.184 [1.97]*	0.131 [1.50]	−0.047 [0.23]	−0.061 [0.72]
Turned precautionary	−0.007 [0.13]	−0.011 [0.06]	0.032 [0.50]	0.153 [1.68]	0.135 [0.72]	−0.196 [4.44]**
Pseudo R^2	0.20	0.44	0.33	0.24	0.29	0.42
Observations	8505	6681	3874	2721	1976	965

The values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables. Robust z statistics (based on country clusters) in brackets.
* Significant at 5%.
** Significant at 1%.

Improved credit quality (proxied by the *Institutional Investor* credit rating which runs from a low of 0 to a maximum of 100) allows for more borrowing both from banks and on bond markets. The importance of the credit rating increases when the external-debt/GDP ratio exceeds 40%. An increase in rating by 10 points from a mean of 52 strongly raises the likelihood of borrowing with no apparent shift in its composition.[16] An interpretation is that whereas ratings influence the willingness of lenders to lend, a country's demand for foreign exchange determines how much it wishes to borrow. Thus, a higher ratio of debt service to exports increases the demand for external resources, thereby raising the likelihood of international borrowing, provided that the debt/GDP ratio is below 60%. Interestingly, as the debt/GDP ratio rises, the demand for external borrowing is increasingly met through loans. Similarly, when countries face higher export volatility, they are less likely to borrow abroad; in particularly, they are especially prone to reduce their borrowing on bond markets.

Bond issues tend also to be larger and longer in term. Whereas the average maturity of loans in our sample is $4\frac{1}{2}$ years (the median is just over 3 years), that for bonds is $6\frac{1}{4}$ years (with a median of 5 years).[17]

IMF programs have limited influence on aggregate borrowing by countries at low debt levels, as already suggested by Table 2. Presumably structural problems that limit the ability to borrow also cause countries to seek Fund assistance. Table 3 suggests, however, that such borrowers are more likely to issue bonds than borrow from

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[16] The likelihood of borrowing rises by between 16% and 25%.

[17] A borrower wishing to increase the length of maturity from the average from the average bank loan to the average bond maturity is about 3.5% (1.75 * 0.02) more likely to issue a bond.

banks. In the medium debt range, a Fund program raises the probability of borrowing by 14%. At high debt levels, the influence of IMF programs remains positive, although the effect is not statistically significant.

We also distinguish precautionary programs. A first case is where IMF programs are designated as precautionary at outset. Country authorities declare that they do not intend to draw on resources made available.[18] Borrowing via both loans and bonds appears to be lower in such cases, but mainly for countries in the intermediate debt range. There is thus some suggestion in the data that countries choosing to approach the Fund for precautionary reasons also behave conservatively in their borrowing from banks and on bond markets.

A second case is when programs turn precautionary. In this instance the member stops drawing on resources available through the program but continues to pay the commitment fee to retain access. Aggregate borrowing does not appear to be affected by such arrangements.[19]

4. The pricing of loans and bonds

To analyze pricing, we use the model developed by Eichengreen and Mody (2000, 2001) and extended by Mody and Saravia (in press). The spreads equation is linear of the form:

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

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. X contains a dummy variable for the existence of an IMF program, program characteristics if any, and interactions between the program and country characteristics.[20] Since the spread will be observed only when there is a decision to borrow and lend, we correct for sample selection. Assume that spreads are observed when a latent variable B crosses a threshold B' defined by

$$B' = \gamma Z + u_2, \tag{2}$$

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). u_2 is a second error term. We 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). Eqs. (1) and (2) can be estimated simultaneously by maximum likelihood.

