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Abstract

Using empirical analysis, complemented with case studies, this paper studies under which circumstances IMF programs manage to catalyze private capital flows into the countries concerned. While we found no catalysis in general, the situation differs very much depending on the type of capital flow and the program's objective. On the first, the Fund seems to be doing a better job at attracting FDI than shorter-term flows, particularly cross-border bank lending. On the second, programs oriented towards crisis prevention or with longer-term objectives, also perform better in terms of catalysis. In turn, programs oriented towards crisis resolution actually discourage private capital flows. This worrisome finding, given the importance of crisis resolution for the Fund, is mitigated for FDI inflows in the case studies analysed. Finally, all case studies point to the role of conditionality –as opposed to signalling and liquidity– as the strongest channel through which IMF catalyzes private flows.

Keywords: IMF, catalytic role, private capital flows.

JEL Classification: F32, F33, F34.

1 Introduction

The role of the International Monetary Fund (IMF) in improving the functioning of the International Monetary System is probably one of the most discussed and long-standing topics in the realm of International Economics. This includes a large number of aspects, such as the success of IMF programs in achieving sustainable growth, its distributional effects, the moral hazard consequences of IMF actions and, also, the IMF's catalytic role in attracting capital flows to emerging countries.[1] In fact, enhancing countries' access to international capital markets is widely regarded as an important objective of the IMF, even if it is not explicitly stated in its Articles of Agreement.

The notion of the IMF having a catalytic role gradually emerged in the last three decades, although it only occupied a prominent position in the policy debate agenda after the financial crises of the 1990s.[2] The liberalization of the capital account and the surge –and increased volatility– in capital flows to emerging countries has been associated with a drastic increase in the size and frequency of balance of payment difficulties, which has made IMF financing unable to cover, on its own, its members' financing needs. Moreover, large IMF-supported rescue packages have been increasingly criticized on the grounds that they induce moral hazard in international financial markets, further stressing the need to generate alternative sources of finance. In this context, the IMF role in catalyzing private capital became crucial for countries to grow out of their balance of payment difficulties.[3]

An assessment of the extent of the Fund's catalytic role is also instrumental in determining the amount of adjustment that a country under an IMF program will need to undergo in order to cover its financing gap. In fact, if the program is designed under a very optimistic assumption for capital inflows and, thereby, economic growth, its targets will probably be too tight, leading to a very costly adjustment.

Many explanations have been put forward to justify the IMF catalysis of private flows. A first one is the **liquidity** obtained by a country which signs an IMF program. This is the most direct channel through which the Fund helps cover a country's financing needs, thereby contributing to the restoration of its external viability and comforting international investors. Liquidity should play a key role in crisis resolution programs but it can also be important in other types of longer-term arrangements such as the Poverty Reduction and Growth Facility (PRGF) as long as recipient countries face balance of payment difficulties. In turn, the potential catalysis of precautionary arrangements cannot be explained by the liquidity channel since no disbursements are made, at least at the start of the program.

A second channel is the policy effect stemming from a program's **conditionality**. As long as conditionality is correctly designed and carried out by the country's authorities, it should imply better policies and, thereby, higher expected growth. The latter should clearly

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1. While other Multilateral Institutions also lend to countries and, thus, may also have a catalytic role, these generally follow IMF decisions as to whether to grant a program. Macroeconomic conditionality is generally delegated to the IMF as well. This is why we focus on the IMF.

2. Cottarelli and Giannini (2002) offer an excellent account of the gradual appearance of the concept in the IMF writings since 1977.

3. The importance of the IMF catalyzing private flows was stressed with the adoption of the Prague Framework for crisis resolution in 2000, where it was stated that "the combination of catalytic official finance and policy adjustment should allow a country to regain full market access quickly if it faces a liquidity problem."

attract private investors [Guitián (1995) and Dhonte (1997)]. It is important to note that conditionality may be associated to a financial disbursement from the part of the Fund but not necessarily, as in the case of precautionary programs.

The positive **signalling effect** that an IMF program can offer to a country is a third channel. This can be related to the conditionality but it can also stem from the IMF's seal of approval of a country's own policies. The signalling effect is based on the assumption of imperfect information in financial markets so that investors profit from the IMF's acting as a "delegated monitor", mediating between its member states and the market [Tirole (2002)]. An important case in which the IMF can signal a country's credibility is in crisis prevention, through a precautionary arrangement. In any event, the move towards more ownership in the IMF programs makes the differentiation between conditionality and signalling fuzzier.

Counterarguments have also been offered as to whether liquidity, conditionality and signalling contribute to catalysis. First, as for the liquidity injection, it could be argued that, unless the IMF program succeeds in restoring confidence quickly, it might just be offering new funds to feed capital flight in the near future. This is in line with the idea that IMF programs may actually induce **moral hazard** in creditors' behaviour. The problem is that it is quite difficult to distinguish between catalysis and moral hazard, particularly in empirical studies since both are associated with an increase of capital inflows, at least in the short-term. Second, the policy regime shift induced by conditionality usually has a **contractionary effect** which may act as a deterrent for foreign investors. Finally, the Fund's signalling may sometimes act as a **wake-up call** for investors that a country may be facing problems not foreseen by the market.

Given the above arguments for and against IMF catalysis, it seems appropriate to assess the question empirically. Existing studies, reviewed in the next section, find little or no evidence of an IMF´s catalytic role. There are, however, a number of considerations to take into account.

First, IMF programs have different objectives, which may affect the extent to which they catalyse foreign capital. Two clearly separated ones are **crisis prevention and crisis resolution**. In the former the fall in capital inflows before the Fund intervenes will probably be less acute than in the latter and the problem less severe. If we think of the traditional model behind the Fund's action, basically addressing balance of payment needs, one should expect a higher IMF impact in crisis resolution. This, however, is not what we find in our empirical analysis, which should constitute a warning signal for the Fund's as a crisis manager. Catalysis in crisis prevention –through precautionary programs– is stronger although concentrated on FDI. This is also the case of IMF longer-term focused on achieving sustainable growth and reducing poverty.

Second, existing studies do not generally handle the problem of **sample selection**, or they do so in very rough terms. We show evidence in this paper that such problem exists since countries engaging in an IMF program tend to be in weaker economic circumstances, beyond what we can control for in the regressions. The question is whether taking into account such difference helps yield a more optimistic picture of the Fund's catalytic role. Our results show that this is the case only where catalysis could be found before controlling for sample selection, namely for precautionary arrangements and longer-term programs and especially for FDI. In the same way, controlling for sample selection increases the negate impact of crisis resolution-oriented programs, as well as for short term flows in general.

Third, the traditional literature on IMF catalysis generally focuses on short term private capital inflows, which are no longer the most important for emerging economies. FDI has become the main source of financing for many emerging countries and it is also more stable. This should raise the interest on the Fund's role in attracting FDI. Although it is true that FDI decisions are generally long-term, this does not mean that an IMF program should not affect them. The most obvious channel would be the policy effect of conditionality. This influences a country's medium term growth and, thereby, the expected return for long term investment. In addition, we do not want to put too much emphasis on total private capital flows –as in other more recent studies– since some of the determinants of FDI, portfolio and cross-border flows are different. We, thus, conduct **separate analysis for each type of capital inflow, with special interest for FDI,** which has been the one least analyzed in the existing research.

We use two methodologies, **econometric analysis and case studies**. These are complementary in several ways. First, econometric techniques can help tackle the sample selection and counterfactual problem through causal inference. Case studies, in turn, allow us to take into account many of the country level specificities lost in the regression analysis. Furthermore, case studies allow us to explore which is the channel(s) behind that catalysis, namely liquidity, conditionality and/or signalling.

In sum, with the help of two complementary methodologies, we intend to answer the following questions: (i) Do IMF programs help countries attract more private capital flows than they would if no program had been signed?; (ii) Does the impact vary for different kinds of flows?; (iii) Is the Fund's catalytic role stronger when preventing or when resolving crisis? What about the impact of longer-term structural programs?, and finally, (iv) What are the channels through which an IMF program catalyzes flows?

2 Existing literature and paper objective

Although scarce, the existing theoretical literature argues in favour on an IMF's catalytic role [Corsetti et al. (2003)]. The reason behind is that the coordination of agents' expectations –including investors– is facilitated when markets are stabilized through the IMF's provision on liquidity.

The empirical literature, in turn, hardly finds any evidence of such catalysis, either through regression analysis or case studies [such as Killick (1995) and Ghosh et al. (2002)]. Table 1 in Appendix 1 summarizes the most relevant contributions. There are, however, a number of specific cases in which some catalysis is found depending on (i) the conditions in the concerned country; (ii) the kind of capital flows analyzed; (iii) the type of IMF programs; (iv) the size of the associated financial assistance, and (v) the relationship between the country and the Fund.

With regard to the **conditions in the concerned country**, there is a growing consensus that IMF programs have stronger catalytic effects in "intermediate" countries, in terms of fundamentals [Eichengreen and Mody (2001a)] or when the situation –measured by the ratio of reserves to imports or the ratio of debt to GDP– has not deteriorated too much [Mody and Saravia (2003)]. For bad performers –probably the most interesting group because of their difficult access to foreign investment– Eichengreen and Mody (2001a) show a fall in capital flows when engaged in IMF programs and the same is true for Bordo, Mody and Oomes, (2004). For good ones, Kletzer and Mody (2005) find that, if they have a low debt to GDP ratio, they will access international markets better under an IMF program. Two other country-specific factors have been highlighted in the literature: the volatility of the external sector, which seems to facilitate catalysis [Mody and Saravia (2003)][4] and market access, which appears to discourage it [Benelli (2003)].[5]

Various contributions have tested whether the presence of an IMF program has a differential effect on the **various types of capital inflows** without reaching a clear consensus. Marchesi (2001) shows that the presence of an IMF program tends to favour debt rescheduling. In this context the IMF would function as a "screening device". For the rest of flows, the evidence is mixed. For FDI, Edwards (2003) reports a negative influence of IMF programs but Bird and Rowlands (2002) find that certain IMF programs, namely Stand-By Arrangements (SBAs) catalyze FDI in middle-income countries. For portfolio flows, Edwards (2003) and Bird and Rowlands (2002) report evidence of a reduction of flows in countries with an IMF program. As for bond issuance, Edwards (2003) finds no catalytic effect while the opposite is true for Eichengreen and Mody (2001b) and Eichengreen, Kletzer and Mody (2005). These authors argue that the role of the IMF as a "delegated monitor" is more likely to manifest itself in the bond market because, as opposed to banks, bondholders are seldom engaged in monitoring activities and can be more influenced by the signalling related to the signing of an IMF program. Indeed, Eichengreen and Mody (2001b) and Eichengreen, Kletzer and Mody (2005) fail to find a catalytic effect for the specific case of bank lending.

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4. They measure the volatility of the external sector with the variance of the growth rate of exports.

5. He finds that market access tends to increase the shortfall observed between actual capital flows and projected capital flows during the implementation of the program.

In the same vein, no clear idea exists on what **kind of IMF program** has a larger catalytic role. In general, it would appear that longer-term, concessionary, programs are associated with lower volumes of capital inflows, mostly FDI [Eichengreen and Mody (2001b); Bird and Rowlands (2002)]. In the same vein, programs with a stronger component of structural conditionality appear to have a weaker catalytic effect [Eichengreen and Mody (2001b)] than programs with a strong macroeconomic conditionality [Benelli (2003)]. In turn, shorter-term programs seem to help attract capital only if certain conditions are met. In particular, SBAs appear to catalyze flows in middle income countries while the Extended Financial Facility (EFF) does so in low income countries [Bird and Rowlands (2002)]. Finally, there is growing –albeit still scarce– evidence that precautionary arrangements tend to catalyze private flows [Mody and Saravia (2003); Eichengreen et al. (2004)]. Still, the difference in catalysis between crisis prevention and crisis resolution programs has not been explored yet.

Another important issue which has been analyzed is the **size of the financial assistance** associated with the program. For Mody and Saravia (2003), larger programs are associated with a stronger catalysis of private flows. In the same vein Eichengreen, Kletzer and Mody (2005) find that, for countries facing solvency risk (i. e., with a high debt ratio), it is the volume of lending rather than the IMF presence which attracts private capital. The opposite seems to be true for countries facing liquidity risk. Killick (1995), however, argues that larger lending may just be fuelling future capital outflows, because of moral hazard. Institutional constraints within the IMF have been used to justify this viewpoint: upon approval of a program with exceptional access, the IMF Staff appears to make more optimistic projections of future private flows in order to close the country's financing gap. This implies an overestimation of the IMF's catalytic impact [Benelli (2003)].[6]

Finally, the **kind of relationship between the IMF and the concerned country** has also been explored. A continued presence of the IMF in a country seems to reinforce the attraction of capital flows [Mody and Saravia (2003)]. At a certain point in time, however, such presence starts to send a negative signal to investors so that it stops catalyzing private flows. Case studies, focusing on some qualitative features of the relationship between the IMF and the countries under a program conclude that what really matters is the perception of a strong commitment to the program [Bird, Mori and Rowlands (2003)].

A question that has not been studied much is through **which channels** the Fund influences investors' behaviour. Benelli (2003) argues that it is the policy adjustment related to IMF programs what catalyzes flows. Eichengreen, Kletzer and Mody (2005) report that the relative importance of the liquidity-signalling effects varies depending on the level of indebtedness of the country concerned. In any event, all these studies are empirical and, therefore, face limitations when analyzing the channels.

In conclusion, the weak evidence in favour of an IMF catalytic role has served the critics of the IMF to strengthen their claims about the "ineffectiveness" of the institution: it has been argued that the Fund fails to correct informational market failures [Edwards (2003)] and that, by overestimating its catalytic role, it introduces excessively contractive policies [Bird and Rowlands (2002)]. Given the relevance of the issue for countries with an IMF

6. Benelli (2003) uses IMF projections as the counterfactual in his study. He interprets that a program has a catalytic effect to the extent that actual capital flows reach projected capital flows in the aftermath of the concession of the program.

program or seeking it, it seems important to build upon the existing research, addressing some of its caveats and open issues.

Probably the biggest caveat of the existing literature is not taking proper account of the counterfactual and, thereby, sample selection. This is so because it is likely that countries seeking an IMF program are generally those in worse shape and/or with the worst starting conditions and that this cannot be fully controlled for. Another important issue is acknowledging that the Fund's different objectives, particularly crisis resolution and crisis prevention and that their impact on private flows could be different. The long or short term nature of IMF program may also have a bearing on catalysis.

