THE IMF AND THE CATALYTIC EFFECT: DO IMF AGREEMENTS IMPROVE ACCESS TO INTERNATIONAL FINANCIAL MARKETS?

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Masters of Public Policy

By

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Washington, DC
April 15, 2010

UMI Number: 1475139

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THE IMF AND THE CATALYTIC EFFECT: DO IMF AGREEMENTS IMPROVE ACCESS TO INTERNATIONAL FINANCIAL MARKETS

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ABSTRACT

Existing studies provide little evidence supporting the claim that an IMF program increases the propensity of private investors to lend to the country concerned (i.e., the catalytic effect). In this thesis I investigate whether countries have access to loans with better conditions after an IMF agreement. In contrast to empirical studies with similar approaches, however, I study debt maturity as an important indicator of better access to international financial markets, because a higher default risk of the country is associated with a shorter maturity structure of the international lending. I conduct an empirical analysis which takes into account both the maturity and the interest rate of public and publicly guaranteed private debt.

A two stage least squares estimation method is used to avoid selection bias problems. Panel data covering 116 countries between 1984 and 2007 and two other subsets of this panel data (62 countries for the second sample and 48 countries for the third sample are selected based on the eligibility criteria to receive International Development Association (IDA)'s concessional loans) are used to test the impact of an announcement of an IMF agreement on access to international financial markets.

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I also control for any possible bias due to endogeneity of GDP growth when tested positive. The results indicate an improvement in access to international financial markets when an IMF program is announced.

Important policy implications can be drawn from the empirical findings of this thesis for both the IMF and borrower countries. From the IMF's perspective, the catalytic effect may lower the level of commitment, political will and "ownership" of the program of the borrower country due to increased access to international financial markets. To avoid this moral hazard, the IMF should consider designing a more flexible exit strategy, increasing cost of borrowing, or limiting access to IMF loans in consequent agreements in case of a low completion. On the other hand, borrower countries should consider the catalytic effect in determining the amount of financial assistance from the IMF; otherwise the burden of conditionality could be higher than optimal.

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Chapter 1. Introduction

The role of International Monetary Fund (IMF) in international finance and IMF's influence on developing countries have caused a heated debate for a long period of time. Indeed, the IMF deserves such intensive attention considering its massive influence on developing countries. In particular, the IMF's involvement with a country or withdrawal from a country has important implications, because it is able to shape a country's policy agenda. Despite the fact that the IMF is harshly criticized for the level of its involvement in national policy making processes, many developing countries still engage in IMF agreements to give the impression to the rest of the world that they are implementing credible economic policies and providing a suitable investment environment, so that they can improve their access to international financial markets.

Surprisingly, there is little evidence to support the assertion that the IMF's "seal of approval" improves the access to international financial markets. There is a consensus that an IMF agreement catalyzes private capital flows in the countries with better initial fundamentals. However, the results do not reflect the conventional wisdom when the empirical analysis is generalized for all recipient countries (Eichengreen and Mody, 2001; Bird and Rowlands, 2002, and Mody and Saravia, 2003). Although, there is some evidence that IMF loans prevent the deterioration of a

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country's access to international financial markets (Edwards, 2005)[1], the expectations of developing countries about the benefits of an IMF agreement are much higher.

Most of the studies on whether the IMF increases the propensity of private investors to lend to the concerned country (i.e., the catalytic effect) are concentrated on particular capital flows. However, too few studies address the country risk perception of international financial markets following an IMF agreement. Existing studies use bond spreads to evaluate the country risk perceptions. Although bond spreads are a good proxy for country risk perception, risk perception can also be reflected in the maturity of the debt. However, results of the studies on bond spreads are unclear and no one has looked at debt maturity to measure the catalytic effect. Since the country risk perception of creditors may be reflected in both the maturity and interest rate of the debt, I take into account variations in both variables. In order to determine the overall effect of an IMF agreement on the access to international capital markets, I use the maturity to interest rate ratio of public and publicly guaranteed private debt.

This thesis proceeds as follows. In the second chapter, I review the literature on the role of the IMF and its conditionality, various arguments on the catalytic effect, and estimates of the impact of an IMF agreement on the access of the recipient country in international financial markets based on alternative research methodologies. In the

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[1] Edwards (2005) finds that "the average state under a program experiences less of an outflow of portfolio investment compared to those that are not under a Fund program."

third chapter, I present the model and the data used in the empirical analysis and discussed the main present empirical challenges. Chapter 4 provides the results of my empirical analysis and discusses my findings. The final chapter draws out some of the policy implications of the findings and summarizes the thesis.

Chapter 2. Review of Literature

The IMF and Conditionality

The IMF was founded at the end of World War II to avoid the kinds of financial crises that lead to international conflicts. The goal was to set certain standards of behavior in international financial matters. More specifically, the IMF's main stated objectives were to promote international financial cooperation between countries, to provide short term capital to countries in case of a balance of payment crisis, to facilitate the expansion and "balanced" growth of international trade, and to promote stable exchange rates (de Vries and Horsefield, 1986, 19-20).

There is no doubt that the world economy has changed remarkably since 1945, especially in terms of the volume and direction of trade, the diversity and ease of capital movements, and the roles of developing countries in production and trade. The collapse of the Bretton Woods system in 1971 forced the IMF to change its way of operating, because the IMF's role as a guarantor of the global exchange rate system had also ended. As a natural consequence of this new financial system, member countries encountered current account deficits, more frequently than before. The IMF's response to these changes was to expand its activities as part of its surveillance exercise. The scope of this exercise further expanded in 1990s as a response to a series of global financial crises (Bordo and James, 2000). In short, the IMF's main concern

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shifted from current account deficits to overall macroeconomic performance (Jensen, 2004).

The role and instruments of the IMF have adapted to the changing world economic environment. However, increased financial integration and fundamental changes in exchange rate regimes that force the IMF to reform its activities, also raised an important question: Do we still need the IMF? Those, whose answer is yes, argue that the IMF is still needed but requires further reforms to increase its effectiveness as a "lender of last resort" and as an international institution providing public goods like "surveillance" and "technical assistance" (Krueger, 1998; Sachs, 1999; De Gregorio et al., 1999). Those, whose answer is no, claim that the IMF has completed its mission and is no longer needed under the new economic circumstances. One argument offered by the latter group is that countries have the ability to follow their independent macroeconomic policies, and if they do, they would generate quicker and more effective solutions to financial problems (Schwartz, 1998). Another argument emphasizes that the IMF programs have detrimental effects on growth and investments, and claims that a typical country would be better off without an IMF program (Barro and Lee, 2005; Dreher, 2006).

What makes the IMF–even its existence–so debatable is its significant influence on national economies. The conditionality of IMF loans is the major

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instrument of this influence. IMF programs aim to support a member country to overcome its external payment problems and to restore its balance of payment position to assure repayment. Since repayments are crucial in ensuring that funds will be available to the IMF to support other members in future, the IMF uses its superior financial position and financial strength to offer support in exchange for a government commitment to affect particular changes in its policies (Buira, 2003), which is broadly termed conditionality. Conditionality is defined by the IMF as follows (IMF Fact Sheet, 2009):

> When a country borrows from the IMF, its government agrees to adjust its economic policies to overcome the problems that led it to seek financial aid in the first place. These loan conditions also serve as a guarantee that the country will be able to repay the Fund.

According to the IMF itself, therefore, IMF loans aim not only to provide financial assistance to cure current account deficit problems, but also to ensure macroeconomic and structural policies that would improve a recipient's economic performance and enable repayment. However, there are different theories for the main underlying reason for conditionality. One theory highlights the fact that the IMF can be considered as bureaucracy at the international level, and like every other bureaucracy, can be inefficient, ineffective, repressive, and unaccountable, which may lead to bureaucratic rent seeking activities (Barnett and Finnemore, 1999). Another argument is that IMF is just an instrument of dominant states, especially the United

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States, who uses conditionality for their interest, not for the needs of the Third World (Krasner, 1968). Whatever the reason is, continuation of financial support is conditional on the implementation of the program. Member countries are forced to implement macroeconomic and structural policies designed by the IMF.

The Catalytic Effect

Although it is not stated in the IMF's Articles of Agreements, enhancing members' access to international capital markets has been regarded as an important objective since the early 1990s (Mody and Saravia, 2003). Capital flows have become an important element of economic development in the 1990s as the global integration of financial markets increased. "Also, fluctuations in capital accounts were seen as a threat to economic activity, therefore the IMF came to view the facilitations and maintenance of capital flows to developing countries as one of its essential functions" (Bordo et al., 2004). This increasing of international capital flows to the member countries is called catalytic effect. In other words, "the IMF's involvement in a country has a catalytic effect to the extent that the announcement of an economic program backed up by a limited amount of IMF resources increases the propensity of private investors to lend to the country concerned, thereby reducing the adjustment burden falling on the debtor country with respect to the no-catalysis scenario" (Cotarelli and Giannini, 2002).

