KEEPING CAPITAL FLOWING: THE ROLE OF THE IMF

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## ABSTRACT

In this paper, we examine the IMF's role in maintaining the access of emerging market economies
to international capital markets. We find evidence that both macroeconomic aggregates and capital
flows improve following the adoption of an IMF program, although they may initially deteriorate
somewhat. Consistent with theoretical predictions and earlier empirical findings, we find that IMF
programs are most successful in improving capital flows to countries with bad, but not very bad
fundamentals. In such countries, IMF programs are also associated with improvements in the
fundamentals themselves.

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# I. INTRODUCTION

Recent research on the role of the International Monetary Fund (IMF) can, broadly speaking, be divided into two strands. Those focusing on the immediate response of the IMF to financial crises—the first strand of literature—have assessed whether IMF-supported programs stemmed the crises, prevented contagion, and helped countries regain access to international capital markets—without inducing the harmful side effect of imprudent lending by international creditors.[1] Others—constituting the second strand—have been concerned with the longer-term macroeconomic implications of IMF programs.[2]

Future research on the role of the IMF faces three challenges. First, the two separate strands of literature deserve to be brought closer together. In particular, do IMF programs serve primarily as a source of emergency finance or do they, by improving macroeconomic fundamentals, also help to ensure longer-term access to international capital markets? Second, a greater appreciation of differences in countries' initial economic conditions is necessary to understand the effects of IMF intervention. Initial conditions influence subsequent dynamics, as well as strategic behavior of the country authorities and international creditors. Third, the channels—or mechanisms—through which the IMF is able to influence economic outcomes need to be identified for the forward-looking design of IMF policy and the international financial architecture.

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[1] See, e.g., Boorman and Allen (2000), Bordo and Schwartz (2000), Meltzer (2002), and Ghosh and others (2002).

[2] An early survey of this literature was carried out by Haque and Khan (1998). More recent articles on this subject include Przeworski and Vreeland (2000), Hutchison (2001), Barro and Lee (2003), and Hajro and Joyce (2004).

This paper presents an initial investigation of this ambitious agenda by focusing on the relationship between IMF programs and private international capital flows. This is a natural set-up to address the first challenge—bringing the two strands of literature closer together—since, to the extent IMF programs succeed in keeping capital flowing, they can help to both contain financial crises and stimulate longer-term investment and growth. To take on the second challenge, we examine the possibility of a non-linear response of capital flows to initial conditions. Finally, we deal with the third challenge by identifying the main mechanisms that allow the IMF to maintain capital flows. We argue that a "good housekeeping seal" may not be operative, leaving in contention the "delegated monitoring" and "catalytic lending" roles of the IMF.[3]

The IMF itself has increasingly viewed the stabilization and fostering of capital flows as crucial to its evolving role. In the 1990s, private capital flows to developing economies resumed after the hiatus following the debt crises of the 1980s. This resumption in capital flows represented both an opportunity to accelerate economic development and a threat in situations where their "sudden stop" was associated with a sharp contraction in economic activity. As the fluctuations in countries' capital accounts acquired greater importance—and sometimes even dominated current account fluctuations—the IMF increasingly came to view the facilitation and maintenance of capital flows to developing countries as one of its essential functions. A clear indication of this was the formation of the IMF's International Capital Markets Department in 2001, which was introduced by former Managing Director Horst Köhler as follows:

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[3] Cottarelli and Giannini (2002) discuss in greater detail the IMF's channels of influence.

Because private capital flows are an indispensable source of financing for development, another crucial function of the IMF's new Capital Markets Department will be to strengthen our ability to help countries gain access to international capital markets. (Köhler, 2001, para. 13)

The main goal of this paper is to study whether IMF programs have indeed helped countries gain or regain access to international capital markets and, if so, through which channels. Since we focus on capital flows, we limit our empirical analysis to 29 emerging market economies.[4] We thus exclude IMF programs supported by the low-interest Poverty Reduction and Growth Facility (so-called PRGF programs), which are targeted at low-income countries. We cover the period 1980—2002, during which these 29 countries contracted 119 programs with the IMF. The unit of analysis is a program-country pair. Since the number of observations declines considerably as we control for country conditions, we mainly present descriptive evidence on the effects of IMF programs on aggregate performance (growth, inflation, the current account, and capital flows).

A key issue in empirical analysis of IMF programs is the characterization of the appropriate counterfactual.[5] That is, in addition to study how economic conditions changed after adoption of an IMF program, it is necessary to benchmark those changes against the evolution that would have occurred in the absence of an IMF program.

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[4] Our definition of "emerging market economies" is the definition used by the IMF's International Capital Markets Department for the purpose of producing "early warning signals," and includes the following 29 countries: Argentina, Bolivia, Brazil, Chile, Colombia, Cyprus, the Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Lebanon, Malaysia, Mexico, Pakistan, Peru, the Philippines, Poland, the Slovak Republic, South Africa, Sri Lanka, Thailand, Turkey, Uruguay, Venezuela, and Zimbabwe.

[5] For early discussions of counterfactuals in the context of IMF programs, see Goldstein and Montiel (1986) and Khan (1990).

We proceed in three steps. As a first step, we compare the average macroeconomic performance of emerging market countries before and after IMF program initiation. The results suggest that macroeconomic aggregates—GDP growth, inflation, and the current account—and capital flows improve following the adoption of an IMF program, albeit often with a lag. In particular, we find that GDP growth rates and capital flows display a "dip and recovery" pattern—that is, performance deteriorates somewhat in the first year of the program but improves significantly in the second year.

However, we are careful not to commit the "post hoc, ergo propter hoc" fallacy. That is, from the observation that performance improved *after* adoption of the IMF program, we cannot necessarily conclude that performance improved *because of* program adoption. In fact, one would expect a certain extent of selection bias, in that countries that adopt IMF programs are likely to have worse initial conditions than countries that do not adopt IMF programs (i.e., selection into IMF programs is not random). Given such selection bias, it would be quite natural to observe a recovery for the group of program countries, simply due to "mean reversion," that is, to an inbuilt tendency for improvement in performance following a setback. In order to reduce this selection bias, one should compare the performance of program and nonprogram countries with similar initial conditions.

Before doing that, we investigate, as a second step, the role of initial conditions. In particular, we examine whether the response of capital flows depends on the state of a country's external fundamentals just prior to the start of an IMF program. We show that the improvement in aggregate performance following program adoption reflects primarily success in maintaining capital flows to countries with "intermediate" initial external fundamentals. That is, in measuring fundamentals in terms of four states ("very bad," "bad,"

"good," and "very good"), we find that IMF programs are more effective in countries with bad rather than very bad fundamentals. Interestingly, this finding is consistent with the empirical results in Mody and Saravia (2003), as well as the predictions of recent models of catalytic lending (Morris and Shin, 2003, and Corsetti, Guimarães, and Roubini, 2003) and the IMF's delegated monitoring role. The results are generally robust to using four different external fundamentals: the current account balance as a percentage of GDP, the reserves-to-imports ratio, the ratio of short-term debt to reserves, and the ratio of total external debt to GDP.

Finally, in our most ambitious attempt at providing a counterfactual, we compare the performance of countries that adopted IMF programs with those of countries that did not adopt IMF programs, but that had similar initial conditions. We do this by estimating the probabilities of transitioning between the four different states, and by comparing the estimated transition probabilities of program countries with that of nonprogram countries. For most initial conditions, except very good ones, we are able to reject the null hypothesis that nonprogram countries perform similarly, given similar initial conditions. That is, we show that the observed increase in capital flows for program countries with intermediate initial fundamentals is accompanied by an improvement in the external fundamentals themselves, an improvement that is not observed for nonprogram countries with similar intermediate initial conditions.[6]

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[6] Goldstein and Monteil (1986) propose simulating a policy response to a crisis without IMF presence and, further, an output response to policy to generate a counterfactual. Estimating such functions can be complicated and the results unreliable. An alternative is to run regressions while controlling for factors likely to explain macroeconomic performance, and to include a dummy variable for an IMF program. For recent examples, see Barro and Lee

(continued…)

We conclude that countries in severe distress (i.e., in a "very bad" state) are unable to revive their capital flows under an IMF program. Countries with "good" initial conditions possibly benefit from IMF programs by maintaining relatively stable capital flows after being hit by temporary liquidity shocks. However, IMF programs play their most important role when countries are in an intermediate regime (with "bad", but not "very bad" initial conditions). In such economies, capital flows and external fundamentals improve over a two- or three-year time period following the start of the program.