3 Methodological issues

The nature of the question explored in this paper implies a number of challenges which have not always been addressed successfully in the existing literature. An important one is the lack of a counterfactual. In order to assess whether the adoption of an IMF program leads to an improved access to international financial markets, one needs to know what would have happened if the program had not existed, but this counterfactual is obviously not observable. A related problem is the fact that the counterfactual is not only not observable, but probably a non random event. While most studies assume that a country's signing IMF program is random,[7] the fact that the IMF generally grants financial assistance only to countries with a balance of payment problem can be informative to potential lenders by itself, independently on the impact of the IMF program. In other words, it can unveil that the country is not doing well or has worse starting conditions beyond what can be observed. This, by itself, should make these countries less attractive to private capital flows, not as a consequence of the IMF program but of the situation it unveils. As a consequence of this sample selection problem, the estimated parameter to account for the IMF's role in catalyzing capital inflows could be biased downwards.

There have been some attempts to handle non-random sample selection in the existing empirical literature. Edwards (2003) applies a two-stage procedure, so that he first estimates the likelihood that an IMF program is granted and, then, the determinants of capital inflows with IMF programs as objective variable. In reality, this procedure basically helps tackle the potential endogeneity that IMF programs are signed because of the evolution of capital inflows. Furthermore, the reasons for a country to sign an IMF program are probably related to the determinants of capital inflows so that the coefficient of interest may still be biased. Mody and Saravia (2003) applied a model *á la* Heckman to correct for sample selection bias when they estimate the effect of an IMF program over the spread charged in the issuance of bonds by emerging countries. However, the reason behind is rather different: making sure that countries which cannot access bond markets are not included in the sample. The variable they use to this end is the ratio of debt service to exports, under the relatively unrealistic assumption that it influences the decision to issue a bond but not the level of the spread. Benelli (2003), in turn, uses the amount of capital flows projected in the IMF program as a measure of the counterfactual. He, then, compares it with the capital flows that actually came in after the program was signed. The problem with this approach is that IMF capital flow projections tend to be optimistic when the program is being designed so that there is no financing gap and the program can be approved by the Board.

The problem of sample selection has long been identified in other spheres of economics (particularly labour and household behaviour) and econometric techniques have been developed to tackle the issue. Many of these techniques cannot be applied to our case because our data is not obtained from a random experiment so as to have the perfect counterfactual. Among the available ones for non-random experiments, **matching** seems to be the preferred one. Hardoy (2002) is probably the first to apply it to a topic related to ours, namely the impact of IMF programs on economic growth. Nunn (2005) also employs

7. One exception in Benelli (2003), who has information on the amount of capital flows projected in the IMF program and compares it with the capital flows that actually came in after the program was signed.

matching to compare the long term growth of countries with its institutions based on British and French common laws.

Finally, existing case studies on the catalytic role of the IMF have not attempted to tackle the sample selection bias. In fact, no full-fledged explanation is given for the country choice, nor the counterfactual problem. We try to tackle both problems by comparing pairs of countries, one with an IMF program and one without, as close as possible in terms of their attractiveness to capital inflows and having experienced similar balance of payment difficulties.

Another important challenge is to **differentiate among IMF objectives**. In fact, no study clearly distinguishes between crisis resolution and crisis prevention. We shall do so both in the regression analysis and in the case studies. In the regressions, we take short-term programs, as IMF tools for crisis resolution, and see how they perform in attracting different types of private capital inflows. In addition, we reduce the sample to countries having undergone a crisis, with or without an IMF program, and see whether the degree of catalysis is different. For crisis prevention, the only available tool at the Fund's disposal –after the elimination of the credit contingency line– are precautionary arrangements. These are IMF programs in which countries accept conditionality voluntarily and have no intention to make use of funds when the program is signed (although they have the possibility to do so in the course of the program if conditions warrant it). In the case studies, we compare pairs of similar countries having undergone a crisis with and without an IMF short-term program and countries having been affected by a common external shock, with and without a precautionary arrangement, but which have managed to avoid a full-fledged crisis.

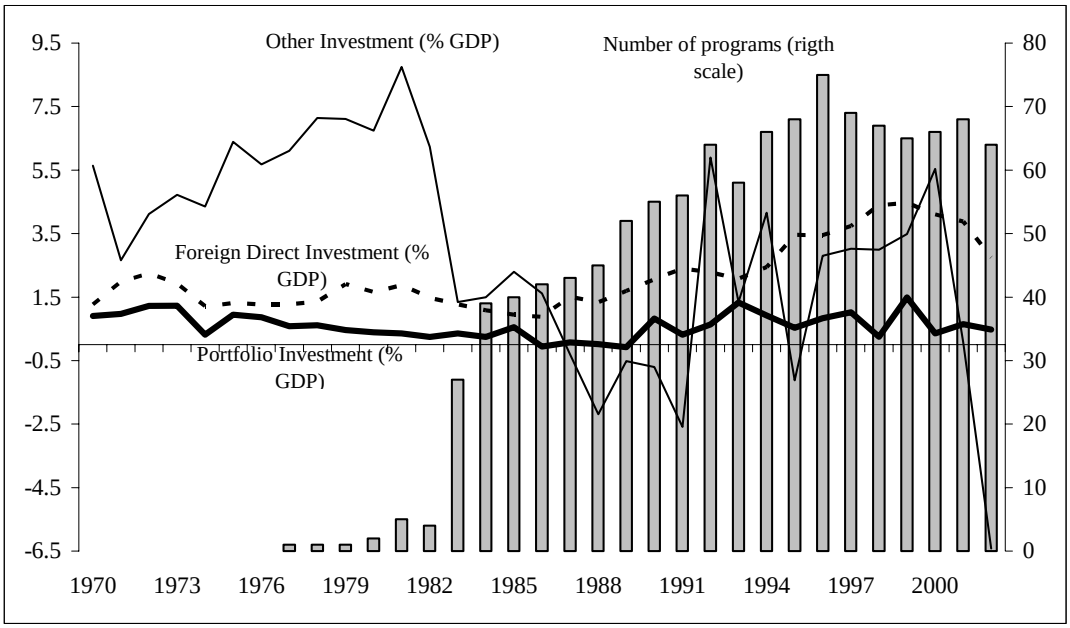
Finally, we also introduce a clear distinction among **types of capital inflows**, being different in nature and even in some of their determinants. While the original literature on the IMF catalysis focused on short-term flows, the growing importance of FDI calls our attention to such longer-term and more stable flows and the question is whether the Fund can do something to attract it. One could think that the policy channel –through complying with the program's conditionality– could be important in attracting FDI. Finally, we also distinguish between countries with market access and without, since the full sample is probably not relevant for some types of private flows, particularly portfolio ones. In the case studies, only countries with market access are considered.

4 Empirical approach to measure the IMF catalysis

4.1 Variables and data

The variables of interest in this study are different types of private capital flows, as dependent variable, and IMF programs as objective. Private capital flows are divided into FDI, portfolio and other flows (mainly bank cross-border lending). We run separate regressions for the three of them and also for total private capital flows (variable definitions and data sources can be found in Table 1 in Appendix 2). The latter, however, is less relevant for several reasons. First, we find very different secular trends for each type of flow with a rapid increase in FDI since the beginning of the 1990s and a sharp fall in cross-border banking lending in the late 1990s (as shown in Graph 1 below and in the main statistics in Table 3, Appendix 2).

Graph 1: Evolution of different types of private capital flows and number of IMF programs



The graph shows the sum of the different types of capital flows for the 156 countries in our sample.

In fact, there are a number of determinants that are specific to each type of flow, so that having a single set of controls for total flows does not allow to take into account their specificities. Second, IMF programs could be designed in such a way as to attract certain types of flows and even discourage others. We shall see some examples of this in the case studies. Third, the relatively small number of observations for portfolio flows, compared with FDI and cross-border bank lending restricts the observations available for total private flows but also biases the sample towards those countries where data for portfolio flows exist.[8]

8. We do not have sufficient information to distinguish between real missing observations and those from countries without portfolio flows so we cannot use imputation to increase the number of observations.

Our database contains annual data for 156 emerging and developing countries for the period 1970 to 2002 (Table 1 in Appendix 2 lists the countries included, and Table 2 in Appendix 2 shows the list of variables used). This is the number of countries for which there are at least two observations available for at least one of the three types of private capital flows. The total sample is composed of 35 Latin American countries, 25 Asian nations, 53 African ones, 29 European countries and 7 from both the Middle East and Oceania. We, thus, have an unbalanced panel with a maximum number of observations of 1850. This is when cross-border lending is chosen as dependent variable. In the case of FDI and portfolio flows, the number of observations is reduced to 1728 and 928, respectively. For total private capital flows, the number is further reduced to 928.[9]

The objective variable is a dummy which takes the value of 1 every year the country has an IMF program and 0 otherwise. When introducing it in the regression, this dummy is taken with one lag so as to allow some time for capital flows to react to the program. In a second set of results, we focus on the possible announcement effect of the program, which implies that only the year in which it is signed takes the value of 1. As before, we take this variable with one lag.

To distinguish between the Fund's two main functions, crisis prevention and resolution, we classify IMF programs in different groups. For crisis prevention, we take precautionary arrangements (PA) and see whether they help attract private capital flows. For crisis resolution, we consider Stand-by arrangements (SBA) accompanied or not by the Supplementary Reserve Facility (SRF),[10] which basically increases the amount of financial assistance available. Although longer-term, we also include the Extended Fund Facility (EFF) since it is generally geared towards solving protracted balance of payments problems. In any event, as Table 6 in Appendix 2 shows, there is no one-to-one relation between the facilities and the crisis resolution objectives, since they do not always coincide with crisis cases. In any event, the percentage of cases in which they coincide is higher than for other programs. Finally, there is a third group of programs, which cannot be easily classified into crisis prevention or resolution, namely the Poverty Reduction and Growth Facility (PRGF) and its predecessors, the Structural Adjustment Facility (SAF) and the Enhanced Structural Adjustment Facility (ESAF). These are longer-term structural programs, aiming at reducing poverty and increasing sustainable growth, whose impact on capital flows we shall also test. When a country has two types of programs in one year, we assign the value of 1 to the program which has been in place more months that year and the value of 0 to the other program. There are a total of 1143 observations with an IMF program, the majority of which are SBA and PRGF (or old SAF or ESAF).

In addition, to test whether the size of the IMF's financial package influence the degree of catalysis, we construct two additional variables. The first one is the amount of financial assistance agreed, as a percentage of the country's quota in the IMF capital. The average size is slightly below 100% of quota, and somewhat higher for SBAs. The second one is a dummy, which takes the value of 1 when financial assistance implies exceptional access to IMF resources. This is above 100% of quota for SBAs EFFs and Pas, and comprises 12.5%, 71.4% and 14.4% of total observations, respectively. Access above

9. This is because we only take those observations for which data for FDI, portfolio and cross-border lending exists. In order words, we do not assume that any of these flows are equal to zero in case the data is missing.

10. Since there are very few SRF to consider them separately and they are similar in nature to SBA, we sum them to the SBA observations.

limits is defined as above 140% of quota in the case of PRGF programs and we have 13.2% of PRGFs in this situation.

Finally, we control for the main determinants of FDI, portfolio and cross-border bank lending, according to the existing literature (See Table 2 in Appendix 1 for a review of the literature on the determinants of each type of private capital flows). There are a number of factors which appear to affect all kinds of flows, namely the investment rate, the degree of political freedom, the domestic interest rate, the sovereign rating, and global economic growth. In addition, economic growth and the GDP per capita seem relevant for FDI and cross-border bank lending. The evolution of exports and the fact of participating in a trade block, in turn, could be relevant for FDI (or at least that which is export oriented). Finally, the level of external debt to GDP, inflation and international reserves in the host country, as well as the level of US interest rates, should be relevant for portfolio and cross-border flows but probably not for FDI. Given the very extreme values of some of the control variables (see Table 3 in Appendix 2), we eliminate the 1% of the distribution for public deficit and external debt over GDP, inflation, and the domestic interest rate. We end up with an unbalanced panel with a maximum number of observations of 1700. For total private capital flows, the number is further reduced to 684.

4.2 Empirical challenges

In our econometric analysis, there are several potential problems, which we need to take into account to obtain a consistent estimate of the IMF's catalysis. The most important one is **selection bias**. Table 5 (in Appendix 2) shows that countries resorting to the IMF tend to have worse starting conditions. While we control for the contemporaneous and –when relevant– lagged determinants of capital flows, we cannot control for unobservable variables.[11] To tackle the selection bias, we carry out three exercises.

Starting from the most intuitive but least rigorous, we take a smaller sample of countries, namely **"problem" countries**, in which those under an IMF program and those which are not should be more similar than in the total sample. We define "problem" countries as those having undergone a crisis, be it currency, banking or sovereign one. Although for this subsample starting conditions are more similar for observations under IMF programs and not, the former still have worse starting conditions (see Table 5 in Appendix 2). In addition, this strategy does not allow us to say something on crisis prevention and the number of observations is substantially reduced.

As a second strategy, we conduct a **two-stage estimation**, similar to that of Edwards (2003), where we first estimate the probability of engaging in an IMF program, through a probit model. We, then, run the original regression within the sub-sample of countries with a relatively high likelihood of having an IMF program, whether they have one or not. The idea behind is that these countries should be more similar than those of the full sample mitigating the sample selection bias. The problem with this strategy is an identification one since the determinants of IMF programs also influence private capital flows.

11. In addition, we estimate –with a binary model– the probability of engaging into a Fund program on the basis of its main determinants. We find that countries with poorer economic growth and a larger external debt service ratio have a higher likelihood of signing an IMF program (results can be obtained from the authors).

Finally, we use causal inference, a more rigorous technique to tackle selection bias. Among the existing methodologies for non-random exercises, we choose **matching.**[12] Applied to our case, this consists of selecting observations with the same probability of engaging in an IMF arrangement, and comparing the different effect of being under a program or not. The idea behind is that the bias is reduced when the comparison of outcomes is performed using treated and control subjects who are as similar as possible. Since matching subjects on an n-dimensional vector of characteristics is typically not feasible for a large n, this method proposes to summarize pre-treatment characteristics of each subject into a single-index variable (the propensity score), which makes the matching feasible. The propensity score, defined as in Rosenbaum and Rubin (1983), is the conditional probability of receiving a treatment given pre-treatment characteristics, namely:

$$p(X) \equiv Pr\{D = 1|X\} = E\{D|X\} \quad (1)$$

where D = {0, 1} is the indicator of exposure to treatment and X is the multidimensional vector of pre-treatment characteristics. Rosenbaum and Rubin (1983) show that if the exposure to treatment is random within cells defined by X, it is also random within cells defined by the values of the mono-dimensional variable p(X). As a result, given a population of units denoted by i, the propensity score $p(X_i)$ –known the Average effect of Treatment on the Treated (ATT)– can be estimated as follows:

$$\tau \equiv E\{Y_{1i} - Y_{0i}|D_i = 1\} \quad (2)$$

Where Y_{1i} and Y_{0i} are the potential outcomes in the two counterfactual situations of treatment and no treatment, respectively. Then, taking the expected value and conditioning to the probability of the event:

$$= E\{E\{Y_{1i} - Y_{0i}|D_i = 1, p(X_i)\}\} \quad (3)$$

$$= E\{E\{Y_{1i}|D_i = 1, p(X_i)\} - E\{Y_{0i}|D_i = 0, p(X_i)\}|D_i = 1\} \quad (4)$$

where the outer expectation is over the distribution of $[p(X_i)|D_i = 1]$.[13]

An estimate of the propensity score is not enough to estimate the ATT of interest using equation (2). The reason is that the probability of observing two units with exactly the same value of the propensity score is zero, in principle, since p(X) is a continuous variable. Various methods have been proposed in the literature to overcome this problem. The first one is the Nearest Neighbor, which matches treated and control units by taking each treated unit and searching for the control unit with the closest propensity score (i. e., the Nearest Neighbor). Once each treated unit is matched with a control unit, the difference between the outcome of the treated units and the outcome of the matched control units is computed. The ATT of interest is, then, obtained by averaging these differences. The stratification method, instead, takes blocks of observations with the same propensity score on average. The problem with this method is that those treated units for which no control is available in their block will be discarded. The Nearest Neighbor, in turn, makes matches with the closest observation, which is good when data is limited but could lead to relatively different pairs.