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We can distinguish two types of catalytic effect: signaling and commitment effects. The "signaling" effect is the level of assurance that the IMF's involvement with a country provides to sovereigns and private creditors. The "commitment" effect, on the other hand, is the result of the IMF's monitoring of the implementation of reform programs by borrowing countries (Bordo et al., 2004). My thesis mainly concentrates on the IMF's "signaling" effect.

It can be argued that the process of implementation of the program is associated with the catalytic effect. However, this study investigates the response of financial markets to an IMF program rather than to its implementation. This is because program implementation depends on the member country's willingness to implement the program which can undermine the catalytic effect of an IMF program. In contrast, signaling effect promises much more direct evidence for the catalytic effect. Thus, in the current empirical analysis, changes in the year that an IMF agreement is signed rather than changes during the IMF program implementation are taken into account. That means, the dummy variable, which is used to evaluate the effect of the IMF involvement in the empirical analysis, is set to1 only for the year when the agreement is signed rather that setting it to 1 during the program implementation.

Since observers claim that IMF agreements have a catalytic effect on the international flow of capital. The theory is based on the fact that the IMF

disbursements are conditional, and this conditionality ensures the implementation of market-oriented policies (Rodrik, 1995; Krueger, 1998). For international creditors, conditionality serves as an indicator of the recipient country's level of commitment to implement credible policies:

> What makes conditionality work as a signal is its contractual nature. The receipt of portions of the Fund's loan (referred to as tranches) are contingent on a state's commitment to austerity. State compliance with the program is assessed quarterly, and breaches of limits on the growth of the money supply or expenditure can force the Fund to suspend lending. In other words, observers see that a country signs a letter of intent, and this informs them that a country is adopting credible policies (Rodrik, 1995; Dhonte, 1997). As a result, one would expect an increase in flows of capital and investment following the decision to sign a Fund letter of intent. [references in original] (Edwards, 2005).

In contrast, others dispute the presence of a catalytic effect. They argue, first of all, that IMF programs aim to stabilize the economy in the concerned country rather than facilitating expansionary policies for a big surge in short-term economic growth.

Traditionally there are three main components of IMF strategies for addressing macroeconomic imbalances: "(1) reining in domestic demand through fiscal and credit restraint; (2) implementing structural reforms to promote a supply response and improve the efficiency of resource use; and (3) securing external financing to support the program." (Schadler, 1996). The first component, demand restraining measures, aims to restore the equilibrium between aggregate expenditure and aggregate income in the concerned country (Mussa and Savastano, 1999). Steps here include reducing

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government expenditure and introducing disciplinary monetary policies (i.e., raising interest rates) to bring the aggregate demand down. However, the results of such policies are likely to be mixed. Higher interest rates may attract some short-term capital; however, reduced aggregate demand due to declines in government expenditure, consumption, and investments may increase expectations regarding economic recession, which, in turn, may decrease portfolio and foreign direct investment. (Bird and Rowlands, 2002). Moreover, the effectiveness of the second and third components of the IMF strategy is similarly uncertain. IMF policies were highly criticized during the last financial crisis in Latin America and Asia, and for that reason investors may think that the credibility of the IMF strategies is not high enough to increase the credibility of the country under the IMF program. Lastly, IMF critics point out that since only countries facing severe financial problems seek for an agreement with the IMF, creditors may perceive an agreement with the IMF as an indicator of a weak financial position in the short run. They may find it riskier to invest in a country under an IMF program. To sum, critics have charged that IMF programs are often poorly designed, and, most importantly, that the implementation of these programs has been poor most of the time, which, in turn, can lead a zero or negative catalytic effect (Bird and Rowlands, 2002).

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Bird and Rowlands (2002) provide qualitative evidence of how investors perceive the IMF involvement in a country. Based on interviews with bankers, fund managers (including hedge fund and pension and mutual fund managers) and credit-rating agencies, these authors report that investors' decisions are "influenced" positively by the presence of the IMF in a country. In general, respondents report a positive catalysis, such that an IMF agreement makes a country more attractive than it would have been. However, Birds and Rowlands (2002) also show in detail that investors' decisions are influenced by the structure of the adjustment program, the short-term financial flows of the agreement, their own (not the IMF's) evaluation and judgments about the concerned country, and the degree of implementation of the program and the completion rate. In addition, the authors point out that credit rating agencies do not in a formal way take IMF involvement into account in their country risk analysis.

Bird and Rowlands' (2002) qualitative analysis also gives some clues about the "commitment" effect of an IMF agreement. They observe a positive catalytic effect for better performing countries with high completion rates. However, they conclude, the "signaling effect" of an IMF agreement is not so clear. Although potential lenders perceive an IMF agreement as a good sign, that does not mean they will provide loans with better terms. The reason, according to Birds and Rowlands (2002) is that investors

tend to rely on their own country analyses, which do not take into account IMF's involvement in a formal way.

In the light of these arguments, we can conclude that the overall effect of an IMF agreement on a recipient country's access to international capital markets is ambiguous and must be explored empirically.

Another counter argument on the catalytic effect is based on the theory that liquidity injection following an IMF program announcement is not due to "signaling" effects but to expected IMF bail-outs, namely investors' moral hazard. That is to say, markets assume that if they refuse to restructure the maturing debt, the IMF will provide resources to finance investors' exit, indirectly. If investor moral hazard exists, this should be reflected in more positive country risk perceptions of private investors. That, in turn, leads to distorted credit allocation and an increased risk of future crisis (Fischer, 1999; Dreher, 2004). However, the catalysis effect and moral hazard effect are observationally equivalent, because both are associated with an increase in capital flows at the same time (Eichengreen and Mody, 2001; Diaz-Cassou et al., 2006).

In this thesis I will not try to distinguish the effect of moral hazard and the catalytic effect, because if there is an increase in gross capital inflows either because investors perceive IMF programs as a signal for economic development or because foreign investors see the IMF as a guarantor for their investments, that will be in

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accord with the claim of the IMF, which is based on the idea that IMF involvement encourages foreign private investors to engage in riskier investments (Fischer, 1999; IMF Fact Sheet, 2001). Indeed, the catalytic effect and the moral hazard effect both work in the same direction and increase access to international capital markets for borrower countries. Moral hazard can even be considered a side effect of the catalytic effect. Precautionary policies (e.g., encouraging better communication between countries and creditors, and encouraging adoption of contract clauses that will make restructuring of debts easier when that becomes essential) are needed to avoid future financial crisis due to the moral hazard problem (Fischer, 1999). However, investigating the effects of moral hazard is outside the scope of this thesis.

Previous Empirical Studies

Studies of the catalytic effects of IMF agreements generally concentrate on various types of capital flows (e.g., foreign direct investment and portfolio flows). These studies, however, have produced mixed results mainly depending on country specific conditions and type of capital flows. Findings on catalytic effect in selected studies are summarized in Table 1.

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Table 1: Summary of Studies

Study	Data Set	Years	Dependent Variable	Catalytic Effect	Effect Type
Eichengreen and Mody (2001)	N.A.	1991-1999	Bond Spreads	+** (b)	Signaling and Commitment
Mody and Saravia (2003)	N.A.	1990-2000	Bond Spreads	+***(c)	Signaling and Commitment
Brune et al. (2004)	96 Countries	1985-1999	Privitization Revenue	+**	Signaling and Commitment
Jensen (2004)	68 Countries	1970-1998	FDI	-**	Signaling and Commitment
Edwards (2005)	106 Countries	1979-1995	Portfolio Flows	+***(d)	Signaling and Commitment
Edwards (2006)	126 Countries	1979-1995	Portfolio Flows	-	Signaling
Díaz-Cassou et al. (2006)	156 Countries	1970-2002	Total Flows	- -	Signaling Signaling and Commitment
Bird and Rowlands (2008)	68 Middle Income Countries	1979-2000	Private Non-Guaranteed Debt & FDI & Portfolio	-*	Signaling
			Portfolio (alone)	+**	
			FDI (alone)	-*	

***: significant at 1% level, **: significant at 5% level, *: significant at 10% level

(a) These studies correct for selection bias by using variety of techniques.
(b) If country has high credit rating.
(c) If the initial conditions of the country are not so bad.
(d) Conditional on success of program implementation.

With regard to the country specific conditions, there is a general tendency in these papers to conclude that IMF programs have a catalytic effect in countries with better initial fundamentals. Eichengreen and Mody (2001) find that in countries with poor credit ratings, the commitments entailed by IMF conditionality are not credible; however, IMF programs play a catalytic role in countries with high credit ratings. Similarly, Bird and Rowlands (2002) find that an IMF agreement is associated with a decrease in foreign direct investment (FDI) in poorer countries, while it is associated

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with an increase FDI in middle income countries. They also find that IMF programs are negatively correlated with subsequent portfolio flows in poorer countries and positively correlated in middle income countries. Mody and Saravia (2003) reach a similar conclusion that IMF programs can be very effective in countries with better reserve to import and debt to gross domestic product (GDP) ratios.