The remainder of the paper is organized as follows. We begin with a discussion of the three channels through which the IMF can help maintain capital flows. Next, we describe the evolution of macroeconomic performance—GDP growth, inflation, the current account balance, and capital flows—following commencement of an IMF program. We then disaggregate the response in capital flows by the state of a country's initial external fundamentals. Next, we examine whether IMF programs influence the transition probabilities across states. We synthesize the principal results in the concluding section.

## II.  THE ROLE OF THE IMF IN FACILITATING CAPITAL FLOWS

Under the Bretton Woods par value system, characterized by pervasive capital controls, the IMF was primarily concerned with surveillance of the exchange rate system and provision of temporary finance to manage current account deficits. Following the breakdown of the Bretton Woods system in 1973, the IMF has faced a new environment encompassing

(2003) for the analysis of growth, and Mody and Saravia (2003), for the analysis of bond spreads.

significant increase in its membership (both less developed countries and transition
countries), a myriad of exchange rate arrangements, and, especially, the problems arising
from open capital accounts and financial globalization. With the opening of international
capital markets to advanced countries in the 1970s and to emerging markets in the 1980s, the
focus of the IMF has shifted toward new market failures and the new "public goods" needed
to maintain financial stability.[7]

How can the IMF add value in this new environment? We begin with the premise that
maintaining the flow of international capital is valuable to the countries that receive those
flows, as well as to the international financial system as a whole. Capital flows, as the
evidence of the 1990s amply bears out, are subject to "sudden stops" and sharp reversals
(Calvo, 1998). The IMF can be particularly important to the international financial and
economic order if it could mitigate these stops and reversals and, thereby, maintain the flow
of capital even when a country was vulnerable to a loss of confidence.

This section discusses three possible channels through which the IMF can help
maintain capital flows (for a more extensive discussion, see Cottarelli and Giannini (2002)).
First, if the IMF has information that the private sector does not have, it can provide a
valuable signal that can act as a "good housekeeping seal of approval." Second, when the
IMF does not have an informational advantage but a country lacks credibility in being able to
honor its external debt obligations, the IMF can act as a "delegated monitor." Finally,
"catalytic lending" by the IMF can induce lenders to roll over their credit and, hence, prevent

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[7] Bordo and James (2000) refer to several such public goods, including short- to medium-
term capital for credit-constrained countries, coordination of lenders in debt crises,
international liquidity in financial crises, and "early warning signals."

an exodus of capital from the country. However, IMF lending could also encourage moral hazard, inducing private lenders to be careless in their credit decisions in the expectation of being bailed out**.**

In the rest of this section, we examine in more detail these three channels through which the IMF can redirect capital flows to an emerging market economy at risk of losing access. We analyze the logic of each channel and highlight the likely observable implications of influence exercised through each channel.

### A. Good Housekeeping Seal of Approval

A good housekeeping seal of approval from a respectable institution can facilitate market access for emerging country borrowers. It can act as a signal that members have sound financial institutions and follow sensible policies. The credibility of such a seal of approval depends, however, on an informational advantage (Rodrik, 1996). For the IMF to provide such a seal, it should possess superior information and be able to communicate its assessment in a transparent manner.

An earlier successful example of an international institution serving as a seal of approval was the classical gold standard in the pre-1914 era of financial globalization. Under the institution of the gold standard, adherence to gold convertibility served as a signal to international lenders that a country had healthy financial institutions and followed sound financial policies (Bordo and Rockoff, 1996). It also served as a credible commitment mechanism, in that gold adherence required that countries keep inflation low and budgets balanced (Bordo and Kydland, 1995 and 1996). Countries that successfully adhered to gold

convertibility were able to borrow from London at rates significantly lower than those who did not (Bordo and Rockoff, 1996; and Obstfeld and Taylor, 2003).[8]

Does the gold standard have resonance for today? There are several key differences between the operation of the gold standard and the IMF. The gold standard, unlike the IMF, was an informal institution that had evolved from centuries of market experience. As such, "membership" in the standard was at the initiative of the individual countries, and country policies would determine if a country was on or off the standard.

When international financial crises occurred under the gold standard, as they frequently did, domestic lenders of last resort, individually and cooperatively, provided emergency liquidity. At the same time, financial institutions adopted preventive measures, such as maintaining high capital and liquidity ratios (Bordo, 2003). Moreover, the advanced (core) countries could temporarily leave the gold standard during a crisis or a war to follow countercyclical policies—the belief that they were credible adherents of the gold standard allowed this departure from "the rules of the game."

Even at that time, the emerging countries faced a different environment. In the face of shocks (terms of trade and political instability), they often left the gold standard, devalued their currencies, and did not return except at a devalued parity. They also occasionally defaulted on their debt (Reinhart, Rogoff, and Savastano, 2003). Because of their inability to adhere consistently to the gold standard, they paid a significant currency risk premium and lost the seal of approval.

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[8] Other institutional factors may have also served as a good housekeeping seal, such as being part of the British Empire (Ferguson, 2002). However, Obstfeld and Taylor (2003) report evidence that the gold standard played a significantly more prominent role.

Thus, the seal of approval worked because a set of credible policies and institutions backed up the adherents of the gold standard. Where gold was merely a temporary prop, its seal was of little value.

It is unclear if the seal of approval is an important mechanism through which the IMF helps maintain capital flows, since the IMF's informational advantage over the private sector appears to have declined. First, transparency has increased both at the IMF, which now makes most of its data and reports publicly available on its website, and in many emerging market countries, especially following the Asian crisis. Second, while in some instances IMF reports remain unpublished at the request of the member country, such "privileged information" tends to convey economic concerns and vulnerabilities that could scarcely constitute the basis for a positive signal. Third, there is no evidence that the IMF's economic forecasts are superior to those of other institutions. For example, Loungani (2001) finds that IMF forecasts of economic growth are no better—though typically no worse either—than that of the private sector. Finally, there may be some concern that IMF signals are influenced by political considerations and, hence, not reliable.

Nevertheless, there are some reasons to assume that the IMF still has an informational edge over the private sector. Disparate market actors may be better at assessing and synthesizing data than the IMF, but it is not obvious that they have better information than the IMF. For example, an investment bank research team typically has one analyst covering multiple small countries, while the IMF has usually has multiple economists covering even small countries. In addition, one could argue that the IMF is better placed to verify data, and to make judgments regarding the intentions of the authorities.

Even if IMF surveillance could constitute a seal of approval, it is difficult to develop an empirical strategy through which the importance of the IMF's informational advantage can be inferred. The IMF, in principle, monitors all countries and the world economy on an ongoing basis, and virtually all countries have been members of the IMF for a long time. As such, creating a counterfactual for inferring an IMF informational advantage is not straightforward. There exists a better possibility of identifying the effects of IMF programs, conditional on the information that the IMF surveillance process generates. We thus turn to the effects of IMF programs, through which the IMF plays the roles of delegated monitor and lender.

### B.  Delegated Monitor

While the IMF may not have an informational advantage over private creditors and investors, it can play the role of a monitor in situations where governments have more information about their economic condition and their intentions than the rest of the world. In such situations of asymmetric information, problems related to contract enforcement have impeded the free movement of financial capital, resulting in frequent financial crises characterized by sudden stops in foreign lending and, on occasion, debt defaults. The IMF can serve as a delegated monitor (Tirole, 2002), that is, it can complete contracts between international lenders and both sovereign and private borrowers in emerging market economies through its lending conditionality.

According to Tirole (2002), the market failure in international financial markets arises from two problems identified in the corporate finance literature: the dual and common agency problems. The *dual agency problem* occurs because emerging market governments

are potential spoilers of international financial arrangements between foreign lenders and private domestic borrowers. A contract between an advanced-country lender and an emerging country private borrower can be threatened ex post by government policies such as devaluation, capital levy, or opportunistic behavior in the political interest of the decision makers. These actions will reduce the ex post returns received by the lender, which, in turn, will discourage future lending. A delegated monitor, such as the IMF, can reduce this problem by constraining opportunistic behavior through conditionality imposed ex post.[9] The *common agency problem* arises when an emerging country borrows from a myriad of lenders, each of whom when booking the loan does not pay adequate attention to the loans already issued, thus leading to overborrowing. In the face of a crisis, the lenders rush to the exits to avoid being caught by the default, and thus ensure its eventuality. A delegated monitor can serve to coordinate lenders and prevent the overborrowing problem or, after a crisis has occurred, arrange an orderly workout. These actions can reduce the disruption in access to capital markets.