12. In a seminal work, Rosenbaum and Rubin (1983) proposed propensity score matching as a method to reduce the bias in the estimation of treatment effects with observational data sets.
13. See Becker and Ichino (2005) for details on the procedure used.

To mitigate this problem, two additional methodologies have been developed: Kernel and Radius. The first calculates a weighted average of all controls with weights that are inversely proportional to the distance between the propensity scores of treated and control units (Kernel). The second predetermines a maximum distance of propensity scores between treated and control units (a maximum "radius"). Between the two, the Kernel method is our preferred option because our sample characteristics (extreme observations and high volatility for some of the regressors). In any event, we conduct robustness tests with two other methods (Nearest Neighbor and Stratification). The results hardly change.

We now move to the second challenge of our empirical exercise, namely **endogeneity**. This is because of potential simultaneity or, even, reverse causality, from our dependent variable, private capital flows, to some regressors (such as the investment rate and GDP growth). To have some information on which regressors could suffer from reverse causality, we run Granger-casualty tests between the dependent variable and each regressor. Those variables for which the test shows reverse causality are included in our main regression with a lag.

The third potential problem is **unobserved heterogeneity**. We include fixed or random effects, on the basis of the result of the Hausman test. Finally, collinearity does not seem to be a very big issue in our sample given the relatively low correlation between variables, except for the rating and GDP per capita (Table 4 in Appendix 2).

4.3 Results

As first step, we test the impact of **IMF programs on different types of private capital flows**, when controlling for the main determinants of such flows. In this benchmark exercise, we do not differentiate between IMF objectives or IMF programs, nor do we control for sample selection. This allows us to compare our results with those of the existing literature. We estimate with fixed effects or random effects, based on the result of the Hausmann test for each type of capital flow.[14] We also lag the regressors for which the Granger causality tests points to reversed causality, so as to minimize endogeneity problems. We find that engaging in an IMF program fosters FDI at a 95% significance level (Table 1 below). The size of the coefficient is large comparing it with other control variables. On the contrary, IMF programs discourage other investment (i. e., cross-border banking flows) at a 99% confidence level. The coefficient is nearly three times larger than for FDI. Finally, no significant impact is found for portfolio or total private capital flows.

As for the control variables, a high investment rate, market size (measured by per capita GDP) and the sovereign rating contribute to higher FDI. Also, faster global growth encourages FDI. The domestic interest rate, which can be understood as the local cost of financing FDI, the lack of political freedom and capital account restrictions have the expected negative sign in the FDI equation but none of them is significant. Regarding portfolio flows, per capita GDP appears to foster portfolio flows while the lack of political freedom and a high level of external debt discourage them. Domestic investment, the interest rate, inflation, the sovereign rating and international reserves do not play a significant role in attracting portfolio flows. Third, high domestic investment, sovereign rating and domestic interest rates foster other investment flows (cross-border bank lending), while restrictions on the capital account and a large stock of external debt hamper this kind of flows. Finally, the results for total private capital flows are harder to interpret since they include all potential determinants of the different types of flows. The investment rate, economic and, to a lesser extent, export growth, and higher domestic interest rates seem to foster total flows. In turn, restrictions on capital account, inflation and external debt discourage total flows.

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14. In the case of FDI and other investment, the Hausmann test shows that fixed effects should be preferred. For portfolio flows and total flows, random effects are better.

Table 1: Impact of an IMF program on private capital flows

	Total flows (b)	*FDI (a)*	*Other investment (a)*	*Portfolio investment (b)*
Objective variables:				
Have an IMF program_1	-0,4111	0,4014 **	-1,1979 ***	0,1664
	(-0,80)	(2,09)	(-4,05)	(1,12)
Control variables				
a.- Country variables				
Investment rate	---	0,0949 ***	---	0,0015
	---	(6,01)	---	(0,96)
Investment rate_1	0,1515 ***	---	0,1265 ***	---
	(3,48)	---	(5,64)	---
Lack of political freedom	-0,1520	-0,0889	---	-0,1415 ***
	(-0,78)	(-1,16)	---	(-2,80)
Lack of political freedom_1	---	---	0,0917	---
	---	---	(0,85)	---
GDP per capita	0,0001	---	---	---
	(0,83)	---	---	---
GDP per capita_1	---	0,0002 ***	---	0,0001 **
	---	(3,25)	---	(1,99)
Growth of GDP_1	0,1894 ***	0,0039	---	0,0133
	(3,75)	(0,24)	---	(0,86)
Change in exports	---	0,0023	---	---
	---	(0,67)	---	---
Change in exports_1	0,0191 *	---	---	---
	(1,67)	---	---	---
Capital account restrictions	---	-0,1934	---	---
	---	(-0,58)	---	---
Cap.account restrictions_1	-1,2517 *	---	-2,1486 ***	---
	(-1,78)	---	(-3,85)	---
Trade bloc	---	-0,0001	---	---
	---	(-0,32)	---	---
Trade bloc_1	-0,0001	---	---	---
	(-0,88)	---	---	---
Public sector balance	-0,0792	---	---	---
	(-1,33)	---	---	---
Public sector balance_1	---	-0,0140	---	---
	---	(-0,70)	---	---
Domestic interest rate	---	-0,0064	---	---
	---	(-1,47)	---	---
Domestic interest rate_1	0,0666 **	---	0,0463 **	0,0092
	(2,39)	---	(2,30)	(0,79)
Rating	---	0,0835 ***	0,0823 **	---
	---	(3,48)	(2,25)	---
Rating_1	0,0295	---	---	0,0126
	(0,56)	---	---	(0,80)
External debt / GDP	-0,0562 ***	---	-0,0345 ***	---
	(-4,92)	---	(-5,78)	---
External debt / GDP_1	---	---	---	-0,0060 **
	---	---	---	(-2,00)
Inflation rate_1	-0,0569 **	---	-0,0064	-0,0008
	(-2,71)	---	(-0,51)	(-0,12)
Reserves	---	---	-0,0050	0,0008
	---	---	(-0,38)	(0,17)
Reserves_1	-0,008	---	---	---
	(-0,44)	---	---	---
b.- World variables				
World growth_1	-0,5935 ***	0,1390 *	-0,1541	-0,1229 *
	(-2,74)	(1,81)	(-1,34)	(-1,91)
Long term US int.rate_1	-0,1294	---	0,3258 ***	0,0017
	(-0,98)	---	(5,42)	(0,05)
Intercept	7,8171	-0,8902	0,4738	0,7822
	(3,44)	(-1,30)	(0,40)	(1,30)
Number of observations	684	1648	1656	807
R2	10.56%	16.27%	5.44%	9.05%

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
Fixed or random effects chosen on the basis of Hausmann test.
Series lagged one period are shown indicated by _1
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

As a second step, we test whether the degree of **catalysis of IMF programs is different depending on their objective**. For the objective of crisis prevention, we test whether precautionary arrangements help countries attract different types of private private flows, when other relevant factors are controlled for.[15] This is clearly the case for FDI, at a 99% significant (Table 2). The coefficient is much larger than the previously found one for IMF programs as a group.

For crisis resolution, we test the impact of those programs more geared toward that objective, namely SBAs (with or without SRFs) and EFFs. This is found negative and highly significant for cross-border bank flows. The coefficient is even larger than that previously found for all IMF programs. In turn, EFFs seem to attract portfolio flows in a significant way. Finally, longer-term concessional programs are found to encourage FDI although with a much lower coefficient than precautionary programs.

Table 2: Impact of different IMF program according to their objectives

	Total flows (b)	***FDI (a)***	***Other investment (a)***	***Portfolio investment (b)***
Objective variables:				
Have an IMF program				
1.- Crisis resolution:				
SBA / SRF_1	-0,7889	0,1688	-1,2404 ***	0,0898
	(-1,41)	(0,76)	(-3,65)	(0,54)
EFF_1	0,1257	0,6619 *	-1,6563 ***	0,4463 **
	(0,17)	(1,87)	(-3,02)	(2,08)
2.- Long term concesional				
PRGF_1	0,6871	0,6135 **	-0,1934	-0,1126
	(0,64)	(2,07)	(-0,43)	(-0,43)
3.- Crisis prevention				
Precautionary_1	1,4143	1,7866 ***	0,9622	0,1243
	(1,55)	(3,98)	(1,39)	(0,48)
Control variables	No change	No change	No change	No change
Number of observations	684	1648	1656	807
R2	11.02%	17.05%	5.36%	8.83%

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
Fixed or random effects chosen on the basis of Hausmann test.
Variables marked with a low hypehn and a 1 have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

We now move to tacking **selection bias** in the way described in the methodological section. As a preliminary exercise, we take the **subsample of countries having undergone a crisis** –which should be more similar than those in the full sample– and test whether the existence of an IMF program helps catalyse private flows. Apart from tackling sample selection, at least to some extent, this exercise helps answer the question of what is the Fund's role in crisis resolution in a different way. In fact, we can test whether the Fund was successful –independently of the program– in managing crises for all countries which ever experienced a crisis.

The results show that the Fund contributes to attracting FDI in crisis situations (those where sample selection is better controlled for) but not in non-crisis ones (see Table 3 below). However, the coefficient for the crisis cases is not larger than for the total sample, pointing to no downward bias due to sample selection. In addition, and as one would expect, the result is the reversed for precautionary arrangements, i. e., FDI is attracted in non-crisis observations. When differentiating among crises, the catalysis of FDI is lost. For sovereign

15. The results for the control variables are available upon the request.

crises, IMF programs even seem to discourage FDI for non crisis observations. In any event, results by type of crisis need to be taken with caution since the number of observations is substantially reduced. Finally, the large negative impact of IMF programs on other investment is not found significant for the sample of crisis cases. This could be due to having controlled for the selection bias, but this approach is too simple to confirm such an hypothesis.

Table 3: Impact of IMF programs differentiating between crisis and non-crisis

	Total flows (b)		*FDI / GDP (a)*		*Other investment / GDP (a)*		*Portfolio investment / GDP (b)*	
	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary
Whole sample	-0,41	1,41	0,40 **	1,79 ***	-1,20 ***	0,96	0,17	0,12
No crisis	-0,88	3,48 ***	0,17	3,24 ***	-1,56 ***	0,74	0,16	0,55 *
Crisis	0,96	-0,26	0,47 *	-0,54	-0,54	1,30	0,41	-0,42
of which Sovereign	0,15	-1,00	0,47	-2,10 *	-0,96	-0,98	0,54	-0,21
of which Banking	0,49	-2,41	-0,24	0,23	-0,18	-0,87	0,34	-0,27
of which Exchange rate	(c)	(c)	-0,40	4,77	7,62 **	-0,49	0,21	0,89
Number of observations								
Whole sample	684		1648		1656		807	
No crisis	442		1065		1073		545	
Crisis	242		583		583		347	
of which Sovereign	104		357		368		120	
of which Banking	142		241		227		148	
of which Exchange rate	50		99		93		58	

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
(c) Cannot be estimated as there are not enough observations.
Fixed or random effects chosen on the basis of Hausmann test.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

Moving to the second approach to tackling the selection bias, we first estimate the probability of reaching an agreement with the IMF, through a probit model. We take four regressors as the most relevant ones (external debt service over GDP, GDP per capita, economic growth and the current account balance over GDP) and confirm that countries resorting to the Fund tend to be more vulnerable externally and poorer. If we restrict the limit to crisis countries, we still find that those engaging in IMF programs have worse conditions, although the difference with those under crisis and without IMF programs is smaller than in the case of the full sample. This indicates that the sample selection problem has not been totally eliminated in the previous exercise. Taking into account this fact, we conduct a **two-step estimation**, first calculating the probability of engaging in an IMF program with a variable which should determine such probability without being an explanatory variable of capital inflows. We choose the ratio of external debt over GDP. Second, we use that probability as a proxy for the objective variable (having an IMF program) and include it in a regression of determinants of different types of capital flows. The results (shown in the third row of Table 4 below) confirm –and even enhance because of the larger coefficient– the positive impact of IMF programs on FDI, which had been found before controlling for sample selection (first row of the same table). Precautionary arrangements are even more positive, in terms of catalysis, than in the benchmark exercise in as far as their impact on total private flows is significant, with a very large and positive coefficient. Finally, IMF programs discourage cross-border bank lending with an even larger coefficient than before controlling for sample selection.

Table 4: Impact of IMF programs when tackling the selection bias

	Total flows		*FDI / GDP*		*Other investment / GDP*		*Portfolio investment / GDP*	
	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary
Whole sample (a)	-0,41	1,41	0,40 **	1,79 ***	-1,20 ***	0,96	0,17	0,12
Crises subsample (a)	0,96	-0,26	0,47 *	-0,54	-0,54	1,30	0,41	-0,42
Two step (b)	0,56	2,08 **	0,69 **	2,40 ***	-1,04	0,85	0,19	0,25
Matching (c)	-0,94 **	1,98 **	0,26	2,77 **	-1,41 ***	0,28	0,05	0,38

(a) Estimation with fixed (FDI and Other investment) or random effects (total flows and Portfolio flows), excluding outliers.
(b) Variables for sample selection: total external debt service over GDP and, in some cases, per capita GDP.
(c) Kernel model chosen. Bootstrapped t-ratios used to calculate significance levels.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

When controlling for sample selection in the best way possible –using the **matching** technique– the results obtained in the benchmark regression are clearly reinforced: precautionary arrangements contribute with an even higher coefficient to attracting FDI (Line 4 in Table 4 above) and even total capital flows. Remaining IMF programs appear to reduce cross-border bank flows to a larger extent than when sample selection is not controlled for. Interestingly, IMF programs –except for precautionary arrangements– are not found significant in attracting FDI. This is explained by the counteracting results found for each type of program; namely short-term crisis resolution-type programs actually discourage FDI in a significant way (as opposed to the benchmark exercise). Instead, longer-term concessional programs attract FDI with an even larger coefficient (Table 5 below). Since these effects net out, there is no significant impact of IMF programs on FDI as a group. As for the negative influence of IMF programs on cross-border lending, it appears to be fully due to short-term crisis management oriented programs, such as SBAs and EFFs. Finally, PRGF seem to discourage portfolio flows when controlling for sample selection. This result, however, needs to be taken with caution since all emerging countries are included and many –particularly those under PRGF– do not have market access so that they hardly receive portfolio flows. We shall come back to this issue later, when we separate countries with and without market access in the regressions.