When different types of capital flows are considered there is no general consensus on the existence of the catalytic effect. Edwards (2006), when not controlling for program success, finds that IMF programs deter portfolio investment flows. However, when the success of the program is taken into account, Edwards (2005) found that states that successfully implemented an IMF program perform better than states not under an IMF program, and states that have their programs suspended by the IMF experience significant capital flight, exceeding levels that that level had the state not entered the program. Brune et al. (2004) show that the market value of state enterprises that come up for privatization is higher for the states under an IMF program as a result of a signal of credible policy reform provided by the IMF conditionality. In contrast, Jensen (2004) finds that "countries that sign IMF agreements, ceteris paribus, attract 25% less FDI inflows than countries not under IMF agreements". In a recent paper, Bird and Rowlands (2008) report that there is statistically significant evidence of negative catalysis; such that IMF programs lead to private capital outflows.

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However the results vary with the initial conditions of the country. Diaz-Cassou et al. (2006), taking into account the kind and the size of the IMF program, find that IMF programs in general do not help attract total private capital flows; but, in particular, programs that are oriented to crisis prevention perform better in attracting private flows than programs oriented to crisis resolution.

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Chapter 3. Methodology

Theoretical Framework

There are two main approaches to testing whether there is a catalytic effect. The first is the direct approach. That is, since the hypothesis is that IMF involvement increases net capital inflows, one can test the hypothesis directly by observing changes in net capital inflows. However, the direct approach has some serious disadvantages. First of all, a decrease in net capital flows may be a consequence of increased repayments by the concerned country, which can undermine the catalytic effect (Mody and Saravia, 2003). Second, under floating exchange rates decline in the current account deficit, which is a major goal of IMF programs, must lead to a decline in net capital inflows. That decline, in turn, may lead to a downward bias in the catalytic effect estimate (Cotarelli and Giannini, 2002).

The second approach is the indirect approach. For example, the effect of an IMF program could be observed in bond spreads instead of net capital flows. The indirect approach tests for the catalytic effect based on the assumption that lower spreads lead to higher private capital inflows and is not subject to the disadvantages of the direct approach,. However, lower spreads do not guarantee higher capital inflows and can only be used as a proxy for the catalytic effect.

The indirect approach, testing the impact of IMF programs on interest rate spreads rather than capital flows, investigates whether improved market access

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subsequent to IMF involvement improved the recipient country's ability to contract new debt at better rates. It does this by determining the spread at the time of bond issuance over the risk-free rate for a bond of similar maturity and currency denomination for bonds of similar value issued before and after IMF involvement. Rather than looking only at risk premium, however, I used a modified indirect approach. I argue that, the catalytic effect can be observed in levels of both the interest rate and maturity. Moreover, studying the variations in the risk premium while controlling for maturity may neglect the fact that the catalytic effect can reveal itself when a country under the IMF program gains access to loans with longer maturity, even if they have same or higher interest rate than before.

In an early paper, Sachs and Cohen (1982) state that a higher risk of country default is associated with a shorter maturity structure of the international lending. This finding is consistent with recent empirical evidence suggesting that countries with relatively higher short term debts are more likely to experience a financial crisis (Radelet and Sachs, 1998; Rodrik and Velasco, 1999). Given these facts, if a country under an IMF program lowers its country risk due to the existence of the program, then creditors may reflect this increase in perceived credit-worthiness by making longer term loans. In fact, Mina and Martinez-Vazquez (2002) find that the impact of IMF programs is in general to reduce short-term debt flows relative to total debt flows.

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To summarize, theory and evidence suggest that an IMF agreement may lead lower interest rates or longer maturity of debt. Hence, in this thesis, I will investigate the effect of an IMF agreement on both interest rates and maturities simultaneously.

The Model

To find the effect of an IMF program on access to international financial markets I estimate a model of the form

$\text{Ln(Maturity/Interest Rate}_{it}) = f(\text{IMF program dummy, Borrower country's conditions}_{it},$

$\text{Conditions in the international markets}_{it}).$

Since a borrower country's conditions affect both the probability of signing an IMF agreement and access to international markets, there is a high risk of selection bias. In order to deal with the selection bias problem, I conduct a two-stage estimation. First I run a selection model to estimate the probability of engaging in an IMF program by using a probit model. The selection model, variables, their definitions, expected signs and data sources are summarized in Table 2. Then, I run the original model by using the predicted probability of the first model, which is cleansed of the effects of the borrower country's conditions. The outcome model, variables, their definitions, expected signs and data sources are summarized in Table 3. The issue of selection bias will be discussed in greater detail later in this chapter.

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TABLE 2: <u>Model 1</u>: IMF = f(GDP Growth, Gross National Income (GNI) per capita, Inflation, Current Account Balance (CAB)/GNI, Openness to Trade, External Debt/GNI, Debt Service/GNI , Reserves in months of imports)

Variable	Definition	Expected Sign	Source
Dependent			
IMF	Dummy variable taking value of 1 if country signs an IMF agreement in year t, 0 otherwise.		IMF
Note: Dummy takes the value of 1 in a year if an agreement is signed from January to November. If it is signed in December, dummy takes value of 0 in this year and 1 next year.			
Independent			
i) Macroeconomic Variables			
GDP growth (annual %)	Gross domestic product is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	_	WDI
GNI per capita (current US$)	Gross national income per capita is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population.	_	WDI
Inflation, GDP deflator (annual %)	GDP implicit price deflator is defined as the price index that measures the change in the price level of GDP relative to real output.	+	WDI
Current account balance (% of GNI)	Current account balance is the sum of the credits less the debits arising from international transactions in goods, services, income, and current transfers. It represents the transactions that add to or subtract from an economy's stock of foreign financial items.	_	GDF
Openness to trade	Sum of exports and imports divided by GNI	+	GDF
ii) Debt-related Variables			
External debt stocks (% of GNI)	Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt.	+	GDF
Debt service on external debt, total (% of GNI)	Debt service is the sum of principal repayments and interest payments actually made	+/-	GDF
Reserves in months of imports	Reserves to imports (months): international reserves in months of imports of goods and services. (Reserves/(imports/12)).This ratio shows reserves expressed in terms of the number of months of imports of goods and services they could pay for.	_	GDF

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TABLE 3: <u>Model 2:</u> **ln(Maturity/Interest Rate) = f(IMF, GDP Growth, GNI per capita, ln(inflation), CAB/GNI, Commitments, External Debt/GNI, Reserves in months of imports, Market Yield on US Treasury Securities)**

Variable	Definition	Expected Sign	Source
Dependent			
Average maturity (years) / Average interest (%)	Average terms of new commitments provide information on the average terms of new commitments on public and publicly guaranteed external debt.		GDF
Independent			
i) Variable of Interest			
IMF (Predicted)	Predicted probability of engaging in an IMF agreement derived from the first model	+/-	IMF
ii) Macroeconomic Variables			
GDP growth (annual %)	As defined in Table 2	+	WDI
GNI per capita (current US$)	As defined in Table 2	+	WDI
Inflation, GDP deflator (annual %)	As defined in Table 2	-	WDI
Current account balance (% of GNI)	As defined in Table 2	+	GDF
iii) Debt-related Variables			
Commitments, public and publicly guar. (Bil.US$)	Public and publicly guaranteed long term consists of commitments from official creditors and commitments from private creditors.	+/-	GDF
External debt stocks (% of GNI)	As defined in Table 2	+	GDF
Reserves in months of imports	As defined in Table 2	-	GDF
iv) Indicator for International Market's Conditions			
Market yield on U.S. treasury securities	Market yield on U.S. Treasury securities at 1-year constant maturity, quoted on investment basis	-	FED

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The variables in the selection model are selected based on conventional wisdom and three studies (Jensen, 2004; Edwards, 2006 and Bird and Rowlands, 2008), in which predicted probability of engaging an IMF program is used as a tool for dealing with the selection bias problem. Variables in the selection model are cross referenced with these studies in the table below. In addition, *openness to trade*, defined as exports plus imports divided by GDP, is used as a trade indicator.

TABLE 4: Variable Selection for the Selection Model

Variables	Jensen (2004)	Edwards (2006)	Bird and Rowlands (2008)
GDP growth (annual %)	X	X	X
GNI per capita	X	X	X
Inflation	X	X	X
Current account balance (% of GNI)			X
External debt stocks (% of GNI)			X
Reserves in months of imports	X	X	
Openness to trade			
Debt service on external debt, total (% of GNI)		X	X

Note: Some variables are used in different scales

I follow a similar variable selection methodology for the outcome model. The variables in the outcome model are selected based on the same three papers (Jensen, 2004; Edwards, 2006 and Bird and Rowlands, 2008). Though all of the independent

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variables in these studies estimate various types of capital flows instead of terms of debt, they are used to determine the degree of catalytic effect. Hence I prefer to choose the independent variables in the outcome model based on these studies. Variables in the outcome model are cross referenced with these studies in Table 5. In addition, the amount of public and publicly guaranteed private commitments related to the dependent variable is included as an explanatory variable.