Estimating the determinants of market access requires information on non-borrowers. 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

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[18] This declaration is not binding, as noted above.
[19] Although borrowers from countries with high debt/GDP ratios appear to be less likely to issue bonds.
[20] As discussed below.

these issuers did not come to the market, we record a zero, and where they did we record a one.[21]

We use our measure of repeat borrowing, R, to proxy for private monitoring. It is likely that the incremental information declines as R rises. Moreover, since R is correlated with the number of debt obligations outstanding, a larger value of R may also create greater coordination problems in the event of restructuring.[22]

The IMF dummy appears in both the selection and spreads equations. In contrast, R appears only in the spreads equation. Other variables in the selection equation are the global and country variables from Table 3. In addition, transaction-specific variables such as the maturity and amount of the credit transaction and dummy variables for the currency of issue and production sector of issuer (not shown to conserve space) are included in the spreads equation.[23] Results are in Table 4.

US growth is associated with lower spreads and raises the likelihood of borrowing through banks and on bond markets. This is again consistent with the idea that stronger global growth and export opportunities act as collateral for emerging markets. These effects are especially important for the middle debt group: an increase in monthly growth rate of 0.1% (a 1.2% increase in annual growth) reduces loan spreads in the mid-debt range by 2% and bond spreads in that same range by about 4%. Increases in issuance probabilities are somewhat smaller.

Among the global variables, an increase in EMBI volatility has a particularly important quantitative effect on bond issuance when a country's debt-to-GDP ratio is below 60%. If daily volatility rises by 1% (at the daily mean of 2%), bond issuances fall by between 5% and 7% (in that same debt range). Improved credit ratings raise the probability of borrowing while lowering spreads, consistent with the idea that their main effect is to increase investors' willingness to lend. A 10-point improvement in the *Institutional Investor* rating has a large impact on spreads (with the largest effect in the mid-debt range, 32% for loans and 48% for bonds). For borrowers from countries with debt/GDP ratios below 60%, improved credit ratings have a relatively small impact on bank lending, suggesting that public rating information, while relevant to access in both markets, is less valuable for bank decision making under normal circumstances.

Our main result is that repeat borrowing reduces spreads on syndicated loans, while IMF programs reduce spreads in bond markets. The coefficient on the log of repeat bank borrowing is negative, significant and larger than the corresponding coefficient for bond markets. This is true for each of the three debt/GDP categories.

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[21] 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 that the variables not be concentrated in a small range and that truncated observations (no bond issuance) not dominate. 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.

[22] In the regressions, we use the log of R, which has a distribution that is much closer to normal than the (skewed) distribution of R. We also allow all coefficients – and not just the variables of immediate interest, R and the IMF program dummy – to vary by debt category.