Table 5: Catalysis of IMF programs using matching to tackle the selection bias

	Total flows	*FDI / GDP*	*Other investment / GDP*	*Portfolio investment / GDP*
Have an IMF program	-0,94 **	0,26	-1,41 ***	0,05
	(-1,98)	(1,13)	(-5,21)	(0,35)
Of which				
1.- Crisis resolution:				
SBA / SRF	-1,39 ***	-0,68 ***	-1,75 ***	0,02
	(-2,39)	(-2,65)	(-4,60)	(0,14)
EFF	-0,52	0,39	-1,06 **	0,38
	(-0,68)	(1,14)	(-2,65)	(1,21)
2.- Long term concesional				
PRGF	-0,44	0,96 **	-0,11	-0,60 ***
	(-0,56)	(2,33)	(-0,31)	(-7,41)
3.- Crisis prevention				
Precautionary	1,98 **	2,77 ***	0,28	0,38
	(1,82)	(3,73)	(0,51)	(1,13)

(a) Kernel model. Bootstrapped t-ratios in parentheses.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

In sum, although sample selection does seem to bias the coefficients, the general message is still the same: precautionary arrangements and longer-term structural programs clearly contribute to attracting FDI but shorter-term, crisis resolution oriented, programs do not. Furthermore, they discourage other types of flows, in particular cross-border bank lending.

From these general results we now investigate a number of questions, which may be relevant for policy makers. To do so, we turn to the econometric methodology used in the benchmark exercise so that our results can be compared with others in the literature.

The first question tries to explore which channel is more important when determining IMF catalysis. While this is clearly hard to test empirically and the case studies are certainly a better tool, we look for a preliminary answer by differentiating between **announcing a program or persevering with it.** The first should reflect the signalling and/or liquidity channel (except in the case of precautionary arrangement where it would only be signalling) and the second could be more related to the change in policies through compliance with conditionality. In the benchmark exercise we had estimated the impact of the whole duration of the program. To test what would be the announcement affect, we use a different objective variable, which takes the value of 1 only in the year the program in signed and zero thereafter.[16.]

From the results obtained, the duration of the program seems to be more relevant in attracting private capital flows than the announcement effect, at least for FDI (Table 6 below). Only in the case of cross-border bank lending both the announcement effect has a strong negative impact, in the same way as the duration effect. This seems to suggest that it is the compliance with IMF conditionality which makes the difference for private investors. Such result is in line with the case studies analyzed later in the paper.

Table 6: Announcement versus duration effects of IMF programs

	Total flows (b)		***FDI / GDP (a)***		***Other investment / GDP (a)***		***Portfolio investment / GDP (b)***	
	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary	IMF program	Precautionary
Announcement (c)	-0,74	-1,17	-0,00	-0,23	-1,16 **	0,63	0,12	0,09
Duration (d)	-0,22	2,14 **	0,69 ***	2,49 ***	-1,26 **	1,07	0,19	0,11

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
(c) First two years of programs
(d) Rest of years of programs
Fixed or random effects chosen on the basis of Hausmann test.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

A second question we pose ourselves is whether **larger IMF financial packages attract more capital inflows**. The increasing share of private capital flows as compared with official flows raises the issue of the optimal size of IMF financial packages. A relatively large number of programs have been granted access above access limits: 26% of them in the case of SBA, EFF and SRF programs, 15.2% of PRGFs, and 16.8% of precautionary

16. We have constructed this variable in such a way that the announcement effect only refers to genuine "new" programs; that is, it does not include the announcement of the renovation of existing programs.

arrangements.[17] We present a set of regressions which intends to clarify whether larger programs attract more private flows than smaller ones (Table 7 below). An increase in the size of the programs leads to higher FDI flows while it discourages cross-border bank lending even further. EFF seem to be effective in terms of catalysis when large enough, namely above access limits.

Table 7: Program size and catalysis of private flows

	Total flows (b)			***FDI (a)***			***Other investment (a)***			***Portfolio investment (b)***		
	Size (c)	Over (d)	Below (d)	Size (c)	Over (d)	Below (d)	Size (c)	Over (d)	Below (d)	Size (c)	Over (d)	Below (d)
Have an IMF program	-0,44 *	-0,13	-0,62	0,23 **	0,94 ***	0,17	-0,61 ***	-1,76 ***	-0,97 ***	0,09	0,30	0,07
Of which:												
1.- Crisis resolution:												
SBA / SRF	-0,82 ***	-1,75 *	-0,44	0,13	0,99 **	-0,03	-0,71 ***	-2,85 ***	-0,82 **	-0,06	-0,13	0,14
EFF	0,60 *	0,79	-2,32 *	0,11	0,68 *	0,61	-0,28	-1,45 **	-2,31 **	0,36 ***	0,68 ***	-0,23
2.- Long term concesional												
PRGF	1,04	1,16	1,02	1,31 ***	3,35 ***	0,21	-0,31	-0,24	-0,17	-0,19	-0,24	0,02
3.- Crisis prevention												
Precautionary	1,24	5,33 ***	0,35	0,83 *	1,15	1,91 ***	1,20	4,41 **	0,42	-0,26	-0,48	0,24

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
(c) Including a regressor representing the amount agreed over quota of each country
(d) Including a dummy for programs over or below quota
Fixed or random effects chosen on the basis of Hausmann test.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

Finally, we differentiate between **countries with and without access to the international capital markets** since the latter should be irrelevant for portfolio flows. Furthermore, access to portfolio flows could even influence developments in FDI and cross-border bank lending in as far as they could be substitutes or complements. We define countries with "market access" as those having been assigned a rating by Moody's.[18]

17. Access limits are 100% of quota for SBA, EFF, SRF and precautionary arrangements while it goes up to 150% for longer-term concessional programs.

18. This is a definition of "potential" market access, not "effective" access to markets, which we would have by taking the countries having issued some kind of debt in international markets. This more restrictive definition would have substantially reduced the sample of countries with market access and might be biased in as far as some countries do not issue debt because of lack of need and not lack of market access.

Table 8: IMF catalysis for countries with an without market access

	Total flows (b)		*FDI (a)*		*Other investment (a)*		*Portfolio investment (b)*	
	Access	No Access	Access	No Access	Access	No Access	Access	No Access
Have an IMF program	1,77 **	-1,23 **	0,05	0,46 **	0,52	-1,39 ***	0,27	-0,00
Of which:								
1.- Crisis resolution:								
SBA / SRF	1,29	-1,52 **	-0,03	0,37	0,74	-1,47 ***	0,01	0,14
EFF	2,40 **	-0,81	0,21	0,78	-0,04	-1,78 **	0,87 **	-0,21
2.- Long term concesional								
PRGF	-0,40	0,66	0,01	0,47 *	0,59	-0,33	-0,80	-0,11
3.- Crisis prevention								
Precautionary	2,40 **	0,65	0,07	4,29 ***	2,17 ***	0,05	-0,11	0,93 **
Number of observations	313	371	437	1211	372	1284	343	434
R2	14.54%	19.58%	10.24%	17.61%	4.13%	6.78%	8.98%	5.77%

(a) Estimation with fixed effects, excluding outliers (1% extreme of samples)
(b) Estimation with random effects, excluding outliers (5% extreme of samples)
Fixed or random effects chosen on the basis of Hausmann test.
Dummy variables for IMF programs have been introduced with a lag.
***: significant at 1% level. **: significant at 5% level. *: significant at 10% level.

When differentiating among countries with and without market access, the IMF positive impact on FDI is restricted to countries without market access. As before, the effect mainly stems from precautionary arrangements and, to a lesser extent, structural programs (PRGF). Second, the negative impact on IMF programs on cross-border bank lending is also concentrated on countries without market access and continues to occur only under crisis resolution programs. Interestingly, precautionary arrangements actually encourage cross-border bank lending in countries with market access; this is also the case of EFFs for portfolio flows. Finally, we do not find confirmation of PRGF discouraging portfolio flows when separating between countries with and without market access.

5 Case studies

5.1 Methodology and countries included

The rationale for completing our empirical research with case studies is that regression analyses based on a large number of countries are characterized by a level of aggregation which conceals valuable information. In the particular case of IMF catalysis, regression analysis does not allow to disentangle the channels through which IMF programs may influence the behaviour of private investors: namely the policy, liquidity and signalling channels described in the introductory section. On the other hand, the case study methodology has some limitations. Based on a much smaller sample, it lacks the possibility of generalizing the results. However, the aim of our case studies is not so much to draw general conclusions, but to analyse which channels of IMF catalysis work and how.

In defining our case study strategy we also face the challenge of defining a valid counterfactual. In the absence of statistical tools, we compare pairs of countries as similar as possible in terms of their attractiveness towards private capital inflows, one having resorted to the Fund for assistance but not the other.[20] To ensure similarity to the extent possible, we calculate averages of three key determinants of private capital flows (per capita GDP, the investment rate and credit rating) during the 1970s and 1980s for 136 emerging and developing countries. We, then, classify these countries in deciles according to their attractiveness to capital inflows. We, then, restrict our sample to the countries that had a credit rating at some point since the early 1990s so as to exclude countries without market access. Having market access makes the country studies more relevant for portfolio flows (Table 1 in Appendix X shows the countries included in each decile for the first two variables (per capita GDP and the investment rate).

We use the same methodology to analyze crisis resolution and crisis prevention episodes. In the first case, we choose pairs of countries which went through a full-fledged crisis, one having resorted to an IMF program but not the other. In the second case, we choose pairs of countries which were affected by a similar shock but did not end up in a crisis. A key issue, therefore, is how to define a crisis and vulnerability episodes. For the former, we consider crises those episodes of balance of payment pressure that were strong enough to have resulted in a change in the exchange rate regime or in a drastic devaluation of the currency. To this end, we use the index of exchange rate pressures constructed by Bubula and Otker-Robe (2003), calculated as a weighted average of exchange rate and interest rate changes, but used it more restrictively. Defining episodes of balance of payment vulnerability is less obvious. We concentrate on the vulnerability stemming from an external shock since it is probably closer to the spirit of the IMF's role in crisis prevention. We choose a common event that sent a wave of financial distress to emerging markets, namely the Russian default in 1998, and avoid choosing cases which ended up in a full-fledged crisis as defined above.[21]

With regard to the IMF programs, we use SBAs (combined with an SRF) for analyzing crisis resolution cases and precautionary arrangements for crisis prevention. In the

20. It is important to note that we can only control for observed similarities (and not unobserved ones as in econometric techniques of causal inference) so as to choose the closest pair of countries.

21. We preferred this to defining it in terms of exchange rate pressures, which in any event would have to be below the benchmark considered for currency crises.

first cases, the IMF programs were approved after the crisis was triggered so that they can be considered a crisis resolution instrument. In the second country studies, the IMF programs were in place prior to the emergence of the balance of payment vulnerability so that they were originally conceived as a crisis prevention tool.

Table 9 below shows the pair of countries chosen for **crisis resolution**. These are similar in terms of attractiveness to capital flows (Appendix 5 shows how they rank in terms of per capita GDP and the investment rate as compared to other countries with market access). In addition, they have all undergone a full-fledged currency crisis at some point in time (T). Two countries managed the crisis resorting to an IMF program (South Korea and Brazil) while the others (Malaysia and Colombia) so that they are considered the counterfactuals.

Table 9: Crisis resolution cases

Countries Without an IMF program	*Countries with an IMF program (SBA)*
Malaysia t: December 1997	South Korea (*) t: November 1997 Program: SBA/SRF, December 1997
Colombia t: September 1998	Brazil (*) t: January 1998 Program: SBA/SRF, December 1998

t indicates the beginning of the crisis episode or the common shock
* indicates access above limit

In the case of **crisis prevention**, to be as close as possible to the counterfactual, the pairs of countries chosen are similar, not only in terms of the main determinants of private capital flows, but also of their linkages to Russia. We, thus, restrict our sample to Latin American countries since they all have similarly limited economic relations with Russia. Finally, case studies should have entered an IMF precautionary arrangement prior to being hit by the Russian shock, namely Argentina and Peru, being Mexico and Chile their counterfactuals.

Table 10: Crisis prevention cases

Countries Without an IMF program	*Countries with an IMF precautionary arrangement*
Mexico t: August 1998	Argentina (*) t: August 1998 Program: EFF, Feb. 1998 (no disbursement)
Chile t: August 1998	Peru t: August 1998 Program: EFF, July 1996 (some disbursement)

t indicates the beginning of the crisis episode or the common shock
* indicates access above limit

We apply a **before-after test**, analyzing whether the presence of an IMF program made any difference with regard to the evolution of private capital flows both in the event of a crisis or a "vulnerable" period (when analyzing crisis prevention). We apply this approach to two temporal horizons: short and long-term. In the first case, we analyze the daily evolution of

spreads surrounding the date of the episode, which we refer to as the **announcement effect.** This is particularly useful to assess whether the IMF did manage to signal and improvement in the situation when the program was announced (i. e., the signaling channel) and also whether there was a liquidity effect when the first program disbursement took place. In the second, we look into the quarterly evolution of total capital flows, FDI, portfolio and other flows (cross-border bank lending) before and after the episode, which we refer to as the **policy correction effect.** This longer-term perspective should help us determine whether the compliance with the IMF conditionality encourage private flows.

As opposed to the crisis management cases, crisis prevention ones can have a common date for the event for all countries, namely the date of the Russian default: August 17, 1998. This is clearly welcome because the push determinants of capital flows to emerging markets will also be common, reinforcing the comparability of the case studies. Another interesting feature is that it will allow us to disentangle the signalling and liquidity effects, which basically come together in the short-term in the crisis resolution cases. This is particularly true in the case of Argentina where there was no disbursement of its precautionary arrangements even after it was hit by the Russian crisis.

5.2 Lessons from cases of crisis resolution

5.2.1 PRIVATE FLOWS BEFORE THE CRISES

The four case studies analyzed for crisis resolution, Brazil, Colombia, Korea and Malaysia, were important participants in the surge of capital flows to emerging markets in the early 1990s. On average, between 1990 and 2002 net capital flows amounted to 2,93 per cent of GDP in Brazil, 4,15 per cent in Colombia, 3,87 per cent in Korea and 6,22 per cent in Malaysia. This surge in capital flows was mainly concentrated between 1990 and 1997, as a result of both international (push) and domestic (pull) factors. On the international side, cyclical developments in mature economies during the first half of the 90´s (recession and low interest rates) attracted international investors to Asian and Latin American countries. On the domestic side, Asian countries were experiencing an impressive period of fast economic growth, while economic prospects in Latin America had greatly improved after the implementation of an ambitious agenda of market-friendly reforms and the signing of the Brady plan for sovereign debt restructuring. Additionally, the trend towards the liberalization of the capital account had intensified, favouring the financial integration of the four countries analyzed with the rest of the world. However, at the time or just before the crisis in our case studies, capital inflows to emerging countries generally slowed down while volatility increased. Apart from the crisis themselves, there were push factors behind this development, such as improved economic conditions in Europe and the United States and increased risk aversion.