TABLE 5: Variable Selection for the Outcome Model

Variable	Jensen (2004)	Edwards (2006)	Bird and Rowlands (2008)
Dependent Variable	FDI Flows	Portfolio Flows	All Private Flows
Predicted probability of IMF	X	X	X
GDP growth (annual %)	X		X
GNI per capita	X		X
Inflation			X
Commitments (Billions US$)			
External debt stocks (% of GNI)			X
Reserves in months of imports			X
Openness to Trade	X		
Market yield on U.S. treasury securities		X	X*
Debt service on external debt, total (% of GNI)			X

Note: Some variables are used in different scales

* LIBOR is used instead

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Data

 I conduct the empirical analyses on three samples. The two smallest samples are subsets of the biggest sample, which is in the form of panel data. The first and largest sample contains 2784 observations covering 116 countries between 1984 and 2007. Determination of the countries in the second and the third samples is based on the list of the countries which are eligible for the World Bank International Development Association's (IDA) concessional loans. Concessional loans are a type of official development assistance (ODA), which provides the poorest countries with lower interest rates and longer debt maturities than they could find in private markets. Therefore the maturity to interest rate ratio of concessional loans does not reflect the country risk perception of the international financial markets. Since the dependent variable in my model is the maturity to interest rate ratio, concessional loans would bias the coefficients. In other words, the higher the concessional debt to external debt ratio the higher the risk of getting upward biased coefficients.

 The second sample excludes all countries eligible to receive ODA from IDA, but includes "blend countries", which are "IDA-eligible but credit-worthy enough to borrow from the International Bank for Reconstruction and Development" (World Bank, 2010). Hence, the second sample includes IDA countries with "better" economic indicators. It contains 1512 observations covering 62 countries between

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1984 and 2007. In contrast, the third sample excludes all IDA-eligible countries; and contains 1200 observations covering 48 countries in the same time period. Therefore, the third sample consists of countries with better macroeconomic fundamentals than IDA-eligible countries.

Means and standard deviations for the concessional debt as a percentage of total external debt are presented in the Table 5. The average percentage of concessional debt for the first sample is 44%; however, it is considerably lower for the second and the third samples. The third sample, with the lowest concessional debt percentage, is less likely to be prone to selection bias resulting from the impact of concessional debt.

Table 6: Concessional debt (% of total external debt)

	Sample - 1	Sample - 2	Sample - 3	Excluded IDA Countries	Excluded IDA - Blend Countries
Mean	43.93	25.37	18.48	61.63	50.42
Std. Dev.	30.79	23.29	18.61	24.54	21.40

The descriptive statistics of the variables used in both selection and outcome models for each sample are given below. In addition, a correlation matrix of the variables is presented in Appendix 2 which suggests no concerns for multicollinearity in my model regressions.

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Table 7: Descriptive Statistics (Sample - 1)

Variable	Observation	Mean	Std. Dev.	Min	Max
ln(Maturity/Interest)	2430	1.93	1.27	-1.238	7.03
IMF	2784	0.16	0.37	0	1
GDP growth (annual %)	2632	3.54	6.78	-51.03	106.28
GNI per capita (current US$)	2543	1533.42	1660.42	90	12000
ln(Inflation)	2422	2.30	1.48	-4.61	9.64
Current account balance (% of GNI)	2349	-5.06	9.57	-59.27	57.27
Commitments (US$)	2617	1.12	2.82	0	35.04
External debt stocks (% of GNI)	2522	79.93	88.37	0.14	1209.3
Reserves in months of imports	2311	3.50	2.88	-0.09	27.08
Market yield on U.S. treasury securities	2784	5.42	2.24	1.24	10.91
Openness to trade	2578	77.00	39.72	9.11	280.36
Debt service on external debt, total (% of GNI)	2522	5.62	5.92	0	112.08

Table 8: Descriptive Statistics (Sample - 2)

Variable	Observation	Mean	Std. Dev.	Min	Max
ln(Maturity/Interest)	1345	1.19	0.88	-1.24	4.32
IMF	1512	0.15	0.36	0	1
GDP growth (annual %)	1429	3.79	6.62	-44.9	88.96
GNI per capita (current US$)	1370	2442.13	1799.03	110	12000
ln(Inflation)	1328	2.27	1.53	-3.00	9.64
Current account balance (% of GNI)	1277	-3.81	8.63	-49.30	36.51
Commitments (US$)	1393	1.91	3.66	0	35.04
External debt stocks (% of GNI)	1341	51.88	33.92	0.14	384.01
Reserves in months of imports	1274	3.98	3.31	0.03	27.08
Market yield on U.S. treasury securities	1512	5.42	2.24	1.24	10.91
Openness to trade	1390	81.58	39.90	12.35	252.74
Debt service on external debt, total (% of GNI)	1341	6.26	4.79	0	54.22

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Table 9: Descriptive Statistics (Sample - 3)

Variable	Observation	Mean	Std. Dev.	Min	Max
ln(Maturity/Interest)	1063	0.97	0.68	-1.24	4.32
IMF	1200	0.16	0.37	0	1
GDP growth (annual %)	1130	3.61	5.65	-42.45	38.2
GNI per capita (current US$)	1090	2696.84	1835.22	250	12000
ln(Inflation)	1050	2.34	1.50	-3.00	8.83
Current account balance (% of GNI)	1021	-2.36	7.26	-39.76	36.51
Commitments (US$)	1100	2.15	3.92	0	35.04
External debt stocks (% of GNI)	1060	51.85	32.04	0.14	253.21
Reserves in months of imports	1014	4.29	3.53	0.03	27.08
Market yield on U.S. treasury securities	1200	5.42	2.24	1.24	10.91
Openness to trade	1098	79.89	40.14	12.35	252.74
Debt service on external debt, total (% of GNI)	1060	6.78	4.98	0	54.22

Selection Bias

Until recently, only a few studies have taken into account the non-random

nature of IMF programs and dealt with the selection bias problem empirically

(Eichengreen and Mody, 2001; Mody and Saravia, 2003; Jensen, 2004; Brune et al.,

2004; Edwards, 2005, 2006; Diaz-Cassou et al., 2006; Bird and Rowlands, 2008). The

selection bias problem is clearly defined by Edwards (2005):

> The existing studies on catalytic finance also neglect the nonrandom nature
> of IMF programs, and this also poses an inferential problem, since we
> know that the same variables that affect financial flows, such as high levels
> of debt service, also affect whether or not a state goes to the Fund. States
> seek IMF programs for specific reasons, and we have to understand these
> reasons since they might also affect financial flows. Failure to do this

compromises one of the assumptions that we make in regression, which is that variables that are correlated with other independent variables that are not in the model do not systematically affect the dependent variable. Since we would suspect that the sample of Fund client states will be less likely to attract catalytic finance even if they did not go to the Fund (owing to their weak macroeconomic fundamentals), a simple regression model can underestimate the effects of the Fund.

General practice in dealing with the selection bias problem is to use a Heckman correction procedure (Eichengreen and Mody, 2001; Mody and Saravia, 2003 and Brune et al., 2004) or various applications of the two stage least squares method (Jensen, 2004; Edwards, 2005, 2006; Diaz-Cassou et al., 2006; Bird and Rowlands, 2008). In the first stage of the two stage estimation, the probability of signing an agreement with the IMF is estimated in order to acquire an exogenous variable of interest. In the second stage, the predicted probability of engaging an agreement with the IMF is used as a proxy for the variable of interest. I also used a two stages least squares method to deal with the selection bias problem and details of my method will be explained in the following chapter.

As mentioned, the variable selection of the selection model in the present study is based on the models of Jensen (2004), Edwards (2006) and Bird and Rowlands (2008). Edwards (2006) and Bird and Rowlands (2008) use one-year-lagged variables to predict the probability of engaging in an IMF agreement. In contrast, Jensen (2004) does not use lagged variables. With Jensen, I preferred not to use lagged variables in

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the selection model, because I assume that countries would sign an IMF agreement as a quick response to a financial crisis or urgent liquidity requirement, which cannot be captured by lagged variables. To test my assumption, I ran several selection models with lagged variables; however, as I expected, the selection model with level variables provided better fit for the actual data.