While the delegated monitoring role can follow from basic IMF membership (which serves as a commitment to follow certain rules of conduct)[10] and IMF surveillance (using the information gathered from members via Article IV consultations), it comes into play especially in the context of an IMF program. Mere membership and surveillance do not

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[9] However, as Ivanova (2003) shows, IMF conditionality may not be effective when there is opposition to reforms by domestic lobbies. If domestic lobbies are strong enough, the government may not be able to commit itself to "good" policies even in the presence of the IMF (and even more so if the IMF has imperfect information about government decisions).

[10] These rules of conduct are given in the IMF's Articles of Agreement, which are available via the Internet at: http://www.imf.org/external/pubs/ft/aa/

induce implementation of prudent policies and financial stability. In contrast, an IMF program, with the carrot of access to financial resources and the stick of conditionality, creates the conditions for country commitment that the IMF can then monitor. In particular, the fact that IMF programs provide credit in tranches, in accordance with specific policy commitments, helps the IMF limit the risk of opportunistic debtor behavior.

In turn, country commitment to good performance and, hence, ability to service external debt arises from three overlapping sources: policy design, conditionality, and the costs associated with these policies and conditionality. Private investors will be more likely to invest their capital when they believe that an IMF program will improve the country's economic policy (e.g., Rodrik, 1996; Masson and Mussa, 1995; and Bird and Rowlands, 1997) and/or that loans will be repaid (Tirole, 2002). Conditionality works if the country can, in fact, overcome political and other implementation barriers. Even if previous programs have not been fully implemented, investors may still view adoption of a new program favorably if the borrowing government must enact policy changes to access new credit (Marchesi and Thomas, 1999).

In a recent paper, Mody and Saravia (2003) argue that the delegated monitor role, although important, is effective only under particular country conditions. If a country has apparently sound economic fundamentals, entering into an IMF program may actually signal a problem and, hence, make market access worse. At the other extreme, if country fundamentals already place it in a crisis mode, then the commitment implied by an IMF program may not be credible and thus, once again be of limited value. Indeed, Powell and Arozamena (2003) argue that, when a country is in a crisis, "gambling for resurrection" may lead countries in IMF programs to behave in a manner contrary to that required for achieving

stabilization and recovery. Mody and Saravia (2003) find empirical support for their proposition that the IMF's delegated monitor role is likely to work best when fundamentals are in an "intermediate range."

## C. Catalytic Lending

By providing liquidity to a country, the IMF can be a "catalyst" in that it reduces the probability of default and can solve the coordination problem between private creditors (e.g., Miller and Zhang, 2000; Morris and Shin, 2003; Corsetti, Guimarães, and Roubini, 2003). That is, even if the seal of approval and delegated monitor channels do not work, the mere provision of credit by the IMF can give private creditors an incentive to roll over their existing loans and possibly supply new loans. If IMF programs are catalytic, they should be expected to increase gross capital flows.

For this channel to work, the IMF should have sufficient information to determine whether the problem is mainly illiquidity, as opposed to insolvency, and it should be able to decide the optimal amount of lending, that is, the amount of lending that is large enough to convince private creditors to roll over their loans. Successfully performing this role requires balancing the benefits of the program against the costs of moral hazard. [11]

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[11] Lerrick and Meltzer (2003) offer a specific proposal that would enable the IMF to preclude panic and contagion while limiting moral hazard. The IMF would perform its lender of last resort role by making a cash support bid at a discount to a government's minimum offer for the restructured value of the debt. The IMF floor would guarantee liquidity and create a functioning market in the defaulted debt, while lenders would be forced to bear the risks they undertake, thereby reducing moral hazard and future instability. In this proposal, however, there is no guarantee that the IMF would not overbid.

Morris and Shin (2003) and Corsetti, Guimarães, and Roubini (2003) present models that show that IMF lending lowers the threshold for preventing default (that is, it lowers the minimum rate of return necessary to prevent default and thereby lowers the probability of default).[12] Their main conclusions, summarized in Table 1, are as follows:

- **For "very bad" fundamentals** (bad enough that, even with IMF support and a maximum adjustment effort, the country cannot prevent default), IMF programs have no effect. This is because the country's benefits from preventing default do not exceed the cost of the necessary adjustment effort needed to improve fundamentals.

- **For "bad" fundamentals** (bad enough that, without the IMF, it would not be worthwhile for the country to make the adjustment effort needed to prevent default), IMF programs can have a positive effect on both the country's adjustment effort and private creditors' willingness to roll over their loans. Absent the IMF, the country is "vulnerable." With IMF support, default is avoided, private capital flows are catalyzed, and fundamentals improve.

- **For "good" fundamentals** (good enough that, even without the IMF, the country would be willing to put in the adjustment effort needed to prevent default), IMF programs can have a negative effect on the country's adjustment effort, and fundamentals may actually

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[12] The model by Corsetti, Guimarães, and Roubini (2003) also suggests that the IMF's catalytic impact is greater if it is able to distinguish between an insolvent and an illiquid debtor, and that its lending serves as a signal to the market. This relates to the "seal of approval" discussed above.

worsen. At the same time, there is no effect on private capital flows (i.e., there is no catalysis).

- **For "very good" fundamentals** (good enough that, even without the IMF, the country can prevent default without any adjustment effort), IMF programs have no effect on the adjustment effort (since there would be no effort in either case) and no effect on capital flows (since creditors would have rolled over their loans in any case).

## III. AGGREGATE TRENDS BEFORE AND AFTER PROGRAM ADOPTION

In this section, we present descriptive evidence on aggregate performance following the start of an IMF program. Our main finding is that macroeconomic fundamentals (growth, inflation, and the current account) and capital flows all improve after a program has been adopted, albeit often with a lag. We observe a "dip and recovery" pattern for growth and capital flows, with an initial deterioration in first-year performance but a significant improvement in the second year and stabilization in the third year.

As noted in the introduction, our definition of "emerging market economies" is the one used by the IMF's International Capital Markets Department and comprises 29 countries. The period covered is 1980–2002.[13] Performance is measured in terms of real GDP growth, inflation, the current account balance (in percent of GDP), and capital flows (also in percent

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[13] By merging data from the 1980s and the 1990s, we implicitly assume that the behavior of creditors has not changed over time. For future research, however, it may be useful to study the 1980s and 1990s separately, given the changes in the type of lending (from sovereign syndicated bank lending to a sovereign bond market and short-term cross-border bank lending), the growing trend of capital account liberalization in the 1990s, and the gradual decline in the IMF's role in explicitly coordinating creditor behavior.

of GDP). Our measure of capital flows is the aggregate of gross bond, equity, and loan

flows.[14] We use gross flows, rather than net flows, since we are interested in a measure of

access to international capital markets. Net flows could be small either because a country has

lost contact with international capital markets or because it is repaying old loans that are

being rolled over.

## A. Average Performance

We start by comparing the average performance in the 12 months prior to the start of

a program ("Year Before IMF Program") with the average performance in the first 12 months

("First Year"), the second 12 months ("Second Year"), and the third 12 months ("Third

Year") after the start of each program.[15] We are interested in studying a country's

performance immediately following the start of an IMF program, since both the seal of

approval and catalytic lending channels would suggest that the effect of IMF program

adoption on performance is immediate, while the delegated monitoring channel becomes

effective during the course of a program. Since it takes time for macroeconomic

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[14] The source of our bond, equity, and loan data is Dealogic. All other data are from the IMF's International Financial Statistics database, the World Economic Outlook database, and other IMF sources.