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

Table 4
Pricing of loans and bonds

Debt/GDP range	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			Bonds		
	Low	Medium	High	Low	Medium	High
Spread equation						
Log of amount	−0.105	−0.095	−0.084	0.033	0.000	−0.001
	[8.24]**	[2.91]**	[3.10]**	[1.04]	[0.01]	[0.02]
Maturity	0.040	0.008	0.012	0.014	0.008	0.012
	[5.34]**	[0.86]	[0.62]	[2.98]**	[1.02]	[2.00]*
US industrial growth	−6.521	−17.801	−8.075	−11.756	−36.014	−3.713
	[0.92]	[2.08]*	[0.63]	[1.23]	[3.06]**	[0.21]
Log of swap rate	0.258	0.005	0.263	0.246	0.263	−0.060
	[4.24]**	[0.06]	[1.40]	[3.51]**	[1.91]	[0.32]
EMBI volatility	−1.521	−0.202	3.481	−0.995	7.180	−0.303
	[2.73]**	[0.12]	[1.63]	[0.60]	[1.53]	[0.12]
Credit rating	−0.017	−0.032	−0.022	−0.034	−0.048	−0.018
	[4.07]**	[2.81]**	[2.70]**	[10.31]**	[5.00]**	[0.92]
Debt/GDP	−0.472	−0.821	0.222	0.097	0.675	4.157
	[1.22]	[0.84]	[0.50]	[0.19]	[0.60]	[2.60]**
Real GDP growth	−6.479	−11.443	−5.028	−10.008	−9.887	−4.641
	[2.36]*	[3.04]**	[0.97]	[3.05]**	[2.99]**	[1.53]
Export volatility	−0.336	−0.702	0.137	−0.218	0.678	−0.161
	[0.54]	[1.83]	[0.99]	[0.48]	[0.54]	[1.60]
Short-term/total debt	−0.214	0.267	0.252	−0.038	−0.851	0.574
	[1.17]	[0.47]	[0.81]	[0.19]	[1.20]	[1.54]
Reserves/imports	0.006	0.059	−0.050	0.018	0.074	0.038
	[0.25]	[0.98]	[0.75]	[0.67]	[1.85]	[0.74]
Private credit/GDP	−0.007	0.047	−0.037	0.033	−0.060	−0.260
	[0.16]	[0.78]	[0.55]	[0.84]	[0.57]	[2.23]*
Public issuer	0.086	−0.291	0.197	−0.095	0.247	0.090
	[0.42]	[0.95]	[0.58]	[0.98]	[1.85]	[0.42]
Private issuer	0.198	−0.162	0.267	0.195	0.520	0.599
	[0.87]	[0.37]	[0.63]	[2.25]*	[3.34]**	[1.62]
IMF program	0.368	−0.041	−0.093	0.092	−0.392	−0.033
	[3.38]**	[0.27]	[1.12]	[1.57]	[2.74]**	[0.34]
Log of repeat borrowing	−0.139	−0.149	−0.142	−0.038	0.047	0.015
	[4.27]**	[3.10]**	[4.84]**	[2.56]*	[1.54]	[0.45]
Selection equation						
US industrial growth	7.547	14.170	2.577	2.772	13.310	13.009
	[2.40]*	[2.11]*	[0.38]	[0.69]	[1.58]	[2.54]*
Log of swap rate	−0.081	−0.141	−0.066	−0.165	−0.080	−0.240
	[1.23]	[1.41]	[0.80]	[2.67]**	[0.99]	[4.28]**

Table 4 (continued)

Debt/GDP range	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			Bonds		
	Low	Medium	High	Low	Medium	High
EMBI volatility	−0.467	−0.061	−1.810	−6.506	−4.992	−1.425
	[0.78]	[0.05]	[2.05]*	[5.81]**	[3.92]**	[1.28]
Credit rating	0.011	0.018	0.016	0.008	0.017	0.015
	[2.45]*	[3.09]**	[3.88]**	[2.17]*	[3.05]**	[5.19]**
Debt/GDP	0.671	−1.441	−0.056	0.203	−1.470	0.831
	[1.42]	[2.17]*	[0.22]	[0.44]	[1.96]	[2.62]**
Debt service/exports	0.575	0.277	0.157	1.543	0.643	−0.090
	[3.35]**	[1.46]	[0.47]	[6.25]**	[2.66]**	[0.55]
Real GDP growth	2.389	4.716	1.714	−0.281	3.829	1.239
	[0.71]	[1.82]	[0.51]	[0.17]	[1.21]	[0.50]
Export volatility	−0.752	−1.257	0.072	−0.585	−1.097	−0.008
	[2.16]*	[3.08]**	[0.48]	[2.14]*	[2.18]*	[0.09]
Short-term/total debt	−0.323	0.380	−0.141	−0.303	0.286	−0.308
	[1.23]	[0.85]	[0.40]	[0.94]	[0.79]	[1.87]
Reserves/imports	−0.018	−0.004	0.007	−0.046	−0.009	0.034
	[0.63]	[0.12]	[0.22]	[1.01]	[0.16]	[1.34]
Reserves/short-term debt	−0.034	−0.025	−0.065	−0.044	−0.035	−0.056
	[1.91]	[1.97]*	[1.76]	[1.74]	[1.89]	[3.40]**
Private credit/GDP	0.104	−0.017	0.019	0.164	−0.016	−0.066
	[1.89]	[0.20]	[0.42]	[5.88]**	[0.26]	[1.54]
IMF program	−0.077	0.115	0.090	0.168	0.132	0.041
	[0.76]	[1.61]	[1.23]	[2.23]*	[1.96]	[1.44]
Public issuer	0.591	0.414	0.560	0.211	−0.142	−0.159
	[9.51]**	[6.35]**	[8.60]**	[1.76]	[1.76]	[2.50]*
Private issuer	0.811	0.713	0.670	0.365	−0.010	−0.107
	[11.43]**	[9.77]**	[13.07]**	[2.97]**	[0.13]	[1.38]
Lambda	−0.032	0.054	0.081	−0.044	−0.657	0.145
	[0.35]	[0.15]	[0.52]	[0.60]	[3.20]**	[0.44]
No. of transactions	4278	1771	648	2220	899	281
Observations	6389	3102	1783	4510	2351	1310