Robustness Tests

I conducted several robustness tests to get the most consistent and reliable results. My main concern was a possible reverse causality problem –i.e., that a change in the dependent variable might affect some of the independent variables in addition to the usual causal relationship assumed in the regression. Regarding the variable of interest, the IMF dummy, however, reverse causality is unlikely to occur because the two-stage least-squares method generates an exogenous predicted probability of engaging an IMF agreement. Since the predicted probability of engaging an IMF agreement is exogenous, endogeneity problem caused by a reverse causality is not expected for the variable of interest.

I also estimated various models with lagged variables in order to avoid possible reverse causality problems for the other variables; however, lagged variables were highly insignificant most of the time. More specifically, only the lagged *reserves in months of imports*, *GDP growth* and *GNI per capita* were statistically significant for

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the first sample, and none of the lagged variables were significant for the other samples, which are subsets of the first sample. This result is probably due to the fact that the dependent variable, maturity to interest rate ratio, is highly responsive to current changes rather than changes in previous years, because changes in macroeconomic fundamentals may exert an immediate influence on expectations about country risk. In contrast, changes in the dependent variable may affect the independent variables in the subsequent time periods, because improved access to international financial markets would have an indirect effect on macroeconomic fundamentals. Therefore, the probability of reverse causality would be less a serious problem than initially conceived.

In addition, I conducted Hausman endogeneity tests[2] (Hausman, 1978) in the case of variables that economic theory suggests might pose an endogeneity problem. These variables are GDP growth and debt service on external debt. Although changes in the dependent variable would typically affect GDP growth and debt service on external debt *in the subsequent period*, reverse causality is still possible in the current period. Hausman endogeneity testing suggests that debt service on external debt is exogenous for all of my samples. The test results also suggest that GDP growth is exogenous for the second and the third sample sets; however, it is endogenous for the

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[2] *Current account balance (% of GDP)* and *openness to trade* are used as additional exogenous variables in estimating the reduced form for tested variables.

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first sample set. In order to avoid a potential bias I conduct a two-stage estimation method for the GDP growth variable for the first sample set. The details of this estimation will also be discussed in the next chapter.

One might also argue that the catalytic effect can be observed during the program implementation; so the model should control for the program implementation. I account for the impact of the implementation of an IMF agreement by using a dummy variable which is set to 1 during the program implementation as opposed to the announcement year only. However, program duration data is unavailable and in the first year I do not expect a strong commitment effect. Hence the dummy variable that I employ appropriately captures the signaling effect. A dummy variable trying to approximate durations to measure the commitment effect after the first year would have to be speculative, because data on program durations are unavailable. Since I can identify the signaling effect, which is my interest, I do not speculate about such a commitment dummy.

Chapter 4. Results

I test the IMF's signaling effect on three samples. I estimate all outcome models with fixed effects, which are preferred to random effects models based on the Hausman test results, using an AR(1) model in order to eliminate autocorrelation. I find that signing an agreement with the IMF significantly improves the terms of debt, which implies an improvement in access to international capital markets.

As a first step, I run a selection model for each sample as can be seen from Table 10. *GDP growth*, *current account balance*, *reserves in months of imports*, and *openness to trade* are statistically significant for all selection models, and all of them are theoretically consistent except *current account balance*. In theory, an increase in the current account balance would decrease the probability of engaging in an IMF agreement. The positive coefficient of the *current account balance* variable can be the consequence of the change in the role of the IMF. As mentioned earlier, the IMF's main concern was shifted from current account deficits to overall macroeconomic performance. Therefore, an increase in current account balance can be the result of a currency depreciation or contraction in domestic demand due to a financial crisis, which can lead to an agreement with the IMF. On the other hand, the variables *GNI per capita*, *inflation* and *debt service on external debt* are statistically significant for the first

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Table 10: Impact of an IMF Agreement on Terms of Public and Publicly Guaranteed Private Debt (Corrected for Selection Bias)

	Sample-1 (116 Countries) (Corrected for Endogeneity)		Sample-2 (62 Countries) (No Endogeneity Concerns)		Sample-3 (48 Countries) (No Endogeneity Concerns)	
	Selection Model	Outcome Model	Selection Model	Outcome Model	Selection Model	Outcome Model
Dependent Variable	IMF	ln(Maturity/ Interest)	IMF	ln(Maturity/ Interest)	IMF	ln(Maturity/ Interest)
Predicted probability of an IMF agreement	.. ..	0.804754* (0.464956)	.. ..	1.028557** (0.505804)	.. ..	1.735700*** (0.509561)
GDP growth (annual %)	-0.022225*** (0.006817)	0.069383***(a) (0 .025011)	-0.040193*** (0.010529)	0.015888** (0.006706)	-0.040231*** (0.011669)	0.024517*** (0.007537)
GNI per capita	-0.000075*** (0.000029)	-0.000038 (0. 000031)	-0.000048 (0.000036)	-0.000002 (0.000022)	-0.000047 (0.000040)	0.000025 (0.000021)
ln(Inflation)	0.064622** (0.028023)	-0. 010916 (0. 022784)	0.046814 (0.041739)	-0.068569*** (0.022353)	0.024751 (0.046142)	-0.052779** (0.022957)
Current account balance (% of GNI)	0.013953*** (0.004713)	.. ..	0.016865** (0.007858)	.. ..	0.021558** (0.010495)	.. ..
Commitments (Billions US$)	.. ..	-0. 014524 (0. 010109)	.. ..	-0.016611** (0.008158)	.. ..	-0.014395* (0.007782)
External debt stocks (% of GNI)	0.000594 (0.000572)	-0. 000346 (0. 000448)	0.009175*** (0.002167)	-0.002071 (0.001732)	0.009357*** (0.002340)	-0.004940*** (0.001748)
Reserves in months of imports	-0.032773** (0.016397)	0. 063341*** (0. 012884)	-0.058171** (0.024110)	0.040702*** (0.013461)	-0.054993** (0.025541)	0.034031*** (0.013043)
Market yield on U.S. treasury securities	.. ..	-0. 050620*** (0. 011906)	.. ..	-0.047354*** (0.012196)	.. ..	-0.042379*** (0.012495)
Openness to trade	-0.003739*** (0.001169)	.. ..	-0.006091*** (0.001821)	.. ..	-0.006030*** (0.002058)	.. ..
Debt service on external debt, total (% of GNI)	0.032574*** (0.006526)	-0. 00384 (0. 007195)	0.000938 (0.013895)	-0.005105 (0.006403)	-0.002080 (0.015057)	0.001069 (0.006152)
Constant	-0.690547*** (0.147814)	1.76994*** (0. 093561)	-0.590738** (0.270080)	1.402224*** (0.096732)	-0.524495* (0.309241)	1.021754*** (0.106513)

***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

(a)   Predicted values for GDP growth are used to avoid reverse causality

sample, but not for the others. In contrast, the variable *external debt stock* is statistically significant for the second and third samples, but not for the first sample.

In the second step, I follow another first stage estimation to deal with the endogeneity problem of the GDP growth in the first model. The determinants of GDP growth are selected based on studies of Barro and Sala-i-Martin (1995) and Barro (1999) on the sources of economic growth. The results are presented in Table 11.

Table 11: Selection model for the GDP growth

	Sample - 1 (116 Countries)
Dependent Variable	**GDP Growth**
GNI per capita	0.00152*** (0.00039)
GNI per capita (squared)	-0.0000001*** (0.00000004)
Inflation	-0.00105*** (0.00026)
Change in current account balance	0.00005 (0.00006)
Openness to trade	0.03434*** (0.00842)
Constant	-0.38762 (0.57576)

***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

Although the signs of the coefficients are generally consistent with the findings of Barro and Sala-i-Martin (1995) and Barro (1999), there are important differences as

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well. First these authors use the growth of GDP per capita (as an indicator of economic growth) as the dependent variable, whereas I use GDP growth. Second, the data sets in the Barro and Sala-i-Martin (1995) and Barro (1999) studies are considerably different from my data set, in terms number of countries, number of observations and time period. Third, and most importantly, they find a negative association between GDP per capita and economic growth, whereas I find a positive marginal effect of the variable *GNI per capita*. One reason for this difference could be the different data sets. One other reason could be a possible omitted variable bias. Both Barro and Sala-i-Martin (1995) and Barro (1999) find that social indicators, such as level of schooling, life expectancy, rule of law, democracy and fertility rate have significant impact on economic growth. Although, I tried to include these variables in the selection model in order to avoid omitted variable bias, I was unable to find sufficient data. Hence omitting these variables may bias the coefficient of *GNI per capita* in the selection model. Theoretically, if we consider *GNI per capita* a proxy for the omitted variables, the net effect could well be positive. So I use the predicted values of the selection model for *GDP growth* in the outcome model for the first sample set. Moreover, I presented the result without endogeneity correction for the first sample set in Appendix 3 for comparison purposes.