[15] We are able to date the start of the IMF program precisely. For example, if a program were started in March 1998, but before March 15, then the first year of the program includes the months March 1998 through February 1999, while if a program were started after March 15, the first year includes the months April 1998 through March 1999. Using this definition of years, the data on capital flows and inflation, being available at a monthly frequency, can be timed quite precisely. For data that are not available at a monthly frequency (e.g., real GDP growth and the current account balance), we follow the convention of constructing monthly values by interpolation (i.e., assuming a constant growth rate during a quarter or year).

fundamentals to adjust, we study their evolution up to three years after the start of the program.

We treat each program as a separate observation and average across programs. To make the averages comparable across each year, we use a balanced sample, in which the set of programs over which we average is the same for all years. We thus exclude programs where no data are available for the year before or any of the three years following the program.[16]

Our main finding here is that both macroeconomic aggregates and capital flows improve following the adoption of an IMF program. This is consistent with Morris and Shin's (2003) hypothesis that the catalytic effect on capital flows and adjustment effort go hand in hand. For growth and capital flows, we observe a dip and recovery pattern: in the first year of the program, performance fails to improve and may even worsen; the second year tends to see a large improvement; and, in the third year, a weaker improvement or even a slight fallback may occur, possibly due to mean reversion. However, in spite of the possible fallback in the third year, the overall effect after three years for the different indicators is generally positive.

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[16] Sometimes data are not available because the program started only recently and sometimes because a new program started within three years of the old program. Dropping programs followed by another program within the balanced-sample period could lead to selection bias, since such programs are likely to have failed. However, even if we did not drop these programs, average performance would still be overestimated in situations where performance improved under the second program, since this improved performance would then be considered as a result of both the first and second programs. While we could have considered two consecutive programs simply as one program, we decided not to do so for the following reasons: (1) the new program may have a separate signaling effect; (2) the amount under the second program may be different from the first; and (3) the second program may be of a different type.

Panel A of Figure 1 illustrates the dip and recovery pattern for real GDP growth: growth dips in the first year of the program, recovers in the second year, and falls somewhat in the third year while remaining well above the low point and even above the level before the start of the program. Inflation performance (panel B) fails to improve in the first year, but then exhibits a large improvement (i.e., a reduction in inflation) in both the second and third years following the start of the IMF program. Countries with IMF programs, not surprisingly, tend to start with a high current account deficit (panel C); this deficit tends to be reduced immediately in the first year of the program and even turns into a surplus in the second year (presumably, as import compression continues). However, as conditions become more normal in the third year, the current account returns to a lower (possibly, more sustainable) deficit than at the start.

The pattern for capital flows is similar to that of real GDP. As panel D of Figure 1 shows, gross capital flows tend to fall somewhat in the first year of the program—especially for bonds and loans, which we do not show separately here. However, flows increase thereafter. By the second year of the program, the different components of capital flows tend to be already higher than in the year preceding the program, and the bond component continues to increase in subsequent years (while equity flows "overshoot" in the second year and then decline).

## B. Program Duration

We next compare performance across two different IMF programs: the Stand-By Arrangement (SBA) and the Extended Fund Facility (EFF). While these programs share several common features, an important difference is that programs under the SBA are shorter

than programs under the EFF. While SBAs are designed to address short-term balance of payments problems and typically last 12–18 months, EFFs are designed to address more structural balance-of-payments problems and last about 3 years. Also, repayment for SBAs is expected within 2¼ to 4 years, while repayment for EFFs is expected within 4½ to 7 years.

Interestingly, we find some evidence that EFFs are associated with better performance than SBAs (Table 2). Given the small number of observations in each category (90 SBA programs versus 29 EFF programs)**,** these results should be interpreted with caution. However, they do suggest that longer-term IMF lending for structural reform works better than short-term lending for balance of payments adjustment. A possible explanation for this result is that EFFs require a stronger—or at least longer—commitment by the IMF, implying a stronger seal of approval, a longer period of delegated monitoring, and often—but not always—more lending. An alternative explanation is that EFF programs work better because they give countries more time for repayment.[17]

Another interesting result is that EFF programs appear to generate higher capital flows (again, with a slight dip in the first year), while the impact of SBA programs on capital flows is roughly nil on average. An explanation for this could be that countries that enter into an EFF program tend to start from a low base and have larger chances of being rewarded with high capital flows than countries that enter an SBA program. The latter countries

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[17] For example, in August 1998 Indonesia requested to replace its 1997 SBA program with an EFF program, with the explicit goal of lengthening the repayment period. In this case, the amount of credit available under the EFF and its duration were identical to those remaining under the SBA; hence, the EFF could not necessarily be regarded as reflecting a stronger IMF commitment than the SBA.

(continued…)

supposedly have fewer deep-seated structural problems and therefore are already able to

borrow more, although they have to struggle to regain market confidence if they are

experiencing temporary liquidity problems.[18] As Table 2 shows, countries with EFF

programs start with an initially lower level of capital flows than countries with SBA

programs, but their recovery is subsequently stronger.

## IV. PERFORMANCE CONDITIONAL ON INITIAL FUNDAMENTALS AND LENDING LEVELS

In the previous section, we reported some preliminary evidence that IMF programs

are associated with improvements in both macroeconomic performance and capital flows,

typically exhibiting a dip and recovery pattern, However, we cannot exclude the possibility

that these observed improvements simply reflect mean reversion. That is, to the extent that

economic conditions may naturally improve after a crisis even without a program, the

observed improvement cannot necessarily be attributed to the program alone.

While it is the case that the initial conditions of countries that enter into an IMF

program are likely to be worse than those of nonprogram countries, in practice we find

considerable variation in the initial conditions of program countries themselves. To test

whether initial conditions matter, this section disaggregates the response in capital flows by

the state of a country's external fundamentals in the year prior to adoption of an IMF

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[18] For example, as Argentina's debt levels built up in the 1990s, it had to struggle just to attract the capital flows needed to refinance its external debt—particularly after Brazil's devaluation.

program. The goal here is to examine whether there is a differential response to an IMF program depending on initial conditions: if there is mean reversion, is it the same irrespective of the starting point or are there systematic differences? We also briefly discuss whether the level of IMF lending matters in helping maintain capital flows.

## A.  Defining Initial Conditions

To operationalize the predictions by Morris and Shin (2003) and others in Table 2, we use four separate indicators to assess the state of those external fundamentals that can affect the probability of a country's default. We use two indicators of liquidity risk (ratios of short-term debt to reserves, and reserves to imports), one indicator of insolvency (total external debt to GDP), and one indicator that is a measure of both illiquidity and insolvency (current account deficit to GDP). The indicators of illiquidity measure the risk of running out of reserves, while the indicators of insolvency assess whether, with IMF lending and external adjustment, the country will be able to pay its overall debt. Although the four indicators are obviously related, the response of capital flows is expected to be different depending on whether the main problem is illiquidity or insolvency.

Next, we define the thresholds defining whether the state of fundamentals is very bad, bad, good, or very good. While the choice of thresholds is necessarily ad hoc, we base them, as far as possible, on commonly accepted thresholds used in the financial crises literature and in IMF surveillance.[19] Thus, for example, we consider a country to be in a very bad state

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[19] As an alternative to predefining thresholds for each state, more sophisticated ways could be used to determine the thresholds. For example, using a Markov switching model, one could define the states by an unobserved composite state variable that depends in certain

during the 12 months preceding the start of an IMF program if the current account deficit is higher than 6 percent of GDP; if reserves are less than 1.25 months of imports; if short-term debt is more than four times reserves; or if total external debt exceeds 60 percent of GDP. In these cases, a country is generally expected not to be able to prevent default, even with IMF support and a maximum adjustment effort. Table 3 summarizes this information, and also contains similar definitions of "bad," "good," and "very good" states.

## B. Results

Table 4 summarizes the evolution of capital flows conditional on the four states defined in Table 3. Our general findings, explained below in more detail, are as follows. First, conditional on very bad initial external fundamentals, IMF programs are typically unable to reverse the slide in capital flows: capital flows either fail to increase, or even continue to fall. Second, IMF programs seem most successful in maintaining capital flows to countries with bad external fundamentals before the start of a program, when fundamentals are stronger than in the "very bad" case, but the country is still vulnerable to an external crisis. IMF programs in this state are typically followed by a dip and recovery pattern, suggesting that countries and the IMF are able to enter into a joint commitment to a policy effort that is credible to foreign investors, although the effort may take some time to bear fruit. Finally, as external fundamentals improve further (good and very good states), the role

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known ways on the observed fundamentals. Another possibility is to define, for example, the threshold for a very bad current account deficit as a deficit above two standard deviations from its mean. We leave these as suggestions for future research.

of the IMF diminishes, although it can help in situations where a temporary shock requires

short-term external assistance.