Robust z statistics, based on country clusters, in brackets.

Notes: 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. In the selection equation, the values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables.

* Significant at 5%.
** Significant at 1%.

The effects in the loan market are large. A second loan reduces spreads by about 10%.[24] A third loan has a spread about 6% lower than the second loan, after which the impact declines to low levels. In bond markets, in contrast, only lightly indebted countries gain from repeat borrowing.

IMF programs, on the other hand, reduce spreads and enhance access mainly in bond markets. This effect is most evident in medium-debt countries with debt/GDP ratios in the 40–60% range.[25] Bond issuance by countries in this category is about 13% higher when there is a Fund program and spreads are 40% lower. Evidently, bondholders become significantly more willing to lend to such countries following the negotiation of a Fund program. IMF programs also facilitate bank borrowing by countries in this medium-debt range, but the impact on spreads is insignificant.

Finally, as noted in Table 2, in the low-debt range (especially when the debt/GDP ratio is below 30%), countries with IMF programs borrow little. Countries with modest debts that nonetheless negotiate IMF programs appear to have unobserved characteristics that raise rather than lower spreads.[26]

In sum, repeat transactions have a significant effect mainly on bank borrowing, while IMF programs improve the terms of access to a greater extent for bonds.

5. Extensions

We now explore further the robustness of these results, varying the cutoff points, considering also the size of IMF programs, and distinguishing private and public borrowers.

We first ask whether the results are sensitive to cut-off points for the debt/GDP ratio. Table 5 reports results for overlapping debt/GDP ratios, starting with the 10–30% range and then raising the end points by 10 percentage points over 6 intervals.[27] Panel A, for loans, confirms the value of repeat borrowing which is significant in all 6 intervals. Comparison with the corresponding coefficients in Panel B shows that the value of repeat borrowing is greater for loans than for bonds in every debt category. Panel A also confirms that IMF programs do not reduce spreads significantly and are associated with higher spreads until the debt/GDP ratio is between 40% and 50%. However, once the debt/GDP ratio exceeds 50%, IMF programs are associated with a higher frequency of borrowing from banks with no apparent adverse effect on spreads.

Panel B confirms that repeated bond issuance lowers spreads only in the 10–30% debt/GDP range and has limited value thereafter, in fact raising spreads as if a mul-

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[24] A coefficient on the log of repeated borrowing of 0.14 times the difference between log 2 and log 1, 0.69.
[25] This finding of a strong impact of Fund programs for bond market access is also a central result in Mody and Saravia (in press).
[26] Even more for loans than bonds.
[27] Ending with the 60–80% range. We exclude the low and high ends of the debt/GDP spectrum where outliers tend to drive the results. Thus, for example, some of 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.