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In the third step, the predict probability of engaging in an IMF program derived from the selection models is used in the outcome model to avoid the selection bias problem. The results are presented in Table 10. The *predicted probability of an IMF agreement* is positive and statistically significant for all samples. The impact of an IMF agreement is highest for the third sample, which only includes countries with "better" economic fundamentals. The impact is lowest for the first sample which includes all countries. Hence as we move from the first sample to the subsets of this sample consisting countries with "better" macroeconomic fundamentals, the impact of an IMF agreement increases. This finding is consistent with the findings in the literature of a negative catalytic effect in general, but a positive catalytic effect for countries with better economic fundamentals.

Considering the higher concessional debt to external debt ratio in the first data set, one can claim that the coefficients are biased upward due to the fact that maturity to interest rate ratio of concessional debts is artificially higher. However, the coefficient of the *predicted probability of an IMF agreement* variable in the third set of results is higher than the one in the first set of results, although the third data set has a considerable lower concessional debt to external debt ratio. This indicates a strong positive catalytic effect in the third data set.

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The variables *GDP growth*, *reserves in months of imports* and *market yield on U.S. treasury securities* are statistically significant and theoretically consistent in all outcome models. In contrast, *GNI per capita* and *debt service on external debt* are statistically insignificant in all outcome models. *Inflation* and *commitments* are statistically insignificant variables for the first sample, but significant for other samples. *External debt stocks*, on the other hand, is statistically significant only for the third sample. All significant variables are also consistent with economic theory.

The greater impact of an IMF agreement for the third sample indicates stronger positive catalytic effects for better performing countries, which is parallel to findings in the literature. This finding holds even without the endogeneity correction as can be seen from Appendix 3. Moreover the positive impact of an IMF agreement on the terms of debt for the first and second samples shows us that the IMF "seal of approval" improves the terms of debt whether it is concessional or not.

In addition, I investigate the impact of an IMF agreement on the interest rate. The results, which are presented in the Appendix 4, are consistent with the findings in the literature. When the interest rate is set as the dependent variable, while controlling for debt maturity, the findings indicate a negative catalytic effect for the first and second samples and a positive catalytic effect for the third sample. These findings support my theory that studying the variations in the risk premium while controlling

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for maturity may neglect the fact that the catalytic effect can reveal itself when a country under the IMF program gains access to loans with longer maturity, even they have same or higher interest rates than before. In other words, the results presented in Table 10 indicate that investigating the effect of an IMF agreement taking into account both the interest rate and the maturity generates significant and positive catalytic effects for all samples.

Chapter 5. Conclusion and Policy Implications

In general, the literature on the catalytic effect of IMF agreements reaches pessimistic results. Given the empirical evidence, it is hard to explain the willingness of developing countries to sign agreements. In contrast to much of the literature, this thesis suggests that IMF agreements *do* produce catalytic effect and that, therefore, borrowing countries are behaving rationally. They accurately process prospect of the improved access to international financial markets when the agreement is announced. I concentrate on this "signaling" effect of an IMF agreement on the terms of public and publicly guaranteed private debt of the borrower countries in order to determine whether an IMF agreement improves access to international financial markets.

My main argument in the analysis is that a catalytic effect can be observed in levels of both the interest rate and maturity, such that an analysis of the impact of an IMF agreement on terms of debt has to consider variations in both interest rate and maturity of the debt. Therefore my empirical analysis takes into account the maturity to interest rate ratio of public and publicly guaranteed private debt.

I investigate the "signaling" effect of an IMF agreement on three sample sets. The first sample, a panel data, consists of 116 countries between 1984 and 2007. Countries in the second sample (62 countries) and in the third sample (48 countries), which are subsets of the first sample, are selected based on their eligibility to receive

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IDA's concessional loans. A two stage least squares estimation method is used to avoid selection bias problems. In addition, the estimation is corrected for the endogeneity, and several robustness tests are conducted to ensure the consistency of the results.

My empirical analysis shows that an IMF agreement improves borrower countries' access to international financial markets for all samples. Moreover, the impact of an IMF agreement increases as we move from the first sample to third sample, which includes better performing countries. In other words, when I control for the conditions leading to an IMF agreement, I find a positive catalytic effect of an IMF agreement which is getting stronger as the macroeconomic fundamentals of the concerned country get "better" on average. The impact of an IMF agreement is the highest for the third sample and this is consistent even if the one estimation is not corrected for endogeneity. This finding is consistent with the findings in the literature. However, in contrast to the empirical evidence in the literature, I also find evidence indicating a positive catalytic effect when the empirical analysis is extended to all countries.

In addition, in order to test my theory that studying variations in the risk premium while controlling for maturity may neglect the fact that the catalytic effect can reveal itself when a country under the IMF program gains access to loans with

longer maturity even they have same or higher interest rates than before, I estimate all models by setting the interest rate as the dependent variable while controlling for the maturity of the debt. I find a negative catalytic effect for the second and third samples and a positive catalytic effect for the first sample, which is consistent with the literature. These robustness test findings support my concern that investigating the catalytic effect of variations in interest rates while controlling debt maturities may undermine estimates of the catalytic effect, because catalytic effect can also be observed in the variations of maturities. Indeed, my investigation on the catalytic effect on the variations of the maturity to interest rate ratio reveals that an IMF agreement has a positive catalytic effect for all samples.

The results, presented in Table 10, suggest an IMF agreement improves access to financial capital markets by enabling better terms for loans. These results help to explain why countries are so eager to sign an IMF program despite the serious criticisms of such programs. They are also helpful in explaining why the IMF's "seal of approval" is so important for developing countries. Based on these results, several policy implications can be drawn.

From the IMF's perspective, borrower country's improved access to international financial market may lead to a moral hazard. Since borrower countries can find additional financial resources as they signed the agreement, they are less

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likely to comply with the conditionality attached to the IMF disbursements. Indeed, Mussa and Savastano (1999) found that 75% or more of the IMF loan was disbursed for only 45.5% of IMF agreements over the period 1973 and 1997, which shows a very low compliance rate (under the assumption that at least 75% disbursement of total commitments is considered to be an indication of high compliance with conditionality). Moreover, according to their study, this ratio falls to 27.6% over the period 1993 and 1997, when the structural conditionality increased (Buira, 2003). The IMF has only pointed to the lack of commitment, political will and "ownership" of the borrower country to explain the low levels of completion of the programs (Bird and Willett, 2004). However, the catalytic effect can explain all of these variables, because as the borrower country's credibility increases with the IMF agreement they are able to improve their access to financial resources and become less dependent on the IMF disbursement. Hence, the conditionality becomes a tool to keep the IMF's involvement within the country rather than a goal to get the IMF disbursements, and as a result countries drag reforms on for decades.

As my empirical analysis shows that an IMF agreement improves borrower country's access to financial markets, which is in accordance with the IMF's goals, the positive catalytic effect also encourages borrower country's moral hazard. Therefore, the IMF programs should be designed considering the possible borrower's moral

hazard. Designing more flexible exit strategy, increasing cost of borrowing in case of low completion rate or limiting access to IMF loans in the consequent agreements can be effective policy options in order to avoid borrower's moral hazard.

From the borrower country's perspective, this study would imply more elaborate evaluations of the financial requirements of the country. During the negotiations with the IMF, the catalytic effect of the agreement should also be taken into account. If the IMF's financial assistance is large in size comparatively, that may come with the rigorous conditions; because conditionality serves as a guarantee for repayment. Hence, smaller financial assistance accompanying with the catalytic effect might be the optimal solution.

To sum up, the results indicate an improvement in access to international financial capital markets when an IMF program is announced. This conclusion implies important evidence to understand the motivation for engaging an IMF agreement. Moreover, since the catalytic effect implies less dependence on IMF disbursements, these findings give important clues to understand why debtor countries are less likely to comply with the conditionality attached to the IMF disbursements.