As Table 4 shows, countries starting out in a very bad state generally experience a

slide in capital flows despite the introduction of an IMF program. This is most clear for the

reserves-to-imports measure: just before the program starts, a low reserves-to-imports ratio is

already associated with relatively low capital inflows, and three years after the start of the

program, the capital flows-to-GDP ratio has fallen even further, to only one-third of its initial

level. When the ratio of short-term debt to reserves—the second measure—is in a very bad

state, capital flows increase somewhat in the first year of a program but fall thereafter. When

the problem is a very high current account deficit—the third measure—capital flows are

substantial in the run-up to the program (presumably because the deficit was being financed

by external flows), but once the program has started, capital flows decline for as long as two

years before bumping back up. Only in the case of a very bad external debt-to-GDP ratio—

the fourth measure—is there some slight indication that capital flows increase after the start

of a program—the fourth measure— but this increase is unlikely to be statistically

significant, given the small number of observations.[20]

`       Starting from a bad state before program adoption, a dip and recovery pattern for

capital flows is observed for all external fundamentals, except for external debt, conditional

on which capital flows increase steadily without a dip. For all other fundamentals, however,

capital flows fall in the first year, suggesting that IMF programs are initiated at the moment

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[20] Formal tests for statistical significance would require estimation of the distribution of the
external fundamentals, which is beyond the scope of this paper.

when things are worsening. In the second and third years, capital flows for all four

fundamentals recover and are above their level before the start of program. It is as if IMF

programs slow the deterioration and help these countries transit to a more benign state. The

indicators that most clearly represent this dip and recovery pattern are the liquidity risk

indicators: the ratios of reserves to imports and short-term debt to reserves. The pattern holds

also for the current account, where the second year sees a sharp recovery following a

shallower dip.

For countries with good or very good fundamentals, the evidence is mixed. When

countries start in a good state, IMF programs seem to make very little difference in the trend

in capital flows, as predicted by Morris and Shin (2003). Surprisingly, however, when

countries start in a very good state, there is some indication that capital flows actually

improve following the start of an IMF program (except for very good external debt

conditions, but this is based on only two observations). Most likely, these countries with very

good external fundamentals had experienced temporary liquidity difficulties that lead to an

IMF program, but the sound fundamentals reasserted themselves soon thereafter.[21]

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[21] Another possibility is that, in such cases, liquidity problems were not the main reason for
starting an IMF program. For example, prior to its July 1996 SBA program, Venezuela was
in very good shape judged by (1) its current account, which was in surplus due to a
devaluation at end-1995; (2) its reserves, which amounted to over seven months of imports;
and (3) its short-term debt, which was less than 50 percent of its reserves. However, an SBA
was considered necessary because of banking sector problems, high inflation (about 70
percent in the year prior to the program), high unemployment (over 10 percent in 1995), and
low growth in the non-oil sector. The program was successful at lowering inflation and
improving confidence, which likely contributed to a rebound in capital flows, although in this
case the rebound was also helped by high oil prices.

Finally, we consider the relationship between the amount of IMF lending and the evolution of capital flows. The evidence, presented in Table 5, is inconclusive. With a larger lending amount, capital flows increase over the course of the following three years; however, the initial level of capital flows is also low where the IMF has made large loans, making it unclear whether the increase is a response to IMF lending or to the relatively low initial level of capital flows.[22]

## V. TRANSITION PROBABILITIES

Our third step, and most ambitious attempt at a counterfactual, is the comparison of the evolution of external fundamentals for program and nonprogram countries, disaggregated by initial conditions. This allows us to test the null hypothesis that the observed improvements in performance following IMF program adoption, reported in Section III, might be simply the result of mean reversion, that is, the performance of countries without IMF programs would be similar, given similar initial conditions.

In the previous section, we studied whether and how the evolution of capital flows following a country's adoption of an IMF program depends on the state of the country's initial external fundamentals. Our results seem to confirm that IMF programs are most successful at keeping capital flowing to countries with bad, but not very bad fundamentals. However, the fact that countries with bad fundamentals appear to be better at escaping from near-crisis situations than countries with very bad fundamentals may be a general

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[22] The results, in this case, are quite sensitive to the specification. When we consider two-year samples, the picture is less clear, suggesting that countries that start a new program within a three-year period do not obviously gain from larger amounts of IMF lending (results available upon request).

phenomenon and not necessarily the result of entering into an IMF program. In order to know whether IMF programs were the main factor in keeping capital flowing, we would need to know what would have happened to these same countries if they had not adopted an IMF program. While it is impossible to answer this counterfactual question, we can approximate it quite closely by comparing the performance of program countries with the performance of countries with similar fundamentals that did not adopt an IMF program.

Our methodology for answering this question is the following. First, we consider a country's initial state to improve if the probability of moving to a better state is raised, or if the probability of moving to a worse state is lowered. Next, to determine whether IMF programs are associated with an improvement in a country's initial state, we calculate a transition probability matrix for the four states, both for countries with IMF programs and for countries without IMF programs. We then test whether the transition probabilities for countries with IMF programs are significantly different from those for countries without IMF programs.

To calculate these transition probabilities, we define a state variable $S_T$ that specifies whether external fundamentals are very bad ($S_T = 1$); bad ($S_T = 2$); good ($S_T = 3$); or very good ($S_T = 4$) during period $T$. Since IMF programs take at least a year to have an effect, we are interested in comparing the fundamental states in the year before and the second year after the start of a program. Thus, for each country-program pair we calculated the following:

- $S_T$ = average state of external fundamentals during the year before the start of a program (i.e., $T$ encompasses the months $t$-11 through $t$ when, for program countries, $t$ is the month in which the program starts); and

- $S_{T+2}$ = average state of external fundamentals during the second year following the start of program (i.e., $T+2$ encompasses the months $t+13$ through $t+24$).

For nonprogram countries, there is no natural starting point, $t$. Nevertheless, it would be misleading to calculate transition probabilities using pairs of $S_T$ and $S_{T+2}$ for every month in a given year, as this would generate a large amount of similar observations and, therefore, would lead to artificially low standard errors when testing for differences between the two transition probability matrices. Instead, we calculate only the states for one month (January) in a given year for each nonprogram country. In addition, for nonprogram countries, we use only the observations of $S_T$ and $S_{T+2}$ if no IMF program was in place during any of the months $t-11$ through $t+24$. This gives us around 250 nonprogram observations, compared with some 100 program observations.

The null hypothesis is that IMF programs have no effect even after two years, that is, $Pr(S_{T+2} \mid S_T)$ is the same regardless of whether an IMF program was present in month $t$. The alternative hypothesis is that these transition probabilities are different for countries with and without IMF programs. To determine whether any observed differences are significant, we conduct a two-sided test and consider differences as "significant" when they are statistically significant at the 5 percent level. (For the calculation of $p$-values, see Appendix).

The main result (Table 6) is that IMF programs are generally associated with improvements in external fundamentals, except when these fundamentals are already in very good shape (state 4). As Table 6 shows, even for countries that start out in a very bad state (state 1), IMF programs significantly increase the probability of moving to a better state. For countries that start out in a bad state (state 2), IMF programs also significantly increase the

probability of moving to a better state after two years, except for the indicator of short-term debt-to-reserves.[23] For countries that start out in a good state (state 3), fundamentals significantly improve following the start of an IMF program, that is, all external fundamentals are significantly more likely to have improved from state 3 to state 4 after two years.[24]

## VI. SYNTHESIS AND CONCLUSION

The IMF has evolving functions in the changing world economy. In this paper, we have put the spotlight on a set of emerging market economies and the IMF's role in maintaining their access to international capital markets. Our results reinforce theoretical predictions and earlier empirical findings on the value of IMF intervention for countries in vulnerable—as distinct from extreme distress—situations.