Table 5
The impact of IMF programs and repeat borrowing

Panel A: *Loans: impact of IMF programs and repeat borrowing*

	(1)	(2)	(3)	(4)	(5)	(6)
Debt range (% of GDP)	10–30	20–40	30–50	40–60	50–70	60–80
Spread equation						
IMF program	0.561	0.230	0.272	−0.041	−0.091	−0.081
	[3.06]**	[2.25]*	[3.53]**	[0.27]	[0.70]	[0.88]
Repeat borrowing	−0.174	−0.090	−0.058	−0.149	−0.159	−0.146
	[4.89]**	[3.05]**	[2.77]**	[3.10]**	[3.99]**	[5.15]**
Selection equation						
IMF program	0.120	0.045	0.041	0.115	0.162	0.135
	[1.30]	[0.51]	[0.48]	[1.61]	[1.99]*	[1.55]
No. of transactions	1908	2598	2426	1771	1355	571
Observations	2960	4066	3804	3102	2647	1471

Panel B: *Bonds: impact of IMF programs and repeat borrowing*

	(1)	(2)	(3)	(4)	(5)	(6)
Debt range (% of GDP)	10–30	20–40	30–50	40–60	50–70	60–80
Spread equation						
IMF program	0.034	−0.000	−0.043	−0.392	−0.252	−0.023
	[0.26]	[0.01]	[0.55]	[2.74]**	[1.86]	[0.20]
Repeat borrowing	−0.067	−0.022	−0.004	0.047	0.067	0.013
	[2.92]**	[1.50]	[0.28]	[1.54]	[2.31]*	[0.39]
Selection equation						
IMF program	0.153	0.250	0.221	0.132	0.045	0.048
	[1.78]	[2.90]**	[2.92]**	[1.96]	[1.05]	[1.51]
No. of transactions	789	1653	1539	899	580	272
Observations	1911	3227	3038	2351	1973	1212

Robust *z* statistics, based on country clusters, in brackets. Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that Table. In the selection equation, the values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables.

* Significant at 5%.
** Significant at 1%.

tiplicity of bonds creates coordination problems. The contrasting importance of IMF programs is also evident. At the low end of the debt/GDP range, there is a tendency for Fund programs to be neutral or to reduce spreads modestly, but the effect strengthens noticeably as the debt/GDP ratio approaches 40–60%. Beyond that, the influence of IMF programs on spreads falls. Fund programs are also associated with more bond issuance. This effect is strongest when indebtedness is between 20% and 60% of GDP.[28]

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[28] These results support those obtained by Mody and Saravia (in press).

Table 6
Does the amount of IMF lending matter?

Debt/GDP range	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			Bonds		
	Low	Medium	High	Low	Medium	High
Spread equation						
IMF program	0.689	1.623	−0.122	0.270	−2.469	−1.052
	[1.15]	[3.74]**	[0.15]	[0.65]	[2.04]*	[0.87]
IMF ∗ Debt/GDP	−1.550	−3.818	−0.039	−0.737	4.354	1.393
	[0.86]	[3.98]**	[0.03]	[0.59]	[1.81]	[0.79]
IMF amount/debt	2.941	6.922	1.801	1.343	−2.401	1.846
	[2.76]**	[5.05]**	[0.82]	[1.64]	[0.99]	[1.13]
Log of repeat borrowing	−0.143	−0.139	−0.146	−0.040	0.051	0.018
	[4.48]**	[3.27]**	[4.83]**	[2.64]**	[1.76]	[0.55]
Selection equation						
IMF program	−0.063	0.141	0.226	−0.237	0.941	0.409
	[0.20]	[0.29]	[0.48]	[0.83]	[2.28]*	[1.04]
IMF ∗ Debt/GDP	−0.106	−0.371	−0.210	1.245	−2.991	−0.689
	[0.12]	[0.38]	[0.35]	[1.38]	[2.50]*	[1.11]
IMF amount/debt	0.386	4.357	0.033	0.376	3.047	1.205
	[0.32]	[3.03]**	[0.02]	[0.34]	[1.34]	[1.27]
No. of transactions	4278	1771	648	2220	899	281
Observations	6389	3102	1783	4510	2351	1483

Robust *z* statistics, based on country clusters, in brackets. Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that table. In the selection equation, the values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables.

  * Significant at 5%.
  ** Significant at 1%.