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Appendixes

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Appendix 1: Countries Included in the Data Sets

Countries with no IMF Agreement	Countries That Had an IMF Agreement		
Angola[1]	Albania[1,2,3]	Ethiopia[1]	Mozambique[1]
Botswana[1,2,3]	Algeria[1,2,3]	Gabon[1,2,3]	Nepal[1]
El Salvador[1,2,3]	Argentina[1,2,3]	Gambia, The[1]	Nicaragua[1]
Eritrea[1]	Armenia[1,2]	Georgia[1,2]	Niger[1]
Fiji[1,2,3]	Azerbaijan[1,2]	Ghana[1]	Nigeria[1]
Lebanon[1,2,3]	Bangladesh[1]	Grenada[1,2]	Pakistan[1,2]
Malaysia[1,2,3]	Belarus[1,2,3]	Guatemala[1,2,3]	Panama[1,2,3]
Maldives[1]	Belize[1,2,3]	Guinea[1]	Papua New Guinea[1,2]
Seychelles[1,2,3]	Benin[1]	Guinea-Bissau[1]	Paraguay[1,2,3]
Solomon Islands[1]	Bolivia[1]	Guyana[1]	Peru[1,2,3]
South Africa[1,2,3]	Bosnia and Herzegovina[1,2]	Haiti[1]	Philippines[1,2,3]
St. Kitts and Nevis[1,2,3]	Brazil[1,2,3]	Honduras[1]	Poland[1,2,3]
St. Lucia[1,2]	Bulgaria[1,2,3]	India[1,2]	Romania[1,2,3]
St. Vincent and the Grenadines[1,2]	Burkina Faso[1]	Indonesia[1,2,3]	Russian Federation[1,2,3]
Swaziland[1,2,3]	Burundi[1]	Jamaica[1,2,3]	Rwanda[1]
Tonga[1]	Cambodia[1]	Jordan[1,2,3]	Sierra Leone[1]
Vanuatu[1]	Cameroon[1]	Kazakhstan[1,2,3]	Somalia[1]
	Cape Verde[1,2]	Kenya[1]	Sri Lanka[1]
	Central African Republic[1]	Kyrgyz Republic[1]	Sudan[1]
	Chad[1]	Lao PDR[1]	Tajikistan[1]
	Chile[1,2,3]	Latvia[1,2,3]	Tanzania[1]
	China[1,2,3]	Lesotho[1]	Thailand[1,2,3]
	Colombia[1,2,3]	Liberia[1]	Togo[1]
	Comoros[1]	Macedonia, FYR[1,2,3]	Tunisia[1,2,3]
	Congo, Rep.[1]	Madagascar[1]	Turkey[1,2,3]
	Costa Rica[1,2,3]	Malawi[1]	Uganda[1]
	Cote d'Ivoire[1]	Mali[1]	Ukraine[1,2,3]
	Croatia[1,2,3]	Mauritania[1]	Uruguay[1,2,3]
	Djibouti[1]	Mauritius[1,2,3]	Venezuela, RB[1,2,3]
	Dominica[1,2]	Mexico[1,2,3]	Vietnam[1,2]
	Dominican Republic[1,2,3]	Moldova[1]	Yemen, Rep.[1]
	Ecuador[1,2,3]	Mongolia[1]	Zambia[1]
	Egypt, Arab Rep.[1,2,3]	Morocco[1,2,3]	Zimbabwe[1,2]

Note: [1]: Countries included only in the first sample;
[1,2]: Countries that are included both in the first and the second samples;
[1,2,3]: Countries included in all samples.

Appendix 2: Correlation Matrix (Sample - 1)

	Ln (Maturity/ Interest)	IMF	GDP growth (annual %)	GNI per capita	Ln (Inflation)	Current account balance (% of GNI)	Commitments (Billion US$)	External debt stocks (% of GNI)	Reserves in months of imports	Market yield on US treasury securities	Openness to Trade	Debt service on external debt, total (% of GNI)
ln(Maturity/ Interest)	1											
IMF	0.0274	1										
GDP growth (annual %)	0.0317	-0.1397	1									
GNI per capita	-0.5102	-0.0884	0.0601	1								
ln(Inflation)	-0.1242	0.1273	-0.2159	-0.1532	1							
Current account balance (% of GNI)	-0.1527	0.0386	0.0726	0.0009	0.0482	1						
Commitments (Billion US$)	-0.3351	-0.004	0.0548	0.2503	0.0553	0.1646	1					
External debt stocks (% of GNI)	0.2047	0.0896	-0.1118	-0.2306	0.2223	-0.4036	-0.1555	1				
Reserves in months of imports	-0.0793	-0.0632	0.1221	0.1776	-0.063	0.3304	0.165	-0.1857	1			
Market yield on US treasury securities	-0.1398	0.0601	-0.0819	-0.1941	0.1933	-0.0006	-0.0382	0.0467	-0.1855	1		
Openness to Trade	-0.0713	-0.0801	0.0967	0.2313	-0.2015	-0.132	-0.2354	0.0613	-0.1502	-0.1599	1	
Debt service on external debt, total (% of GNI)	-0.2837	0.1252	-0.0367	0.1743	0.035	-0.0602	0.0808	0.3515	-0.0738	0.0375	0.2366	1

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Appendix 2: Correlation Matrix (Sample - 2)

	Ln (Maturity/ Interest)	IMF	GDP growth (annual %)	GNI per capita	ln(Infla-tion)	Current account balance (% of GNI)	Commit ments (Billion US$)	External debt stocks (% of GNI)	Reserves in months of imports	Market yield on US treasury securities	Openness to Trade	Debt service on external debt, total (% of GNI)
ln(Maturity/ Interest)	1											
IMF	-0.0286	1										
GDP growth (annual %)	0.1693	-0.1983	1									
GNI per capita	-0.2678	-0.088	0.0024	1								
ln(Inflation)	-0.2689	0.1732	-0.2686	-0.1643	1							
Current account balance (% of GNI)	-0.1803	0.0555	0.0246	-0.1523	0.2191	1						
Commitments (Billion US$)	-0.2531	0.0152	0.0145	0.1031	0.0928	0.1673	1					
External debt stocks (% of GNI)	-0.0545	0.2003	-0.1549	0.0058	-0.0413	-0.1491	-0.1404	1				
Reserves in months of imports	-0.0367	-0.0727	0.1156	0.0938	0.0208	0.3828	0.1363	-0.1758	1			
Market yield on US treasury securities	-0.195	0.0253	-0.0326	-0.258	0.2124	0.0233	-0.03	0.0597	-0.1427	1		
Openness to Trade	0.154	-0.1111	0.0879	0.2	-0.3396	-0.2239	-0.376	0.1283	-0.2696	-0.1286	1	
Debt service on external debt, total (% of GNI)	-0.2389	0.1104	-0.0686	0.1564	-0.0737	0.0199	0.0466	0.6496	-0.0714	0.0123	0.0864	1

Appendix 2: Correlation Matrix (Sample - 3)

	Ln (Maturity/ Interest)	IMF	GDP growth (annual %)	GNI per capita	ln(Infla-tion)	Current account balance (% of GNI)	Commit ments (Billion US$)	External debt stocks (% of GNI)	Reserves in months of imports	Market yield on US treasury securities	Open.to Trade	Debt service on external debt, total (% of GNI)
ln(Maturity/ Interest)	1											
IMF	-0.0281	1										
GDP growth (annual %)	0.1208	-0.2118	1									
GNI per capita	-0.168	-0.0978	0.0464	1								
ln(Inflation)	-0.2553	0.1651	-0.3012	-0.1978	1							
Current account balance (% of GNI)	0.0131	0.0337	-0.0175	-0.202	0.1599	1						
Commitments (Billion US$)	-0.2347	0.0137	0.0226	0.1204	0.0655	0.1028	1					
External debt stocks (% of GNI)	-0.016	0.2113	-0.1227	-0.0447	-0.0326	-0.1775	-0.1354	1				
Reserves in months of imports	0.0892	-0.0837	0.1472	0.0637	-0.0034	0.3897	0.0851	-0.1953	1			
Market yield on US treasury securities	-0.1983	0.0344	-0.0335	-0.2827	0.2282	-0.0299	-0.0486	0.1075	-0.1441	1		
Openness to Trade	0.1834	-0.102	0.0992	0.1812	-0.3501	-0.1423	-0.3389	0.1346	-0.2397	-0.1497	1	
Debt service on external debt, total (% of GNI)	-0.1162	0.0971	-0.013	0.1178	-0.1298	-0.1161	0.0353	0.6581	-0.1244	-0.0005	0.1288	1

Appendix 3: Impact of an IMF Agreement on Terms of Public and Publicly Guaranteed Private Debt for Sample-1 (Uncorrected for Endogeneity)

	Sample-1 (116 Countries)	
	Selection Model	Outcome Model
Dependent Variable	**IMF**	**ln(Maturity/ Interest)**
Predicted probability of an IMF agreement	.. ..	1.596722*** (0.601644)
GDP growth (annual %)	-0.022225*** (0.006817)	0.014861*** (0.005250)
GNI per capita	-0.000075*** (0.000029)	0.000012 (0.000028)
ln(Inflation)	0.064622** (0.028023)	-0.029577 (0.022681)
Current account balance (% of GNI)	0.013953*** (0.004713)	.. ..
Commitments (Billions US$)	.. ..	-0.014683 (0.010048)
External debt stocks (% of GNI)	0.000594 (0.000572)	-0.000178 (0.000440)
Reserves in months of imports	-0.032773** (0.016397)	0.072406*** (0.012579)
Market yield on U.S. treasury securities	.. ..	-0.058268*** (0.011797)
Openness to trade	-0.003739*** (0.001169)	.. ..
Debt service on external debt, total (% of GNI)	0.032574*** (0.006526)	-0.011318 (0.007810)
Constant	-0.690547*** (0.147814)	1.839487*** (0.082315)