We identified three channels through which the IMF potentially helps emerging market economies maintain access to international capital markets: (1) by providing a good housekeeping seal of approval, (2) by means of delegated monitoring, and (3) through catalytic lending. We argued that, although the good housekeeping seal presupposes superiority of information held by the IMF, it is not evident that the IMF has significantly more comprehensive or more timely information on a sustained basis than, say, investment banks or credit rating agencies. The IMF does have an informational role to play, but this

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[23] We also calculated the transition probabilities between $S_T$ and $S_{T+1}$ and found that IMF programs do not have a significant effect in one year (results available upon request).

[24] Even within one year, reserves-to-imports and the current account-to-GDP ratios are significantly more likely to improve from state 3 to state 4 under an IMF program. However, reserves may be increasing in some cases just because of IMF disbursements.

more likely occurs in the context of agency problems, where a country, as an "agent" of international investors, needs to be monitored by a credible external agency. In this context, the second and third channels are more important than the first. As a delegated monitor, the IMF can constrain opportunistic behavior through its program benchmarks and conditionality imposed ex post. As a lender, the IMF can reduce the probability of default and solve the coordination problem between private creditors, simply by its ability to provide financial resources.

We started by making a simple before-after comparison (Section III), which suggested that, on average, both macroeconomic aggregates and capital flows improve following the adoption of an IMF program, albeit with lags. The first year of IMF programs is typically associated with some initial decline in performance, but by the second year growth is up and inflation is down. The current account is initially compressed but by the third year appears to return to a more sustainable deficit than at the start of the program. Capital flows follow a path similar to growth: an initial tiny dip followed by a modest recovery. These findings are, of course, based on averaging across programs.

We also found that three-year programs (EFFs) are associated with better performance than shorter-term programs (SBAs), suggesting that the improvement in performance depends positively on the duration of the program. A possible explanation for this result is that EFFs imply a stronger seal of approval, a longer period of delegated monitoring, and often—but not always—more lending.

We next attempted to test whether the effect of IMF programs on capital flows was conditional on the state of a country's initial external fundamentals (Section IV), and whether these fundamentals themselves improved following program adoption. Table 7 summarizes

our findings on capital flows and improvements in fundamentals, as assessed by changes in the probability of transitions across states.

Our results suggest that, when a country starts out in a situation of economic distress (with very bad external fundamentals), an IMF program is at best associated with stemming the decline in capital flows, but may be associated with the country's continued loss of access to international capital markets. External fundamentals, starting from this distressed situation, do improve, as the current account deficit declines and reserves rise. However, where these improvements do occur, they are possibly the consequence of a significant import compression and, hence, are not necessarily sustainable. Thus, when initial fundamentals are extremely weak, IMF programs may be associated with some adjustment effort, but this is not sufficient to ensure a significant turnaround in capital flows.

In contrast, when a country is vulnerable (with bad, but not very bad external fundamentals), we found that an IMF program is associated with both better market access and improvements in the country's external fundamentals. It may well be possible that, in such vulnerable initial conditions, the country is itself able to engineer the recovery. It may, however, also be the case that, although the effort is essentially undertaken by the country, the IMF is used as a commitment mechanism or delegated monitor. Either way, this is where we have the strongest evidence that IMF programs are associated with increased capital flows and improved fundamentals.

Finally, for countries with relatively strong initial conditions (good or very good external fundamentals), we found that IMF programs can sometimes help to stabilize capital flows following temporary shocks, while their effect on fundamentals is ambiguous. While Morris and Shin (2003) make a distinction between good and very good states, such a

distinction is not clear in the data examined. Moreover, the possibility that, in countries with good  fundamentals, IMF lending may lead to moral hazard (reduced adjustment effort by the country itself), does not appear to be a serious one.

Our results are subject to several caveats. First, although we have attempted to construct the best counterfactual possible, by comparing the performance of program countries with that of nonprogram countries with similar initial conditions, there may be other important observed or unobserved initial conditions that we have not controlled for. While it would be useful to extend our analysis by widening our definition of initial conditions, the fact remains that we will never know what would have happened to program countries had they not adopted a program. Hence, one can never conclude with certainty that IMF programs necessarily had the determining influence in the observed improvement in performance. Second, since we limited ourselves to emerging market economies between 1980 and 2002, our results cannot necessarily be generalized to apply to all IMF programs. Finally, while we distinguished between EFF and SBA programs, we otherwise treated all programs as more or less uniform. In reality, however, IMF programs differ in both their design and their execution, and these differences may affect the private sector's response in terms of capital flows.

We have several suggestions for future research. First, the list of variables used to characterize a country's initial condition could be expanded to include real GDP growth, inflation, and even capital flows themselves. Second, more sophisticated econometric methods could be used to derive, rather than predefine, the thresholds for the states of external fundamentals. For example, one could use a Markov switching model to estimate an unobserved composite state variable that depends in certain assumed ways on the observed

fundamentals. Third, rather than treating IMF programs as a "black box," one could further differentiate between IMF programs in terms of their design (e.g., precautionary versus nonprecautionary programs) and execution (e.g., cancelled versus completed programs). Fourth, the determinants of capital flows could be better modeled. While this paper focused on the supply-side determinants of capital flows (i.e., decisions on the part of creditors as to whether to roll over their loans or issue new loans), it would be useful to capture demand-side determinants as well, for example, by scaling capital flows in terms of gross financing need. Similarly, it would be useful to try to distinguish between "pull" and "push" factors as determinants of capital flows.

## REFERENCES

Barro, Robert J., and Jong-Wha Lee, 2003, "IMF Programs: Who Is Chosen and What Are the Effects?" Working Papers in Trade and Development, No. 2003/09 (Canberra, Australia: Australian National University). Available via the Internet: http://post.economics.harvard.edu/faculty/barro/papers/IMF_Programs.pdf

Bird, Graham, and Dane Rowlands, 1997, "The Catalytic Effect of Lending by the International Financial Institutions," *World Economy*, Vol. 20 (No. 7), pp. 967–91.

Boorman, Jack, and Mark Allen, 2000, "A New Framework for Private Sector Involvement in Crisis Prevention and Crisis Management," in *Reforming the International Financial System: Crisis Prevention and Response*, ed. by Jan Joost Teunissen (The Hague: Forum on Debt and Development), pp. 101–23.

Bordo, Michael D., 2003, "Market Discipline and Financial Crisis Policy: A Historical Perspective, in *Research in Financial Services: Private and Public Policy*, Vol.15, ed. by George G. Kaufman. (Greenwich, Connecticut, JAI Press), pp.157–182.

———, and Harold James, 2000, "The International Monetary Fund: Its Present Role in Historical Perspective," NBER Working Paper No. 7724 (Cambridge, Massachusetts: National Bureau of Economic Research).

Bordo, Michael D. and Finn E. Kydland, 1995, "The Gold Standard as a Rule: An Essay in Exploration," *Explorations in Economic History*, Vol. 32 (No. 4), pp. 423–64.

———, 1996, "The Gold Standard as a Commitment Mechanism," in *Modern Perspectives on the Gold Standard*, ed. by Tamim Bayoumi, Barry Eichengreen, and Mark P. Taylor (Cambridge, New York, and Melbourne: Cambridge University Press), pp. 55–100.

Bordo, Michael D., and Hugh Rockoff, 1996, "The Gold Standard as a 'Good Housekeeping Seal of Approval,'" *Journal of Economic History*, Vol. 56 (No. 2), pp. 389–428.

Bordo, Michael D., and Anna J. Schwartz, 2000, "Measuring Real Economic Effects of Bailouts: Historical Perspectives on How Countries in Financial Distress Have Fared With and Without Bailouts," NBER Working Paper No. 7701 (Cambridge, Massachusetts: National Bureau of Economic Research).

Calvo, Guillermo A., 1998, "Capital Flows and Capital-Market Crises: The Simple Economics of Sudden Stops," *Journal of Applied Economics*, Vol. 1 (No. 1), pp. 35–54.

Corsetti, Giancarlo, Bernardo Guimarães, and Nouriel Roubini, 2003, "International Lending of Last Resort and Moral Hazard: A Model of IMF's Catalytic Finance," NBER Working Paper No. 10125 (Cambridge, Massachusetts: National Bureau of Economic Research).

Cottarelli, Carlo, and Curzio Giannini, 2002, "Bedfellows, Hostages, or Perfect Strangers? Global Capital Markets and the Catalytic Effect of IMF Crisis Lending," IMF Working Paper 02/193 (Washington: International Monetary Fund).