In Table 6, we examine the influence of the size of IMF programs.[29] We interact the IMF program dummy with the country's debt/GDP ratio and normalize the amount of IMF lending by the country's external debt. For bonds, all the action is in the intermediate debt category where, as above, IMF programs have their major impact on spreads. The results in Table 6 thus reinforce the earlier finding that higher debt/GDP levels reduce the impact of IMF programs on bond markets. At the same time, the amount of lending does not influence spreads. These results are consistent with the Fund's value as a monitor rather than a provider of liquidity that prevents the occurrence of a financial crisis on account of strategic uncertainty among creditors (for a discussion of crisis resolution issues, see Eichengreen et al. (2004)).

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  [29] Based on the findings reported in Tables 4 and 5, we again allow for the effect of programs and repeat borrowing to vary by the level of indebtedness. But to avoid excessively detailed results, we return to presenting results by three debt categories.

In the market for bank loans, the larger is IMF assistance the higher are spreads in the two low-debt categories at least. Thus, while availability of additional IMF resources allows for additional borrowing, it is as if the creditor coordination advantage is eliminated.[30]

In Table 7, we again consider precautionary programs. For bank loans and to a lesser extent for bonds, programs that are precautionary at outset reduce both issuance and spreads, as if countries entering such programs are more cautious in seeking access to private markets.[31] Spreads show a tendency to decline, as if lenders wish to acquire more of their debt because their credit quality is perceived favorably.

But programs that turn precautionary tend not to have an impact on the frequency of either bank loans or bond issuance. However, they do have a spread-reducing effect. This is largest for countries in the high-debt zone. In this range borrowers both from banks and on the bond market enjoy lower spreads, although the impact is larger in bond markets. Thus, when a country is coming off a period during which it has relied on official finance, a continued precautionary relationship with the Fund appears to enhance market access. That the relationship rather than the amount lent is what matters supports once more the idea of a Fund monitoring/country signaling function.[32]

Finally, Table 8 considers whether the market access of private borrowers is differentially affected by the existence of an IMF program. In fact, repeat borrowing reduces spreads more strongly for bank loans than bonds irrespective of whether the borrower is a private- or public-sector entity. But the effect is larger for private sectors borrowers.[33] Less is publicly known about private borrowers. Their repeat borrowing therefore provides particularly valuable information in the bank market. In the bond market, in contrast, better known private borrowers gain little from repeat borrowing. In fact, public borrowers face rising spreads as they borrow more, presumably reflecting the dominance of coordination effects over information gains.

The stronger influence of IMF programs when borrowing occurs through the bond market also survives splitting the sample. Again, private borrowers gain the most. The principal action is still in the intermediate debt category. In addition, the effects for private borrowers are substantially stronger than those for public borrowers. A Fund program reduces bond spreads for private borrowers from countries in this intermediate debt zone by 47% while raising the probability of bond issuance by 27%.[34]

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[30] However, in the medium-debt range, the adverse effects of increasing debt levels from 40% to 60% of GDP are mitigated by the presence of an IMF program.

[31] Recall that this was what was suggested by our earlier analysis.

[32] That this function is important also to bank lenders when a country is in the high-debt range suggests that bank monitoring may not be enough when there is a high risk of insolvency.

[33] Thus, a second loan reduces the spreads charged private bank borrowers by about 13%, while public borrowers achieve, on average, a 7% spread reduction.

[34] The direction of influence is the same for public issuers, but the size and statistical significance of the outcome is weaker.

Table 7
Is precaution valuable?

Panel A: Bank loans: is precaution valuable?