There are significant differences in the volume and composition of capital flows towards our sample countries: In the Latin American countries, portfolio flows were key during the first half of the decade, and FDI during the second half of the decade. The Asian countries began the decade with a much higher volume of net capital flows (2,8% of GDP in Korea, and 4,5% of GDP in Malaysia). In Malaysia the most important category of capital inflows was FDI, which amounted to more than 6% of GDP during most of the first half of the decade. In Korea, the two most important components until 1997 were portfolio flows and cross-border bank loans.

5.2.2 THE CRISES AND IMF PACKAGES

The countries chosen to analyze crisis resolution, Brazil and Korea (with IMF programs) and Colombia and Malaysia (without) not only had similar fundamentals to attract private flows but they also experienced a similar crisis in terms of exchange rate pressures. In addition, the four crises were rooted in the capital account.

Still, there were differences, which do not make our case studies totally comparable (a more detailed summary of each crisis can be found in Appendix 3 and a brief overview of the crises' dates and characteristics in Table11 below). First, Brazil and Colombia had larger public and current account deficits than in Malaysia and Korea. This explains why the crises in the last two countries came as much more of a surprise to most international observers. Second, the nature of the borrowers was different: In Malaysia, Korea the crisis was rooted in private sector over-borrowing. In Brazil (and to a lesser extent Colombia) it was the public sector which borrowed in excess. Third, the exchange rate crises in Malaysia, Korea and Colombia were sided by banking crises. Instead, the Brazilian banking sector was essentially sound at the time of the crisis, so that the trade-offs facing the authorities in the crisis resolution process were different.

Table 11: Dates and key characteristics of four crises

Countries	*Date currency crisis*	*Change in Exchange Rate Regime*	*Sovereign Debt Crisis*	*Banking Crisis*	*Date IMF package*
Brazil	1999 Q1	From a crawling peg to pure float	No	No	1998 Q4
Korea	1997 Q4	From a tightly managed float to pure float	No	Yes	1997 Q4
Malaysia	1997 Q4	From a tightly managed float to managed float.	No	Yes	Non applicable
Colombia	1998 Q3	From a crawling peg to pure float one year after crisis. Meanwhile two depreciations	No	Yes	Non applicable

The IMF responded quickly to the authorities' request for a program, both in Brazil and Korea (see Table 12 below for details). The rescue packages were very large, especially in Korea's case, nine times above access limits. Additional resources were also substantial, particularly for Korea. Macroeconomic conditionality was strong for Brazil and less so for Korea. Structural conditionality was strong for both although with a different focus: the fiscal sphere in Brazil and bank and enterprise restructuring in Korea.

Table 12: Main features of IMF packages in crisis resolution cases

	Type of program	Amount	% quota	Additional resources	Approval date	Expiration date	Key macroeconomic conditionality	Key structural conditionality
Brazil	SBA / SRF	US$ 18 billion	429%	WB/IDB: US$ 9 billion Bilateral loans: US$ 15 billion	Dec 2, 1998	**SBA**: Sep 14, 2001; **SRF:** Dec 1, 1999	**Original program**: primary fiscal surplus of 2,6% of GDP.**Renewed program:** primary surplus of 3,1% of GDP in 1999, 3,25% of GDP in 2000 and 3,35% of GDP in 2001	**Original program**: Fiscal responsability law; structural tax reform; pension reform; supportive monetary policy. **Renewed program**: drop of the peg; introduction of an inflation targeting system
Korea	SBA / SRF	US$ 21 billion	949%	WB/ADB: US$ 14 billion Bilateral loans: US$ 20 billion	Dec 4, 1997	**SBA**: Dec 3, 2000; **SRF:** Dec 17, 1998	Commitment to a small fiscal surplus and to a tight monetary policy. Progressive relaxation of these conditions.	Financial sector restructuring, reinforcement of financial regulation and supervision, corporate sector reform, other liberalization reforms.

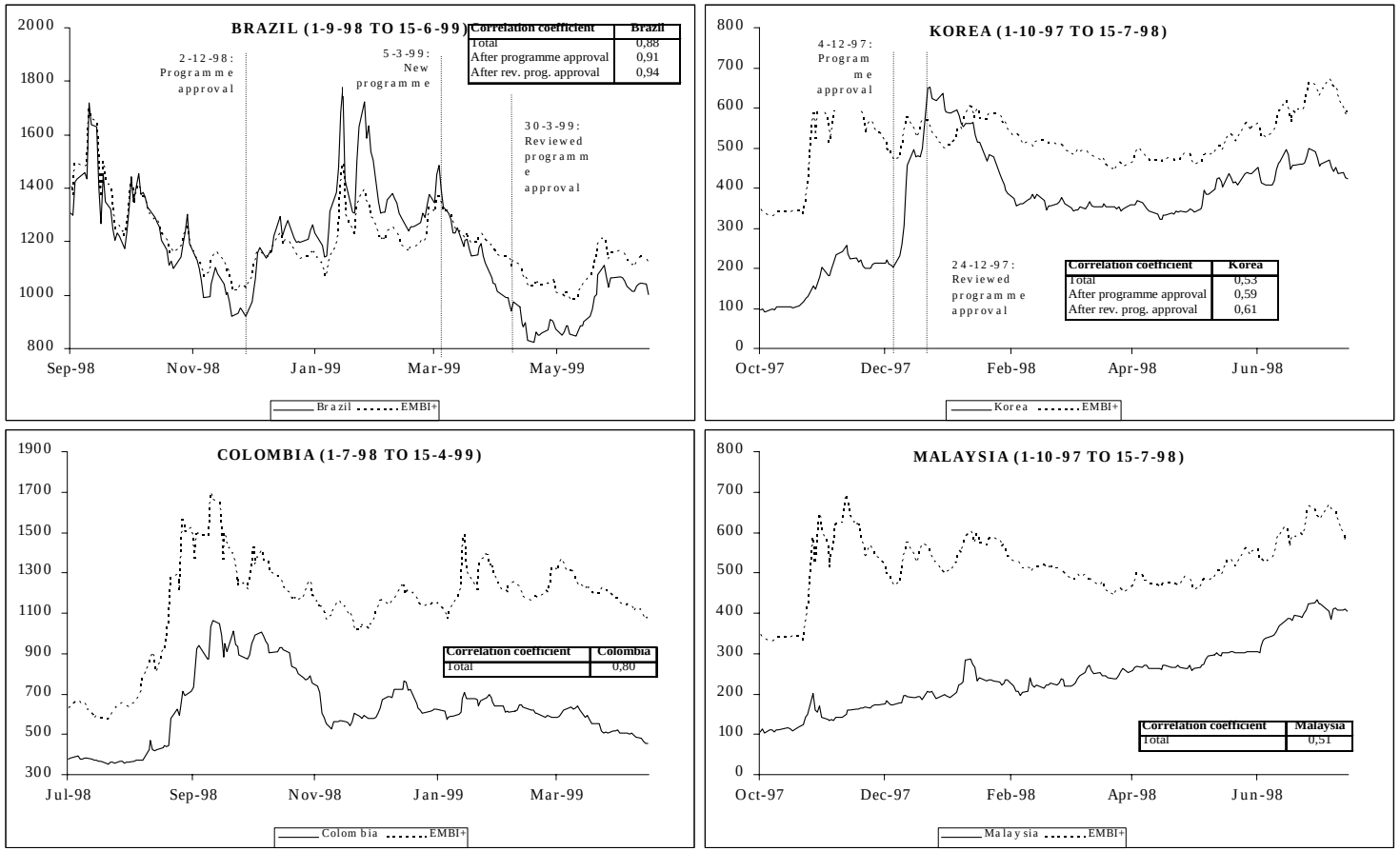
In the next sections we review how foreign investors behaved in the aftermath of the crisis in the program countries (Brazil and Korea) and compare it with the counterfactuals (Colombia and Malaysia). We, first, concentrate on the short-term –or announcement effect– of an IMF program, analyzing the evolution of sovereign spreads. We, then, look into the medium-term impact –or policy effect– focusing on private capital flows.

5.2.3 ANNOUNCEMENT EFFECT

Our case studies show some evidence of the existence of an announcement effect associated with the IMF rescue packages, as measured by the increased correlation of the spreads of crisis countries after the IMF programs were signed with the average spread of all emerging countries, measured by EMBI+ (Graphs 2-5 below). Such correlation was also much higher than that of counterfactual countries with the emerging countries' average.

When we look at the evolution country by country, Brazil did not succeed in restoring market confidence with the first IMF package and the sovereign spread continued its rise. One of the main problems was that the program did not include a change in the exchange rate regime although the market considered that the peg was unsustainable. This probably intensified speculative pressures on the Brazilian currency. Another problem was political uncertainty and lack of ownership of the program. In fact, there were indications that the program would face a strong opposition from Congress and the Brazilian States, although the Federal government was clearly committed. In turn, the announcement of a reviewed IMF package, which included the floating of the exchange rate, was followed by a fall in the sovereign spread.

Graph 2-5: Evolution of sovereign spreads in crisis resolution cases



In Korea, the rescue package was followed by a sharp rise in the sovereign spread. This was related to the fact that, soon after the approval of the program, the real level of usable reserves was leaked to the press bringing about a speculative attack on the domestic currency, the won. Another problem was the electoral process at that time, which raised doubts about the ownership of the program. Finally, the market considered the second line of defence associated with the program insufficient, which meant that the program could be under-funded. As a consequence of the rapidly deteriorating situation, the IMF promoted the participation of international lenders in the resolution of the Korean crisis. The form of private sector involvement was the roll-over of existing cross-border bank lending. Additionally, the IMF announced the revision of the SBA, which implied a much larger and more front-loaded financial package. Korean spreads fell soon after this announcement.

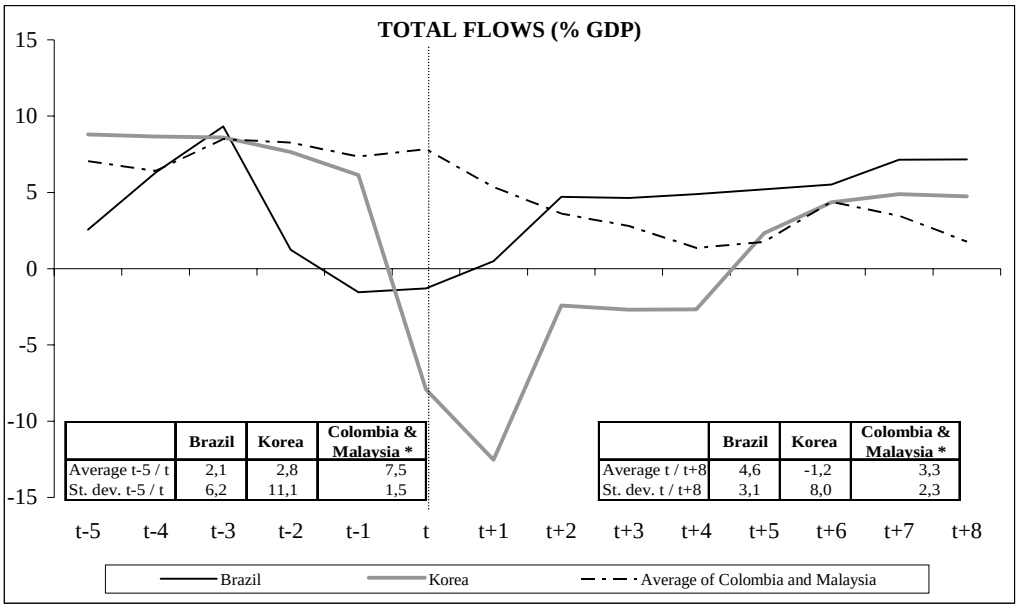
The counterfactuals moved relatively close the EMBI+ of all emerging countries. In Malaysia, announcements of policy changes did not manage to revert the upward trend on spreads. Colombia performed better after the announcement of a number of policy measures regarding the restructuring of the financial sector and the curbing of fiscal spending. This relieved the upward pressure on the sovereign spread.

5.2.4 POLICY EFFECT

The evolution of quarterly capital flows after the crisis seems to indicate a relatively strong catalysis associated with IMF programs. Although it is always difficult to isolate the impact of the policy correction induced by the Fund from that of other equally important pull and push determinants of capital flows, there are reasons to believe that some of the policy measures did have a positive impact. In line with the results of the empirical analysis, however, such impact varies widely for different types of capital flows, being FDI the one which behaves best and cross-border loans worst.

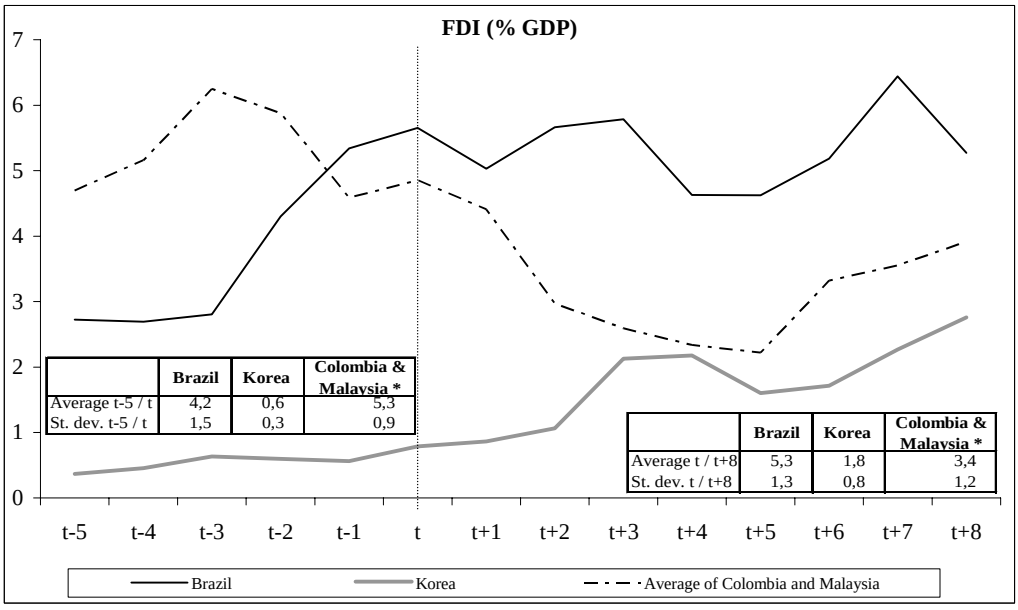
The key priority of the policy responses put forward by the four countries of the sample in order to cope with their respective crises was to restore confidence among international investors (Tables 2 to 5 in Appendix 3 list the main policies implemented by each of the four countries). In Brazil, capital flows experienced a fast recovery, even compared to the counterfactual, as well as a fall in volatility after the renewed program was approved (Graph 6 below). This is basically explained by the substantial increase in FDI flows, which rose substantially, compared to a negative trend in the counterfactuals Graph 7 below), and also faster than in emerging markets in general. Cross-border bank lending recovered very slowly after the crisis (Graph 8 below) and portfolio flows did not change much before and after the crisis (Graph 9 below).