Ferguson, Roger W., 2002, "Understanding Financial Consolidation," *Economic Policy Review*, Federal Reserve Bank of New York, Vol. 8 (May), pp. 209–13.

Ghosh, Atish R., and others, 2002, *IMF-Supported Programs in Capital Account Crises*, IMF Occasional Paper No. 210 (Washington: International Monetary Fund).

Goldstein, M., and P. Montiel, 1986, "Evaluating Fund Stabilization Programs with Multicountry Data: Some Methodological Pitfalls," *Staff Papers*, Vol. 33 (June), pp. 304-44 (Washington: International Monetary Fund).

Hajro, Zlata, and Joseph P. Joyce, 2004, "A True Test: Do IMF Programs Hurt the Poor?" Wellesley College Department of Economics Working Paper No. 04-01 (Wellesley, Massachusetts: Wellesley College).

Haque, Nadeem Ul, and Mohsin Khan, 1998, "Do IMF-Supported Programs Work? A Survey of the Cross-Country Empirical Evidence," IMF Working Paper 98/169 (Washington: International Monetary Fund).

Hutchison, M., 2001, "A Cure Worse Than the Disease? Currency Crises and the Output Costs of IMF-Supported Stabilization Programs," NBER Working Paper No. 8305 (Cambridge, Massachusetts: National Bureau of Economic Research).

Ivanova, Anna, 2003, "IMF Conditionality and Implementation of IMF-Supported Programs" (Ph.D. dissertation; Madison, Wisconsin: University of Wisconsin-Madison).

Khan, M., 1990, "The Macroeconomic Effects of Fund-Supported Adjustment Programs," *Staff Papers*, Vol. 37 (June), pp. 195–231 (Washington: International Monetary Fund).

Köhler, Horst, 2001, "Promoting Stability and Prosperity in a Globalized World," remarks by IMF Managing Director, Council of the Americas, Washington, May 7. Available via the Internet: http://www.imf.org/external/np/speeches/2001/050701.htm

Loungani, Prakash, 2001, "How Accurate Are Private Forecasts? Cross-Country Evidence from Consensus Forecasts of Output Growth, *International Journal of Forecasting*, Vol. 17 (July-September), pp. 419–32.

Lerrick, Adam, and Allan H. Meltzer, 2003, "Blueprint for an International Lender of Last Resort," *Journal of Monetary Economics*, Vol. 50 (January), pp. 289–303.

Marchesi, Silvia, and Jonathan P. Thomas, 1999, "IMF Conditionality as a Screening Device," *Economic Journal*, Vol. 109 (March), pp. C111–25.

Masson, Paul R., and Michael Mussa, 1995, "Long-Term Tendencies in Budget Deficits and Debt," IMF Working Paper 95/128 (Washington: International Monetary Fund).

Meltzer, Allan H., 2002, "New International Financial Arrangements," *Monetary and Economic Studies*, Vol. 20 (special edition, December 2002), pp. 11–22.

Miller, Marcus, and Lei Zhang, 2000, "Sovereign Liquidity Crises: The Strategic Case for a Payments Standstill," *Economic Journal*, Vol. 110 (January), pp. 335–62.

Mody, Ashoka, and Diego Saravia, 2003, "Catalyzing Capital Flows: Do IMF-Supported Programs Work as Commitment Devices?" IMF Working Paper 03/100 (Washington: International Monetary Fund).

Morris, Stephen Edward, and Hyun Song Shin, 2003, "Catalytic Finance: When Does It Work?" Cowles Foundation Discussion Paper No. 1400 (New Haven: Yale University). Available via the Internet: http://ssrn.com/abstract=383604

Obstfeld, Maurice, and Alan M. Taylor, 2003, "Sovereign Risk, Credibility and the Gold Standard: 1870-1913 versus 1925-31," *Economic Journal*, Vol. 113 (No. 487), pp. 241–75.

Powell, Andrew, and Leandro Arozamena, 2003, "Liquidity Protection Versus Moral Hazard: The Role of the IMF," *Journal of International Money and Finance*, Vol. 22 (special issue, December), pp. 1041–63. Available via the Internet: http://www.utdt.edu/~apowell/

Przeworski, Adam, and James Raymond Vreeland, 2000, "The Effect of IMF Programs on Economic Growth," *Journal of Development Economics* Vol. 62 (August), pp. 385–421.

Reinhart, Carmen M., Kenneth Rogoff, and Miguel Savastano, 2003, "Debt Intolerance," *Brookings Papers on Economic Activity: 1* (Washington: Brookings Institution), pp. 1–74

Rodrik, Dani, 1996, "Why Is There Multilateral Lending?" in *Annual World Bank Conference on Development Economics, 1995*, ed by Michael Bruno and Boris Pleskovic, (Washington: The World Bank), pp 167–93.

Tirole, Jean, 2002, *Financial Crises, Liquidity, and the International Monetary System* (Princeton and Oxford: Princeton University Press).

## Calculation of *p*-Values for Differences in Transition Probabilities

Let $p_1$ denote the transition probability between two states for countries with an IMF

program, and let $p_0$ denote the transition probability between the same two states for

countries without an IMF program. Let $D = p_1 - p_0$ denote the difference between the two

transition probabilities. The standard deviation of $D$ is then given by

$$\sigma_D = \sqrt{\left( \frac{p_0(1-p_0)}{n_0} + \frac{p_1(1-p_1)}{n_1} \right)},$$

where $n_0$ and $n_1$ are the number of observations corresponding to each row in the transition

probability matrix (e.g., for $p_{11}$, this is the number of cases where $S_T = 1$). Under the null

hypothesis, we have $H_0$: $p_1 = p_0 = p$. Let $\hat{p}_0$, $\hat{p}_1$, and $\hat{p}$ denote the estimates of the respective

transition probabilities, i.e., the sample proportions. We then have:

$$\hat{p} = \frac{X_0 + X_1}{n_0 + n_1},$$

where $X_0$ and $X_1$ are the number of transitions without and with an IMF program,

respectively. This gives the following estimate of $\sigma_D$ under the null hypothesis:

$$SE_{Dp} = \sqrt{\hat{p}(1-\hat{p})\left( \frac{1}{n_0} + \frac{1}{n_1} \right)}.$$

If $n_0$ and $n_1$ are large, the standardized difference $z = \dfrac{\hat{p}_1 - \hat{p}_0}{SE_{Dp}}$ is approximately $N(0,1)$.

The *p*-value for a test of the null hypothesis ($H_0$: $p_1 = p_0$) against the alternative hypothesis

$H_a$: $p_1 \neq p_0$ is thus given by $\Pr(Z \neq z)$, where $Z$ is a standard normal random variable.

Table 1. Summary of Predictions by Morris and Shin (2003) and Corsetti, Guimaraes, and Roubini (2003)

| | Fundamentals | | | |
| --- | --- | --- | --- | --- |
| | Very Bad | Bad | Good | Very Good |
| Effect of IMF lending on adjustment effort | None | Positive | Negative (moral hazard) | None |
| Effect of IMF lending on capital flows | None | Positive (catalysis) | None | None |

Table 2. Average Performance of Emerging-Market Economies With EFF and SBA Programs
(In percent)

A.  Average Performance of Emerging Market Economies with EFF Programs

| Fundamental | Year Before IMF Program | First Year | Second Year | Third Year |
|---|---|---|---|---|
| Current account/GDP | –3.8 | –2.7 | 3.2 | –3.2 |
| Gross capital flows/GDP | 1.1 | 1.0 | 1.7 | 1.5 |
| Inflation | 23.5 | 18.7 | 13.5 | 11.0 |
| Real GDP growth | 1.4 | 2.6 | 5.2 | 4.3 |

B.  Average Performance of Emerging Market Economies with SBA Programs

| Fundamental | Year Before IMF Program | First Year | Second Year | Third Year |
|---|---|---|---|---|
| Current account/GDP | –3.7 | -1.5 | 1.7 | –0.5 |
| Gross capital flows/GDP | 2.1 | 2.1 | 2.2 | 2.1 |
| Inflation | 21.8 | 25.4 | 18.0 | 15.3 |
| Real GDP growth | 3.0 | 1.8 | 3.9 | 3.9 |