	(1)	(2)	(3)	(4)	(5)	(6)
Debt range (% of GDP)	10–30	20–40	30–50	40–60	50–70	60–80
Spread equation						
IMF program	0.587 [2.92]**	0.291 [2.95]**	0.299 [3.15]**	0.086 [0.59]	0.151 [0.94]	0.206 [2.07]*
Precautionary program	−0.372 [1.10]	−0.533 [2.12]*	−0.125 [0.85]	−0.348 [2.02]*	−0.470 [2.39]*	−0.477 [2.79]**
Turned precautionary program		−0.075 [0.36]	−0.022 [0.15]	−0.097 [0.77]	−0.264 [2.55]*	−0.350 [2.44]*
Repeat borrowing	−0.174 [4.89]**	−0.091 [3.17]**	−0.059 [2.72]**	−0.164 [3.39]**	−0.186 [4.90]**	−0.144 [5.23]**
Selection equation						
IMF program	0.166 [1.88]	0.093 [0.92]	0.086 [0.88]	0.196 [2.69]**	0.250 [2.71]**	0.149 [2.16]*
Precautionary program	−0.341 [1.68]	−0.172 [1.16]	−0.200 [1.30]	−0.272 [2.32]*	−0.310 [2.07]*	−0.177 [1.16]
Turned precautionary program		−0.117 [0.65]	−0.055 [0.61]	−0.015 [0.18]	0.026 [0.18]	0.165 [0.84]
No. of transactions	1908	2598	2426	1771	1355	571
Observations	2960	4066	3804	3102	2647	1471

Panel B: Bonds: is precaution valuable?

	(1)	(2)	(3)	(4)	(5)	(6)
Debt range (% of GDP)	10–30	20–40	30–50	40–60	50–70	60–80
Spread equation						
IMF program	0.053 [0.37]	0.043 [0.81]	0.014 [0.17]	−0.282 [2.50]*	0.013 [0.08]	0.148 [1.36]
Precautionary program	−0.198 [0.96]	−0.077 [0.28]	−0.153 [1.31]	−0.140 [0.98]	−0.283 [0.82]	−0.372 [3.20]**
Turned precautionary program		−0.131 [2.33]*	−0.130 [2.36]*	−0.267 [1.60]	−0.622 [2.01]*	−0.331 [2.12]*
Repeat borrowing	−0.068 [2.98]**	−0.023 [1.66]	−0.005 [0.37]	0.049 [1.74]	0.065 [2.32]*	0.007 [0.24]
Selection equation						
IMF program	0.248 [2.63]**	0.238 [2.48]*	0.233 [2.88]**	0.112 [1.99]*	0.065 [0.94]	0.065 [1.45]

Table 7 (*continued*)

Panel B: Bonds: is precaution valuable?						
	(1)	(2)	(3)	(4)	(5)	(6)
Precautionary program	−0.324 [2.93]**	−0.290 [2.03]*	−0.155 [1.75]	−0.067 [0.62]	−0.115 [1.06]	−0.064 [0.65]
Turned precautionary program		0.138 [1.52]	0.033 [0.32]	0.161 [1.25]	0.064 [0.47]	−0.003 [0.03]
No. of transactions	789	1653	1539	899	580	272
Observations	1911	3227	3038	2351	1973	1212

Robust z statistics, based on country clusters, in brackets. Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that table. In the selection equation, the values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables.

 * Significant at 5%.
 ** Significant at 1%.

6. Conclusions

Bank loans and bonds are alternative ways of transferring capital to emerging markets. The growth of global bond markets is of course one of the signal features of the last 15 years of international financial history. Transacting through bond markets has obvious advantages for investors, notably greater scope for diversifying country risk. Given the advance of securitization across a broad front, it is therefore useful to recall why bank finance continues to play an important role in international financial markets. Bank loans are easier to access for borrowers new to such markets, since banks have a comparative advantage in bridging information asymmetries. Banks' intermediation technologies are also better suited to providing small loans.

We show in this paper, how the ability of banks to bridge information asymmetries is supported by repeat borrowing. As borrowers return for credit, they reveal information about themselves, reducing uncertainty and hence incurring a lower risk premium on their loans. Since the issuers of bonds are better known, the value of information obtained through repeat issuance is less. Indeed, to the extent that it results in a proliferation of separate bond issues, repeat borrowing may in fact increase the risk premium, reflecting the greater difficulty of coordinating the holders of different issues in the event of debt-servicing difficulties.