Graph 6-7 (*)



	Brazil	Korea	Colombia & Malaysia *
Average t-5 / t	2,1	2,8	7,5
St. dev. t-5 / t	6,2	11,1	1,5

	Brazil	Korea	Colombia & Malaysia *
Average t / t+8	4,6	-1,2	3,3
St. dev. t / t+8	3,1	8,0	2,3

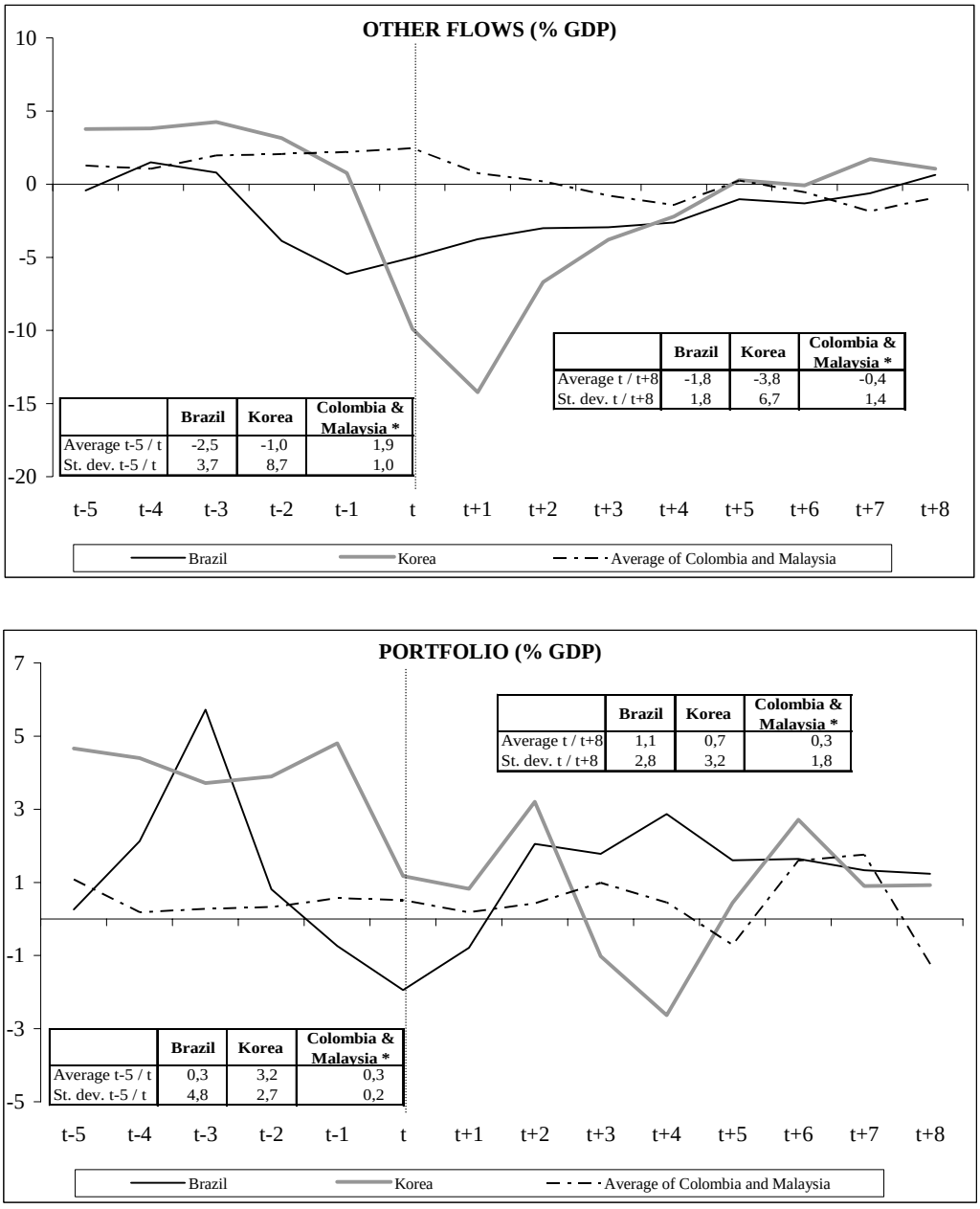


	Brazil	Korea	Colombia & Malaysia *
Average t-5 / t	4,2	0,6	5,3
St. dev. t-5 / t	1,5	0,3	0,9

	Brazil	Korea	Colombia & Malaysia *
Average t / t+8	5,3	1,8	3,4
St. dev. t / t+8	1,3	0,8	1,2

(*) Period moving average.

Graph 8-9 (*)



(*) 2 period moving average.

In Korea, instead, a substantially lower volume of capital flows was registered in the post-crisis period (Graph 6 above). While this could be interpreted as absence of catalysis from the IMF program, a deeper look at the evolution of the different types of inflows yields a more optimistic view. Most of the fall in capital inflows is accounted for by a sharp reduction in cross-border bank lending, notwithstanding the maintenance of some borrowing lines, within the private sector involvement agreed with the Fund (Graph 8 above). However, because it is precisely domestic banks that had over-borrowed internationally, the fall in cross-border lending after the crisis can be regarded as a necessary consequence of the policy correction induced by the IMF program. In fact, the IMF conditionality included the reinforcement of the regulatory and supervisory framework, which probably implied less demand for cross-border bank loans to avoid large currency mismatches. In addition, FDI did increase, albeit slowly,

from the very low levels before the crisis (Graph 7 above). This, again, was in part due to the structural conditionality imbedded in the program: namely the restructuring and privatization of insolvent financial and non financial institutions and the opening up of the economy to foreign competition. Finally, portfolio flows rose right after the program was put in place, probably due to the restrictive monetary policy and the high real interest rates, and fell as monetary policy became laxer.

Colombia and Malaysia opted not to call the IMF for assistance. The policy response implemented in each country was very different: Colombia carried out an orthodox stabilization, which did not depart substantially from IMF recommendations. Furthermore, it eventually engaged in a precautionary arrangement in December 1999. Malaysia, instead, relaxed the fiscal and monetary stance, bailed out troubled firms and resorted to capital controls in order to limit speculative pressures in the off-shore market and stabilize capital outflows. Both in Colombia and Malaysia, a reduction in total capital flows was observed in the quarters following the crisis. Furthermore, FDI fell substantially not only in Malaysia but also in Colombia, notwithstanding its orthodox policies.

5.2.5 CONCLUSIONS FROM CRISIS RESOLUTION CASE STUDIES

Some conclusions can be drawn from these experiences. First, the case of Korea highlights the importance of the format and size of the rescue package. One of the main reasons for its failure to generate an announcement effect was that the second line of defence was not truly available, which pointed to the program's being under-funded. This probably avoided the liquidity channel to function properly. Second, Korea and Brazil, to a lesser extent, are good examples of how private sector involvement can help restore confidence. The key conditions in these cases were that such involvement arrived in the early stages of the crisis resolution, it was voluntary although coordinated by the IMF and supported by the central banks of lender countries. Third Korea's case also illustrates the importance of transparency and a good communication strategy so that information leakages do not have such a devastating effect. Fourth, the case of Brazil, particularly its exchange rate policy, clearly shows how crucial it is for the Fund to impose appropriate policies in its conditionality. This is true not only in the medium term, but also in the short term since private investors do not seem to react solely to the stamp of approval of the Fund but also to the policies behind it. Finally, both the cases of Brazil and Korea highlight the importance of program ownership for a positive announcement effect and how difficult it is to achieve it during electoral periods.

5.3 Lessons from cases of crisis prevention

5.3.1 PRIVATE FLOWS BEFORE THE SHOCK

Between 1990 and 2002 net capital flows averaged 3,45 per cent of GDP in Argentina, 5,04 per cent in Peru, 4,59 per cent in Mexico and 8,59 per cent in Chile. Leaving aside push factors such as the cyclical conditions of European and North American economies, the surge of capital flows to the region can be explained by the success of the stabilization policies introduced during the first half of the decade, the introduction of far-reaching market friendly structural reforms, and the completion of important free trade agreements such as Mercosur or NAFTA.

The evolution of capital inflows during the period under analysis was not homogenous. At the beginning of the decade Argentina and Peru were registering negligible levels of capital inflows while Mexico and Chile were already absorbing net inflows above 7 per cent of GDP. In between 1991 and 1995, Peru and Argentina started to converge to the levels of Mexico and Chile in view of the success of macroeconomic

stabilization. In 1995, capital flows fell substantially in the region because of the Mexican crisis but recovered after 1996 reaching unprecedented levels in Argentina and Chile. In Peru, capital flows had started to fall even before the Russian crisis instead, because of an idiosyncratic shock (el Niño) and domestic problems. Regarding the composition of capital flows, FDI become the most important source of external financing since 1993 for the four case studies. With the exception of Chile, the second source of external finance was portfolio flows. Only in Chile did cross-border bank lending constitute an important source of external financing. This may be explained by the existence of exchange rate controls, which may have discouraged portfolio flows.

5.3.2 THE RUSSIAN CRISIS AND THE SITUATION OF OUR CASE STUDIES AT THAT TIME

Russia's default in August 1998 can be considered the clearest case of an exogenous shock for the countries of our sample. One can think of three major reasons for this. First the crisis raised awareness about the general risks associated with emerging markets sovereign debt. Second, discrimination among emerging markets on the part of international investors was insufficient, reinforcing channels of financial contagion. Third, the response of the international community to the crisis, i. e. the non-bailout to Russia, signalled a new policy on the provision of financial rescues to distressed emerging markets leading to a re-assessment of risks.

With the exception of Brazil, Latin America remained relatively insulated from the immediate effects of the Russian crisis in as far as most countries avoided a full-blown crisis. This can be partly explained by the important reforms implemented in the region in the aftermath of the Tequila crisis [Beattie (2000)]. For instance, Argentina had strengthened institutions related to the regulation and supervision of financial markets, Mexico had shifted to a flexible exchange rate regime, and Chile and Peru had introduced measures to limit current account deficits [Corbo (2000)]. In addition, two of the four countries, namely Argentina an Peru, had precautionary arrangements in place prior to the crisis, the first of which even above access limits (Table 13 below describes their main characteristics). Notwithstanding such insulation, the Russia's default did lead to a sharp general increase in sovereign spreads in emerging countries and a reduction in short-term capital flows that also affected Latin America.

Table 13: The IMF precautionary Programs for Argentina and Peru

	Type of program	Amount granted	% quota	Amount drawn	Approval date	Expiration date	Key macroeconomic conditionality
Argentina	EFF	US$ 3093 million	135%	0	Feb 4, 1998	Feb 3, 2001	Contractionary fiscal policiy: gradual move to budgetary balance. Close monitoring of evolution of currente account. Commitment to implement corrective measures if current account deficit widens
Peru	EFF	US$ 369 million	53%	US$ 269 million	July 1, 1996	March 31, 1999	Improve overall position of public sector form 2,6% of GDP deficitin 1995 to balance in 1998. Increase primary surplus to 2% of GDP in 1998. Limitis to contratc private short term debt. Tigth monetary policiy. Inflation to industrial countries level.

Although we have used the same methodology as in the crisis resolution cases to choose the closest possible counterfactuals, there are two reasons why it is much harder in this case: first, the number of countries under a precautionary arrangement before the Russian crisis erupted is smaller; second, they need to have equally small relations with Russia to make the external shock comparable. The countries chosen comply with both conditions but vary in their degree of vulnerability. In fact, the two case studies under

the IMF before the crisis were more vulnerable and had worse fundamentals, as can be seen from their lower sovereign rating (see Table 14 below). This introduces a bias toward pessimistic findings since the catalysis is bound to be lower for more vulnerable countries.

Table 14: Indicators of vulnerability

	Total ext. debt (% GDP)	Short term debt (% total debt)	Debt service (% of exports)	International Reserves (months of imports)	International Reserves (% of GDP)	Credit Rating
Argentina	47	22	58	6	8	Ba3
Chile	41	5	17	7	22	Baa1
Mexico	38	16	21	2	8	Ba2
Peru	54	21	24	9	17	Ba3

5.3.3 THE SHORT-TERM EFFECT

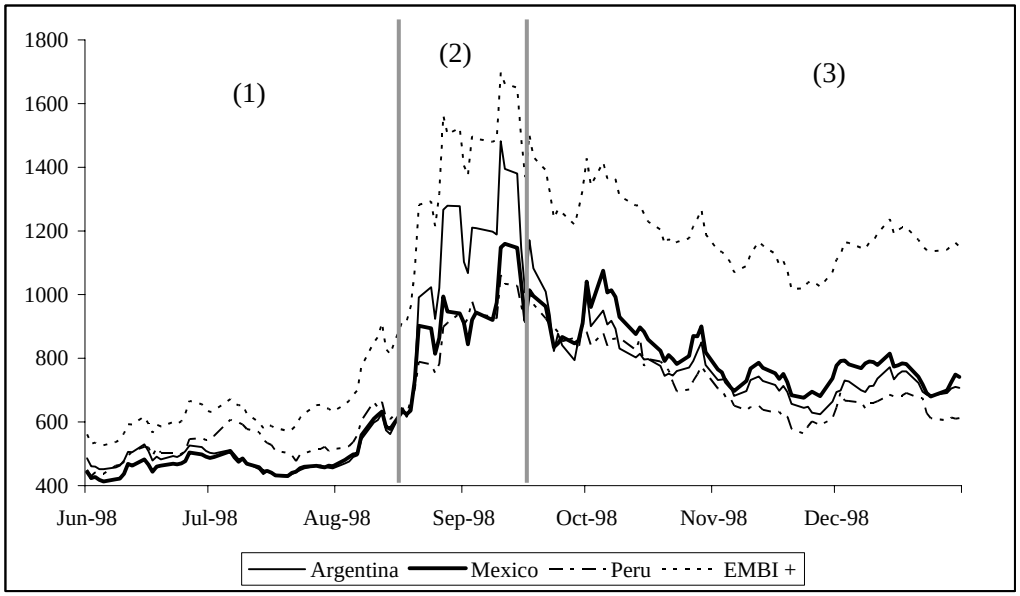
Graph 10 shows the evolution of sovereign spreads in Argentina, Mexico and Peru, together with the evolution of the Global EMBI for emerging markets, during the period surrounding the Russian default.[21]

We can distinguish three phases in the evolution of sovereign spreads. The first is characterized by the stability and high correlation of spreads, and ends just before the Russian default. The second starts with the announcement of the Russian default on August 17, 1998 until end-September. During that period a drastic increase in the volatility of spreads was registered together with a substantial fall in the correlation of spreads. From end-September 1998, the third phase is characterized by a return to a relative stability and high correlation in the evolution of spreads and finishes with the Brazilian currency crisis. We do not consider the period following the devaluation of the Brazilian real because the impact of that crisis on the three countries analyzed in this section was asymmetric, given their different linkages with Brazil.