Table 3. Definitions of States in Terms of Fundamentals

| Fundamentals | Current Account to GDP | Reserves to Imports | Short-term Debt to Reserves | External Debt to GDP |
|---|---|---|---|---|
| | In percent | | | |
| 1 (Very bad) | Deficit larger than 6 | Between 0 and 1.25 | Larger than 4 | Larger than 0.6 |
| 2 (Bad) | Deficit between 3 and 6 | Between 1.25 and 3 | Between 2 and 4 | Between 0.4 and 0.6 |
| 3 (Good) | Deficit between 0 and 3 | Between 3 and 7 | Between 1 and 2 | Between 0.2 and 0.4 |
| 4 (Very good) | Surplus | More than 7 | Between 0 and 1 | Between 0 and 0.2 |

Table 4. Average Capital Flows to Emerging-Market Economies Conditional on External Fundamentals
(In percent of GDP)

A. Conditional on Reserves/Imports

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Very bad | 1.5 | 1.2 | 0.5 | 0.5 | 8 |
| Bad | 1.5 | 1.2 | 2.1 | 2.2 | 16 |
| Good | 2.2 | 2.4 | 2.5 | 2.0 | 11 |
| Very good | 2.3 | 2.4 | 2.8 | 2.8 | 6 |

B. Conditional on Short-Term Debt/Reserves

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Very bad | 1.6 | 1.9 | 1.6 | 1.5 | 4 |
| Bad | 1.6 | 0.8 | 1.8 | 1.9 | 9 |
| Good | 2.0 | 2.6 | 2.3 | 1.9 | 9 |
| Very good | 2.2 | 2.2 | 2.7 | 2.6 | 12 |

C. Conditional on Current Account Deficit/GDP

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Very bad | 2.4 | 2.3 | 1.8 | 2.2 | 10 |
| Bad | 2.1 | 1.9 | 2.7 | 2.2 | 13 |
| Good | 1.0 | 1.2 | 1.1 | 1.1 | 12 |
| Very good | 0.7 | 1.2 | 2.3 | 1.6 | 5 |

D. Conditional on External Debt/GDP

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Very bad | 1.5 | 1.7 | 1.6 | 1.8 | 14 |
| Bad | 1.4 | 1.7 | 1.9 | 2.1 | 11 |
| Good | 1.9 | 1.7 | 2.7 | 1.9 | 13 |
| Very good | 0.0 | 1.1 | 0.0 | 0.5 | 2 |

Table 5. Average Capital Flows to Emerging-Market Economies Conditional on IMF Lending Amount
(In percent of GDP)

A. Amount/Reserves

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Low | 1.8 | 2.6 | 1.3 | 2.4 | 6 |
| Medium | 2.1 | 1.9 | 2.4 | 1.9 | 22 |
| High | 1.1 | 0.9 | 1.5 | 1.6 | 13 |

B. Amount/Short-Term Debt

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Low | 1.5 | 2.1 | 0.9 | 1.1 | 8 |
| Medium | 2.4 | 2.2 | 2.3 | 2.1 | 12 |
| High | 1.8 | 1.5 | 2.9 | 2.6 | 15 |

C. Amount/Imports

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Low | 2.2 | 1.9 | 1.7 | 2.2 | 11 |
| Medium | 2.2 | 2.4 | 2.3 | 2.0 | 12 |
| High | 1.1 | 1.1 | 1.9 | 1.5 | 18 |

D. Composite Amount Index

| State | Year Before IMF Program | First Year | Second Year | Third Year | No. of Observations |
|---|---|---|---|---|---|
| Low | 2.2 | 2.6 | 1.6 | 2.1 | 11 |
| Medium | 1.8 | 1.4 | 2.1 | 1.8 | 27 |
| High | 1.1 | 1.2 | 2.2 | 1.7 | 10 |

Table 6. Two-Year Transition Probabilities for Emerging-Market Economies With and Without IMF Programs
(In percent)

A. Current Account Balance to GDP

| | State | $S_{T+2}=1$ | $S_{T+2}=2$ | $S_{T+2}=3$ | $S_{T+2}=4$ |
|---|---|---|---|---|---|
| $S_T=1$ | Program | 0.23 | 0.15 | 0.38 | 0.23 |
| (Very bad) | Nonprogram | 0.29 | 0.49 | 0.17 | 0.06 |
| | P-value | 0.35 | 0.01 | 0.05 | 0.03 |
| $S_T=2$ | Program | 0.14 | 0.14 | 0.48 | 0.24 |
| (Bad) | Nonprogram | 0.26 | 0.43 | 0.28 | 0.03 |
| | P-value | 0.12 | 0.01 | 0.04 | 0.00 |
| $S_T=3$ | Program | 0.10 | 0.10 | 0.55 | 0.25 |
| (Good) | Nonprogram | 0.08 | 0.27 | 0.55 | 0.10 |
| | P-value | 0.37 | 0.05 | 0.50 | 0.04 |
| $S_T=4$ | Program | 0.00 | 0.11 | 0.33 | 0.56 |
| (Very good) | Nonprogram | 0.10 | 0.13 | 0.36 | 0.41 |
| | P-value | 0.15 | 0.44 | 0.44 | 0.21 |

B. Reserves to Imports

| | State | $S_{T+2}=1$ | $S_{T+2}=2$ | $S_{T+2}=3$ | $S_{T+2}=4$ |
|---|---|---|---|---|---|
| $S_T=1$ | Program | 0.42 | 0.17 | 0.42 | 0.00 |
| (Very bad) | Nonprogram | 0.71 | 0.24 | 0.05 | 0.00 |
| | P-value | 0.04 | 0.30 | 0.00 | n/a |
| $S_T=2$ | Program | 0.13 | 0.35 | 0.52 | 0.00 |
| (Bad) | Nonprogram | 0.13 | 0.62 | 0.24 | 0.00 |
| | P-value | 0.49 | 0.01 | 0.01 | n/a |
| $S_T=3$ | Program | 0.06 | 0.06 | 0.39 | 0.50 |
| (Good) | Nonprogram | 0.00 | 0.14 | 0.78 | 0.07 |
| | P-value | 0.01 | 0.15 | 0.00 | 0.00 |
| $S_T=4$ | Program | 0.00 | 0.00 | 0.20 | 0.80 |
| (Very good) | Nonprogram | 0.00 | 0.05 | 0.16 | 0.80 |
| | P-value | n/a | 0.24 | 0.37 | 0.49 |

C. Short-Term Debt to Reserves

| | State | $S_{T+2}=1$ | $S_{T+2}=2$ | $S_{T+2}=3$ | $S_{T+2}=4$ |
|---|---|---|---|---|---|
| $S_T=1$ | Program | 0.20 | 0.50 | 0.30 | 0.00 |
| (Very bad) | Nonprogram | 0.63 | 0.32 | 0.05 | 0.00 |
| | P-value | 0.01 | 0.15 | 0.03 | n/a |
| $S_T=2$ | Program | 0.18 | 0.09 | 0.45 | 0.27 |
| (Bad) | Nonprogram | 0.04 | 0.33 | 0.38 | 0.25 |
| | P-value | 0.07 | 0.05 | 0.32 | n/a |
| $S_T=3$ | Program | 0.00 | 0.15 | 0.23 | 0.62 |
| (Good) | Nonprogram | 0.04 | 0.09 | 0.76 | 0.11 |
| | P-value | 0.22 | 0.24 | 0.00 | 0.00 |
| $S_T=4$ | Program | 0.00 | 0.00 | 0.17 | 0.83 |
| (Very good) | Nonprogram | 0.00 | 0.03 | 0.08 | 0.89 |
| | P-value | n/a | 0.24 | 0.12 | 0.23 |

Table 7. Summary of Main Results

| Initial Fundamentals | Capital Flow Trends | Change in Fundamentals |
|---|---|---|
| Very bad (state 1) | Either continued decline after initiation of program or, at best, no improvement. | Some improvement in external fundamentals, but related to domestic recessionary conditions. |
| Bad (state 2) | Dip and recovery, as the decline in capital flows is stemmed and a rise initiated. | Strong evidence for improvement in external fundamentals. |
| Good and very good (states 3 and 4) | Either no change or evidence consistent with stabilization of flows following a temporary shock. | Ambiguous. |

Figure 1. Average Performance of Emerging-Market Economies with IMF Programs