These observations have obvious relevance to arguments about IMF monitoring and surveillance of indebted countries. Our results suggest that IMF monitoring and surveillance matter more in bond markets. This role for the IMF has the largest impact when debts reach 40% of GDP and countries are therefore vulnerable to liquidity shocks. However, as debts continue rising from there, the impact of monitoring declines. There being relatively little uncertainty about the nature of the problem, lenders now care mainly about whether the IMF is providing real resources that help to keep debt service current. But as debt and the risk of insolvency grow still higher, even a significant amount of additional official finance may not be enough to make a

Table 8
Do private borrowers benefit more than public borrowers from IMF programs?

Panel A: Private borrowers

Debt/GDP range	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			Bonds		
	Low	Medium	High	Low	Medium	High
Spread equation						
IMF program	0.245	−0.116	−0.114	0.096	−0.466	−0.031
	[2.25]*	[0.56]	[1.19]	[1.62]	[2.85]**	[0.13]
Log of repeat borrowing	−0.133	−0.179	−0.179	−0.098	−0.034	−0.103
	[4.14]**	[2.93]**	[7.08]**	[4.52]**	[1.33]	[1.50]
Selection equation						
IMF program	−0.044	0.091	0.130	0.200	0.266	−0.018
	[0.77]	[2.01]*	[1.46]	[2.71]**	[2.51]*	[0.65]
No. of transactions	2806	1343	429	1405	407	99
Observations	3315	1672	784	2109	890	452

Panel B: Public borrowers

Debt/GDP range	(1)	(2)	(3)	(4)	(5)	(6)
	Loans			Bonds		
	Low	Medium	High	Low	Medium	High
Spread equation						
IMF program	0.599	−0.065	−0.038	0.118	−0.153	0.018
	[5.12]**	[0.50]	[0.26]	[1.34]	[1.55]	[0.22]
Log of repeat borrowing	−0.138	−0.109	−0.075	−0.014	0.099	0.083
	[4.38]**	[2.10]*	[1.10]	[0.61]	[2.67]**	[4.82]**
Selection equation						
IMF program	−0.053	0.054	0.045	0.085	0.075	0.072
	[0.49]	[0.85]	[1.19]	[1.35]	[1.16]	[2.37]*
No. of transactions	1472	428	189	815	492	182
Observations	3074	1430	999	2401	1461	858

Robust *z* statistics, based on country clusters, in brackets. Other variables included in these regressions are those listed in Table 4, including those referred to in the footnote to that table. In the selection equation, the values reported represent the probability for an infinitesimal change in each independent, continuous variable (at its mean) and the discrete change in the probability for dummy variables.

* Significant at 5%.
** Significant at 1%.

difference. At that point, what matters most is when programs turn precautionary, signaling that conditions have improved sufficiently that the country no longer requires financial assistance.

There clearly is further scope for elaborating these results. More generally, the approach taken here points to the importance of distinguishing capital international

flows by instrument and intermediary. Macroeconomic analyses lumping together bank loans and bonds will tend to neglect important differences between these market segments that stem from the nature of the information environment, the monitoring technology, and the scope for creditor coordination. We have shown in this paper that these distinctions are important for understanding the impact of IMF programs. We would conjecture that the same is true for a variety of other issues in international finance.

Acknowledgements

Appendix A. Data Appendix

A.1. Bond characteristics

The bond dataset, obtained from Loanware and Bondware covers the period 1991–2002 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).

A.2. 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.

A.3. 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

(continued on next page)

Appendix A (*continued*)

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)[a]	National	Quarterly	IFS	q#c|32d__zf
Short-term bank debt (BISSHT)[b]	US$	Semi-annual	BIS	
Total bank debt (BISTOT)[c]	US$	Semi-annual	BIS	
Credit rating (CRTG)	Scale	Semi-annual	Institutional Investor	

[a] Credit to private sector.
[b] Cross-border bank claims in all currencies and local claims in non-local currencies of maturity up to and including one year.
[c] Total consolidated cross-border claims in all currencies and local claims in non-local currencies.

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/). US industrial production was obtained from the Federal Reserve and Swap rates and EMBI from Bloomberg.

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