***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

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Appendix 4:	Sample - 1 (116 Countries)	Sample - 2 (62 Countries)	Sample - 3 (48 Countries)
	Outcome Model	Outcome Model	Outcome Model
Dependent Variable	**ln(Interest)**	**ln(Interest)**	**ln(Interest)**
Predicted probability of an IMF agreement	1.67206*** (0.38948)	0.07915 (0.32379)	-0.32556 (0.33309)
ln(Maturity)	-0.44868*** (0.02931)	-0.21006*** (0.03142)	-0.14973*** (0.03383)
GDP growth (annual %)	0.00884*** (0.00341)	0.00164 (0.00429)	-0.00138 (0.00492)
GNI per capita	0.00005*** (0.00002)	0.00002 (0.00001)	0.00000 (0.00001)
ln(Inflation)	-0.02981** (0.01451)	0.03035** (0.01428)	0.01750 (0.01490)
Commitments (Billions US$)	0.00935 (0.00638)	0.00906* (0.00520)	0.00965* (0.00504)
External debt stocks (% of GNI)	0.00062** (0.00028)	0.00016 (0.00111)	0.00153 (0.00114)
Reserves in months of imports	-0.00784 (0.00799)	-0.00956 (0.00865)	-0.00797 (0.00854)
Market yield on US treasury securities	0.07255*** (0.00737)	0.07158*** (0.00783)	0.06942*** (0.00822)
Debt service on external debt, total (% of GNI)	-0.00977** (0.00498)	0.00831** (0.00408)	0.00456 (0.00397)
Constant	1.83978*** (0.07471)	1.64206*** (0.08048)	1.69815*** (0.08560)

***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

References

Barnett, M. N. and Finnemore M. (1999). <u>The Politics, Power, and Pathologies of</u>
  <u>International Organizations.</u> International Organization, Vol. 53, No. 4, pp.
  699-732.

Barro, R.J. (1999). <u>Determinants of Economic Growth: Implications of the Global</u>
  <u>Evidence for Chile.</u> Cuadernos de Economia, 36 (107), 443-478

Barro, R. J. and Lee, J. (2005). <u>IMF Programs: Who Is Chosen And What Are The</u>
  <u>Effects?</u> Journal of Monetary Economics, Vol. 52, 1245-1269.

Barro, R.J. and Sala-i-Martin, X. (1995). <u>Economic Growth.</u> New York: McGraw Hill.

Bird, G. and Rowlands, D. (2002). <u>Do IMF Programmes have a Catalytic Effect on</u>
  <u>other International Capital Flows?</u> Oxford Development Studies, 20 (3), 229-
  249.

Bird, G. and Rowlands, D. (2008). <u>Catalyzing Private Capital Flows and IMF</u>
  <u>Programs: Some Remaining Questions.</u> Journal of Economic Policy Reform,
  Vol. 11, No. 1, 37-43.

Bird, G. & Willett, T. (2004). <u>IMF Conditionality, Implementation and the New</u>
  <u>Political Economy of Ownership.</u> Comparative Economic Studies, 46 (3), 423-
  450.

Bordo, M. D. and James, H. (2000). <u>The International Monetary Fund: Its Present Role in Historical Perspective</u>. NBER Working Paper 7724.

Bordo, M. D.; Mody A. and Oomes, N. (2004). <u>Keeping Capital Flowing: The Role of the IMF</u>. IMF Working Paper 02/193.

Brune, N.; Garrett, G. and Kogut, B. (2004). <u>The International Monetary Fund and the Global Spread of Privatization</u>. IMF Staff Papers, Vol. 51, No.2, 192-219

Buira, A. (2003). <u>An Analysis of IMF Conditionality</u>. G-24 Discussion Paper Series, 22. New York and Geneva, UNCTAD and Center for International Development, Harvard University, August.

Cottarelli, C. and Giannini, C. (2002). <u>Bedfellow, Hostages, or Perfect Strangers? Global Capital Markets and the Catalytic Effect of IMF Crisis Lending.</u> IMF Working Paper 02/193.

De Gregorio, J.; Eichengreen, B.; Ito, T. and Wyplosz, C. (1999). <u>An Independent and Accountable IMF</u>, Geneva Reports on the World Economy, No. 1, (Geneva: International Center for Monetary and Banking Studies).

De Vries, M. G. and Horsefield, J. K. (1986). <u>The International Monetary Fund 1945 – 1965: Twenty Years of International Monetary Cooperation. Volume II: Analysis</u>. Washington, DC: International Monetary Fund.

Diaz – Cassou, J., Garcia Herrero A. and Molina L. (2006). <u>What Kind of Capital</u>
<u>Flows Does the IMF Catalyze and When?</u> Working Paper, No. 0617, Bank of
Spain.

Dreher, A. (2004). <u>Does the IMF Cause Moral Hazard? A Critical Review of the</u>
<u>Evidence.</u> Mimeo. Retrieved October 26, 2009 from
<u>http://129.3.20.41/econ-wp/if/papers/0402/0402003.pdf</u>

Dreher, A. (2006). <u>IMF and Economic Growth: The Effects of Programs, Loans, and</u>
<u>Compliance with Conditionality</u>. World Development, 34, 769–788.

Edwards, M. S. (2005). <u>Investor Responses to IMF Program Suspensions: Is</u>
<u>Noncompliance Costly?</u> Social Science Quarterly, 86, 857–873.

Edwards, M. S. (2006). <u>Signaling Credibility? The IMF and Catalytic Finance.</u> Journal
of International Relations & Development, Vol. 9, No. 1, 27-52

Eichengreen, B. and Mody A. (2001). <u>Bail-Ins, Bailouts, and Borrowing Costs.</u> IMF
Staff Papers, Vol. 47, No. 3, 155–88.

Fischer, S. (1999). <u>Learning the Lessons of Financial Crises: The Roles of the Public</u>
<u>and Private Sectors</u>. Emerging Market Traders' Association Annual Meeting
New York, December 9. Retrieved October 26, 2009 from
<u>http://www.imf.org/external/np/speeches/1999/120999.htm</u>

Hausman, J. A. (1978). <u>Specification Tests in Econometrics.</u> Econometrica, 46, 1251-

    1271

IMF Fact Sheet. (2001). <u>The IMF and Private Sector</u>. Retrieved October 26, 2009 from

    http://www.imf.org/external/np/exr/facts/privsec.htm

IMF Fact Sheet. (2009). <u>IMF Conditionality</u>. Retrieved October 26, 2009 from

    http://www.imf.org/external/np/exr/facts/conditio.htm

 Jensen, N. (2004). <u>Crisis, Conditions, and Capital: The Effects of International</u>

    <u>Monetary Fund Agreements on Foreign Direct Investment Inflows</u>. Journal of

    Conflict Resolution, 48 (2), 194-210.

Krasner, S. D. (1968). <u>The International Monetary Fund and the Third World.</u>

    International Organization, Vol. 22, No.3, 670-688

Krueger, A. (1998). <u>Whither the World Bank and the IMF?</u> Journal of Economic

    Literature, 30, 1983-2000.

Mina, W. and Martinez-Vazques, J. (2002). <u>IMF Lending, Maturity of International</u>

    <u>Debt and Moral Hazard</u>, Georgia State University International Studies

    Program Working Paper 03-01.

Mody, A. and Saravia, D. (2003). <u>Catalyzing Capital Flows: Do IMF-Supported</u>

    <u>Programs Work as Commitment Devices?</u> IMF Working Paper No. 03/100.

Mussa, M. and Savastano, M. (1999). <u>The IMF Approach to Economic Stabilization.</u> IMF Working Paper No. 99/104.

Rodrik, D. (1995). <u>Why is There Multilateral Lending?</u> NBER Working Paper 5160

Rodrik, D. and Velasco A. (1999). <u>Short-Term Capital Flows</u>. NBER Working Paper 7364

Radelet, S. and Sachs J. (1998). <u>The East Asian Financial Crisis: Diagnosis, Remedies, Prospects</u>. Brookings Papers on Economic Activity, Vol. 1998, No. 1, 1-90

Sachs, J. and Cohen D. (1982). <u>LDC Borrowing with Default Risk</u>. NBER Working Paper 925.

Sachs, J. (1999). <u>The International Lender of Last Resort: What are the Alternatives?</u> In J. S. Little and G. P. Olivei (eds.) Rethinking the International Monetary System, Federal Reserve Bank of Boston, 181-188.

Schadler, S. (1996). <u>How Successful are IMF Supported Adjustment Programs?</u> Finance and Development 33(2): 14–17.

Schwartz, A. J. (1998). <u>Time to Terminate the ESF and the IMF</u>. Cato Institute Policy Briefing No. 48 (Washington: Cato Institute).

World Bank. (2010). IDA Borrowing Countries. Retrieved February 15, 2010 from http://go.worldbank.org/83SUQPXD20

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