During the first phase, Argentina and Peru had higher sovereign spreads than Mexico, in line with their larger vulnerability and worse sovereign rating. Towards the end of the first phase there was a hike in the Global EMBI, reflecting growing unrest among international investors because of Russia's situation. Argentina, and Peru to a lesser extent, experienced a much less pronounced increase until Russia's default occurred. Thereafter (in the second phase of Graph 10) Argentina performed nearly as poorly as the average emerging country. This suggests that Argentina was considered to be more vulnerable to contagion from Russia than the other two countries. The negative perception regarding Argentina is probably much more related to its exchange rate regime than to the precautionary arrangement. Argentina was under a currency board, while Mexico and Peru had floating regimes, at least *de iure,* implying that Argentina had less tools at its disposal to respond to the crisis and that –as the Russian experience showed– a speculative attack was more likely to occur.

21. JP Morgan does not provide with an index of Chile's sovereign spread until April 1999.

Graph 10: EMBI Argentina, Mexico, Peru and Global



If we restrict the analysis to the cases of Mexico and Peru, with similar exchange rate regimes at the time of the Russian default, Peru's better performance –particularly if we consider its weaker starting conditions and its higher spread before the crisis– could provide some evidence of a short term catalytic effect associated with its precautionary arrangement with the Fund.

The third phase was characterized by a return to relatively stable spreads, albeit at a higher level, for all emerging countries. Mexican spreads remained at a higher level than those of Argentina and Peru, which again may indicate that, during turbulent periods, precautionary arrangements might have been regarded positively by international investors. Still, such signalling effect is much clearer for Peru than for Argentina, which might be explained by the exchange rate regime.

5.3.4 THE POLICY EFFECT

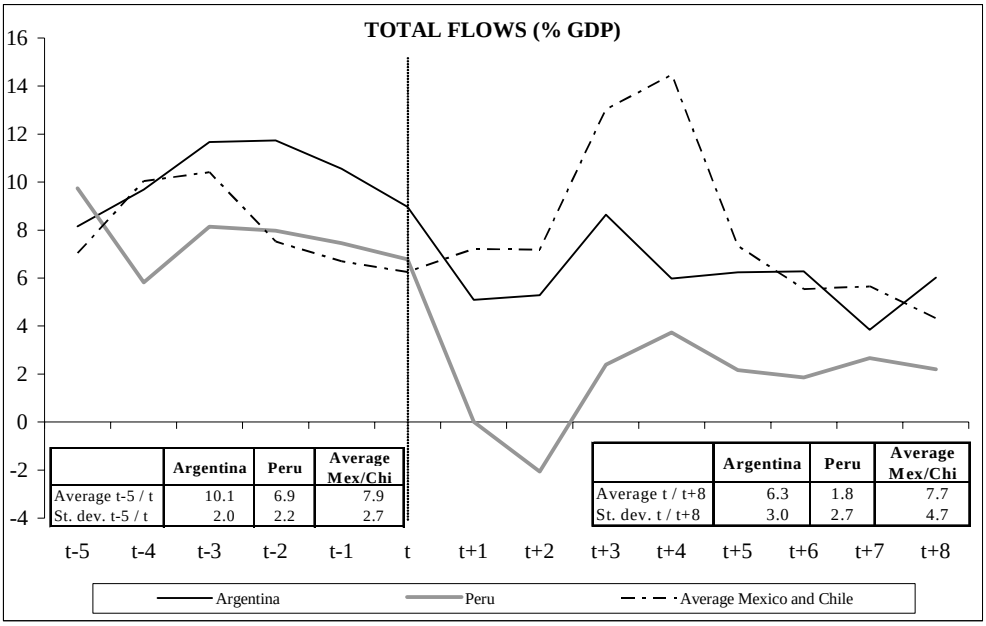
Our case studies and their counterfactuals were running important current account deficits at the time of the crisis: 4.7 per cent of GDP in Argentina, 7 per cent of GDP in Peru, 4 per cent of GDP in Mexico and 6.8 per cent of GDP in Chile. Furthermore, the general trend in the quarters prior to the crisis (less clearly so in the case of Peru) was a widening of this imbalance. This was primarily the result of a deterioration in the terms of trade of the region. In this respect, the time of the shock –the Russian crisis– constitutes a turning point, as it marked the beginning of a correction of the current account deficit in the four countries of the sub-sample. Chile went from a deficit of almost 7 per cent of GDP to a surplus 6 quarters after the crisis, while Argentina's, Peru's and Mexico's current account tended to converge towards 3 per cent of GDP. This turning point was closely associated with the fact that the Russian default substantially worsened access to international finance in the four countries of the sub-sample, making it more difficult to sustain large current account deficits, and forcing a domestic adjustment. Indeed, as we can see in more detail in Tables 6-9 in Appendix 3, the authorities of the four countries of the sample implemented contractive macroeconomic policies in an attempt to reduce domestic absorption and close the external financing gap.

This trend was especially clear in the realm of monetary policy. Domestic interest rates were raised particularly in Mexico and Chile. Monetary policy began a gradual relaxation at least six months after the Russian shock. Fiscal policy was also contractionary except for Chile, which could let automatic stabilizers work given the accumulated surpluses before the Russian crisis. This tendency was especially pronounced in Argentina and Peru, where primary deficits peaked at 3 and 3.6 per cent of GDP respectively. Exchange rates hardly changed, not only in those countries with more rigid regimes such as Argentina (currency board) and Chile (crawling peg), but also in Peru and Mexico, with *de iure* flexible regimes. Economic growth decelerated, particularly in Chile.

A comparative analysis of the evolution of total private capital inflows to the four countries of the sample shows that the impact of the Russian default was asymmetric. While Chile witnessed an increase in capital inflows relatively early (one quarter after the crisis) Mexico experienced a moderate fall and Argentina and Peru a substantial reduction. It, therefore, seems that the existence of a precautionary arrangement prior to the shock was not enough to counteract the higher degree of vulnerability of these two countries. In Peru, two negative events (El Niño and the presidential elections) made it even harder for the precautionary arrangement to avoid a fall in inflows. In the same vein, the strength of the US economy clearly favoured Mexico more than Argentina or Peru.

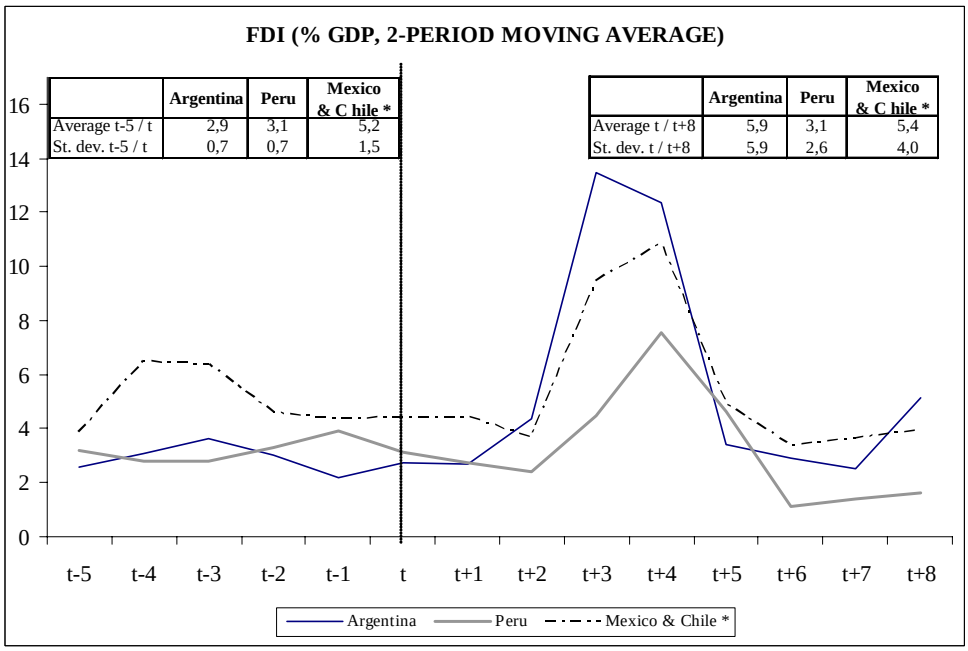
When looking at the composition of capital inflows, both Argentina and Peru continued to attract FDI for quite some time after the Russian default, but portfolio and cross-border bank loans registered an important reduction. One way to interpret this evidence is that IMF precautionary arrangements may influence the long term interest of investors in an economy, providing a certain degree of assurance about the sustainability of sound-macroeconomic policies. In any case, both the Argentine and the Peruvian cases show that for the IMF to be catalytic with a precautionary arrangement, the economic program needs to be credible. Indeed, a turning point can be identified in the evolution of FDI coinciding with the loss of credibility of the policy mix implemented by the Argentine and the Peruvian authorities. In the case of Argentina, it occurred as it became increasingly clear to international investors that the authorities were being unable to reduce public finance imbalances. In Peru, it occurred as macroeconomic discipline was eased, and as certain ambiguities emerged with regard to the direction of economic policy. In this case, the turning point in the evolution of FDI also coincides with the non completion of the program's conditionality. The fact that FDI also remained robust in the counterfactual cases, Chile and Mexico, makes it difficult to support the hypothesis of a clear IMF catalytic effect in crisis prevention, at least in the medium term. However, the opposite cannot be confirmed either since Argentina and Peru had worse initial conditions.

Graphs 11-12 (*)



	Argentina	Peru	Average Mex/Chi
Average t-5 / t	10.1	6.9	7.9
St. dev. t-5 / t	2.0	2.2	2.7

	Argentina	Peru	Average Mex/Chi
Average t / t+8	6.3	1.8	7.7
St. dev. t / t+8	3.0	2.7	4.7

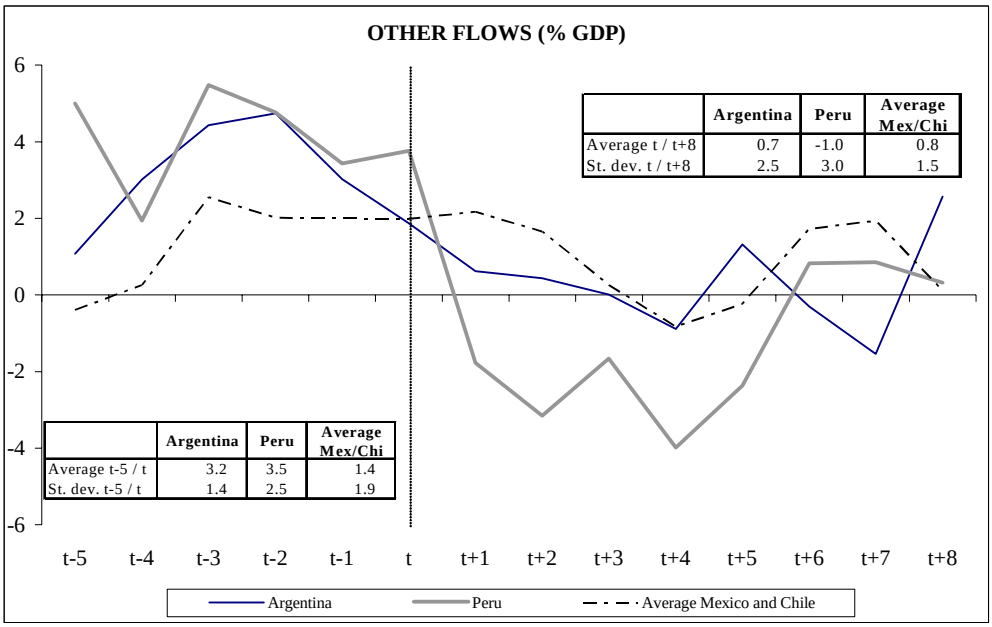


	Argentina	Peru	Mexico & C hile *
Average t-5 / t	2,9	3,1	5,2
St. dev. t-5 / t	0,7	0,7	1,5

	Argentina	Peru	Mexico & C hile *
Average t / t+8	5,9	3,1	5,4
St. dev. t / t+8	5,9	2,6	4,0

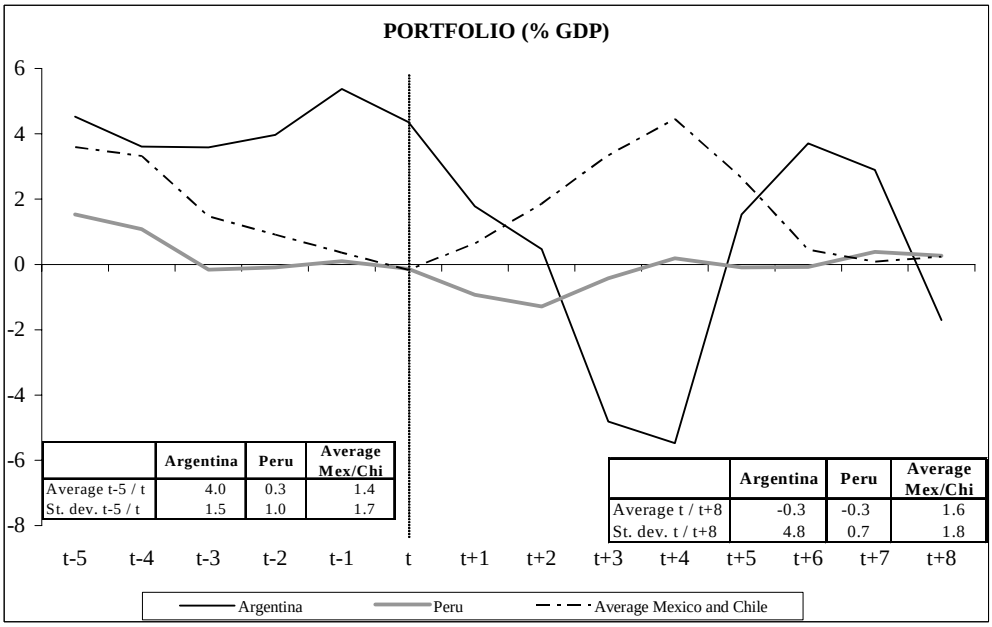
(*) 2 period moving average.

Graphs 13-14 (*)



	Argentina	Peru	Average Mex/Chi
Average t / t+8	0.7	-1.0	0.8
St. dev. t / t+8	2.5	3.0	1.5

	Argentina	Peru	Average Mex/Chi
Average t-5 / t	3.2	3.5	1.4
St. dev. t-5 / t	1.4	2.5	1.9



	Argentina	Peru	Average Mex/Chi
Average t-5 / t	4.0	0.3	1.4
St. dev. t-5 / t	1.5	1.0	1.7

	Argentina	Peru	Average Mex/Chi
Average t / t+8	-0.3	-0.3	1.6
St. dev. t / t+8	4.8	0.7	1.8

(*) 2 period moving average.

5.4 Conclusions from crisis prevention case studies

From this evidence, the existence of a precautionary program does not seem to have been a critical factor to attract private capital flows. Other factors of vulnerability, instead, shaped the behaviour of capital flows during the period analyzed. There is some evidence of an IMF catalytic role in the short-term as Peru experienced a less pronounced increase in spreads. No evidence, instead, can be found in the middle-term. This is mainly due to the fact that countries under a precautionary arrangement had worse starting conditions. The exchange rate regime was a crucial factor in the case of Argentina due to its simmilarity with the Russian regime.

6 Conclusions

We use regression analysis and case studies to assess whether IMF programs contribute to attracting different types of private capital flows, namely FDI, portfolio and other flows, mainly bank cross-border lending. With both methodologies we distinguish among IMF objectives, namely crisis resolution and crisis prevention, but also longer-term programs, basically oriented towards sustainable growth and poverty reduction.

Based on a large number of countries, the first methodology allows us to draw general conclusions and also to control for the existence of a sample selection bias. This bias stems from the fact that countries seeking IMF programs tend to be worse performers from the start and we cannot control for it fully. Case studies, in turn, help us take into account countries' own circumstances and analyze which channels (conditionality, liquidity and/or signalling) may be more relevant in influencing private flows.

In the background of a rather pessimistic empirical literature on the IMF's catalytic role, we confirm that IMF programs, as a group, do not help attract total private capital flows, even when controlling for sample selection in a number of ways. However, this general conclusion changes when differentiating among types of capital flows and IMF objectives. By type of flow, the IMF impact is positive for FDI but clearly negative for shorter-term flows, particularly cross-border bank lending. The results also differ markedly for different IMF objectives: programs oriented towards crisis resolution, such as the Stand-By Arrangement and the Supplementary Reserve Facility, actually discourage private capital flows, when controlling for sample selection. On the contrary, programs oriented towards crisis prevention, namely precautionary arrangements, perform very well in attracting private flows, particularly FDI. In addition, longer-term programs, such as the Poverty Reduction and Growth Facility, contribute to attracting FDI.

We also show empirically findings for a number of policy-relevant questions related to the IMF catalysis. First maintaining a program seems to be more relevant than its announcement. This could indicate that complying with the IMF conditionality is more important than the signalling which takes place when the program is signed. Second, larger IMF packages (understood as above access limits) are generally beneficial, particularly in the case of precautionary arrangements. Third, market access to capital flows does make a difference for capital flows to be attracted.

The case studies –Brazil and Korea for crisis resolution and Argentina and Peru for crisis prevention– and the comparison with their counterfactuals (Malaysia and Colombia in the first case and Mexico and Chile in the second) offer a slightly more positive view of IMF catalysis for crisis resolution, at least for FDI. Finally, all case studies point to the role of conditionality –as opposed to signalling and liquidity– as the strongest channel through which IMF catalyzes private flows.

Being catalysis an important objective for the Fund, our results could look worrisome given the apparent inability to attract capital flows with programs oriented towards crisis resolution. However, it is also true that the Fund is most successful with FDI, which has been the most relevant source of capital for most emerging and developing countries. In addition, the catalysis of long-term structural programs is also important given the growing relevance of sustainable growth and poverty reduction objectives in the international agenda.

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APPENDIX 1: REVIEW OF THE LITERATURE

Table 1: Review of the literature on the IMF catalytic role

	Objective	Methodology	Dependent variable	Objective variables	Sample and temporal domain	Main findings
Rodrik (1995)	Rationale for existence of multilateral lending institutions in a world with well-developed international private capital markets, and substantial bilateral aid programs	Basic regression	Net private capital flows	Official flows, distinguishing between multilateral and bilateral transfers, and between concessional and non-concessional lending	A sample of developing countries in Asia, sub-Saharan Africa and Latin America. 1970-1993	No evidence of catalytic role
Killick (1995)	Impact of IMF supported programs in developing countries	Case studies	Not applicable	Not applicable	17 countries under an IMF program	No catalytic effect: only in two countries was IMF program associated with larger capital inflows
Schadler et al. (1995)	Impact of IMF conditionality on a number of macroeconomic outcomes	Case studies	Not applicable	Not applicable	36 countries between 1988 and 1992	Catalytic effect only in a few cases
Corbo and Hernández (1999)	Role of fundamentals as determinants of capital flows	Panel data	FDI; portfolio flows; long-term private debt flows and sum of all private flows	Variable reflecting "new lending from multilateral sources"	73 countries 1985-1994	Capital flows positively correlated to "new lending from multilateral sources"
Bird et al. (2000)	Catalytic effect of multilateral lending institutions	Case studies	Not applicable	Not applicable	17 countries 1980s and 1990s	The involvement of multilaterals does not guarantee an inflow of capital from other sources
Marchesi (2001)	To assess the impact of IMF lending on the subsequent concession of a debt rescheduling	Bivariate probit model	Probit for the occurrence of a debt rescheduling	Distinguishes between SBAs, EFFs, SAFs and ESAFs	93 developing and transition economies 1983-1996	Adoption of an IMF program facilitates the rescheduling of existing loans

Table 1: Review of the literature on the IMF catalytic role						
	Objective	**Methodology**	**Dependent variable**	**Objective variables**	**Sample and temporal domain**	**Main findings**
Benelli (2003)	Comparison of actual capital flows and IMF projections after the concession of a program	Panel data	Net private capital flows	Takes into account the size of and the adjustment induced by the programs	105 SBA and 31 EFF programs	Actual capital flows fall short of projections in larger programs and in countries with access to capital markets
Eichengreen, Kletzer, Mody (2004) mimeo	Fund's catalytic role in bond market and in bank lending; distinction between the IMF's catalytic potential through monitoring/commitment and through lending	Multinomial logit regression. Transactional data to reduce the severity of reverse causality	Frequency of transactions and initial risk premium charged on credit	Loan and bond transactions. Takes into account external debt/GDP ratio	6 700 loan transactions, 3 500 bond transactions 1991-2002	Stronger catalytic effect in the bond market than in bank lending. Catalytic effect correlated to the country's level of external solvency
Bordo, Mody & Oomes (2004)	IMF programs' role in helping countries (re)gain access to international capital markets and, if so, through which channels; and to explore the role of the country's initial conditions	Statistical comparison of the performance of program and non-program countries with similar initial conditions	Gross bond, equity and loan flows	Excludes SAF/ESAF/PRGF from the analysis. Distinguishes between SBAs and EFFs	29 emerging markets 1980-2002	After a fall, IMF programs contribute to an improvement of capital inflows to countries departing from "intermediate" initial conditions

Table 1: Review of the literature on the IMF catalytic role						
	Objective	**Methodology**	**Dependent variable**	**Objective variables**	**Sample and temporal domain**	**Main findings**
Eichengreen & Mody (2001)	Effect of IMF programs and contigent action clauses on access to financial markets	Sample selection, maximum likelihood model	Gross capital flows (new bond issuance) and spreads	SBAs, EFFs and ESAFs	International bonds issued by emerging markets. 1991-1999	Catalytic effect when the country concerned has intermediate credit rating and when programs introduced limited structural conditionality
Bird & Rowlands (2002)	Catalytic impact of IMF lending, drawing a distinction between types of capital flow, and types of IMF program	Panel data	Net FDI/GDP; official flows/GDP; portfolio flows/GDP; Private source debt/GDP	Distinguishes between SBAs, EFFs and ESAFs/PRGFs. Takes into consideration the country's past record with IMF programs	117 countries 1977-1999	No broad-based catalysis. SBAs have a positive effect on FDI in middle-income countries and a negative effect on portfolio flows. ESAFs/PRGFs have a negative effect on FDI
Ghosh et al. (2002)	Experience of eight IMF-supported programs during the capital account crises of the 1990s	Case studies	Not applicable	Not applicable	Eight countries 1990s	Catalytic effect was systematically over-estimated in the program figures
Mody & Saravia (2003)	Assessment of delegated monitoring function of the IMF	High frequency panel data	New bond issues (gross capital flows) and spreads on these bonds	Size of programs, precautionary character and program duration	3 066 bond issuances 1991-2000	No automatic catalytic effect. Found only under certain conditions relating to the country, the program and the relationship with the IMF
Edwards (2003)	Catalytic effect of IMF programs on portfolio flows and FDI, distinguishing among IMF facilities	Hazard rate methodology to capture the effect of self-selection	FDI/GDP and portfolio flow/GDP ratios	SBAs and EFFs	126 countries 1979-1995	IMF lending has a negative effect on both portfolio flows and FDI regardless of the type of facility

Table 2: Literature review on determinants of capital inflows

Determinant	*Expected Effect on capital flows*	*Expected Effect on FDI*	*Source*
Size of foreign debt	-	None	Hernández et al.(1997); Corvo et al. (1999); Mody et al.(2001); Fiess (2003)
International reserves	+	None	Hernández et al.(1997); Ashoka et al.(2001)
Exports growth rate	+	None	Hernández et al.(1997)
Volatility real E/R	-	None	Hernández et al.(1997)
Trade openness	+		Haussmann et al.(2002); Albuquerque et al.(2002); Haussmann et al.(2002)
Interest rate	+	None	Taylor et al.(1997); Ashoka et al.(2001)
Macroeconomic stability	+		Agédir (1998); Mody et al. (2001); Ewee-Ghee Lim (2001); Albuquerque et al.(2002); Haussmann et al.(2002); Mody et al.(2003)
Stock exchange indexes	+	None	Ashoka et al.(2001); Mody et al.(2001)
GDP growth rate	+		Corvo et al.(1999); Corbo et al.(1999); Albuquerque et al.(2002); Fiess (2003)
Saving rate	+	None	Hernández et al.(1997)
Investment rate	+	None	Hernández et al.(1997); Corvo et al.(1999)
Credit Ratings	+	None	Chuhan et al.(1993); Taylor et al.(1997); Mody et al.(2001)
Market size	+		Loree et al. (1994); Kawaguchi (1994); Branard (1997); Dees (1998); Billington (1999); Portes et al.(1999); Venables (2000); Fung, Izaka et al (2000); Shatz et al.(2000); Stein et al.(2001); Haussmann et al. (2002); AT Kerney
Distance	Ambiguous	Ambiguous	Portes et al. (1999); Shatz et al.(2000); Haussmann et al.(2002)
Nat. resources endowm.	None	+	Haussmann et al.(2002)
Infrastructure quality	None	+	Ewe-Ghee Lim (2001); Stein et al.(2001)
Clustering	None	+	Ewe-Ghee Lim (2001)
Human capital endowment	None	+	Stein et al. (2001); Wei (1997)
Labour cost	None		Ewee-Ghee Lim (2001); Kawaguchi (1994); Dees (1998); Wheeler et al. (1992); Mody et al.(1998); Fung et al.(2000); Stein et al.(2001); Albuquerque et al.(2002)
Political stability	None	+	AT Kerney; Ewe-Ghee Lim (2001)
Quality of institutions; Regulatory environment; corruption; rule of law	+	Ambiguous	Wheeler et al.(1992); Singh et al.(1995); Wei (1997); Ewee-Ghee Lim (2001); Stein et al.(2001); Haussmann et al. (2002)
Restrictions on FDI	None	-	Kawaguchi (1994); Stein et al. (2001); Albuquerque et al. (2002)
Fiscal treatment/incentives on FDI	None	+	Wheeler et al. (1992); Kawaguchi (1994); Wei (1997); Stein et al. (2001); Albuquerque et al. (2002)
Depth of the financial system	+	+	Chen et al. (1997); Montiel et al. (2000); Albuquerque et al. (2002); Haussmann et al. (2002)
Participation in trade agreements	None	+	Ewe-Ghee Lim (2001); Stein et al.(2001); Levy-Yeyati et al. (2002)

APPENDIX 2: DATA ISSUES

Table 1: Countries included in the database

Region: Asia	***Access***	***Crisis in at least one year***
Afghanistan	no	no
Bahrain	yes	yes
Bangladesh	no	yes
Bhutan	no	yes
Cambodia	no	yes
China, Mainland	yes	yes
China, Hong Kong	yes	yes
India	yes	yes
Indonesia	yes	yes
Iran	yes	yes
Korea	yes	yes
Lao	no	yes
Malaysia	yes	yes
Maldives	no	yes
Mongolia	no	yes
Myanmar	no	yes
Nepal	no	yes
Oman	yes	no
Pakistan	yes	yes
Phillippines	yes	yes
Singapore	yes	yes
Sri Lanka	no	yes
Thailand	yes	yes
Turkey	yes	yes
Vietnam	yes	yes
Region: Middle East	***Access***	***Crisis in at least one year***
Israel	yes	yes
Jordan	yes	yes
Kuwait	yes	yes
Lebanon	yes	yes
Saudi Arabia	yes	no
Syria	no	yes
Yemen, Rep.	no	yes
Region: Europe	***Access***	***Crisis in at least one year***
Albania	no	yes
Armenia	no	yes
Azerbaijan	no	yes
Belarus	no	yes
Bosnia & Herzegovina	no	yes
Bulgaria	yes	yes
Croatia	yes	yes
Cyprus	yes	yes
Czech Rep.	yes	yes
Estonia	yes	yes
Georgia	no	yes
Hungary	yes	yes
Kazakhstan	yes	yes
Kyrgyz Rep.	no	yes
Latvia	yes	yes
Lithuania	yes	yes
Macedonia FYR	no	yes
Malta	yes	yes
Moldova	yes	yes
Poland	yes	yes
Romania	yes	yes
Russia	yes	yes
Slovak Rep.	yes	yes
Slovenia	yes	yes
Tajikistan	no	no
Turkmenistan	yes	no
Ukraine	yes	yes
Uzbekistan	no	no
Yugoslavia	no	yes

Region: Africa	***Access***	***Crisis in at least one year***
Algeria	no	yes
Angola	no	yes
Benin	no	yes
Bostwana	yes	yes
Burkina Fasso	no	yes
Burundi	no	yes
Cameroon	no	yes
Cape Verde	no	yes
Central African Rep.	no	yes
Chad	no	yes
Comoros	no	no
Congo, Dem. Rep.	no	yes
Congo, Rep.	no	yes
Côte d'Ivoire	no	yes
Djibouti	no	no
Egypt	yes	yes
Equatorial Guinea	no	yes
Eritrea	no	no
Ethiopia	no	yes
Gabon	no	yes
Gambia	no	yes
Ghana	no	yes
Guinea	no	yes
Guinea-Bissau	no	yes
Kenya	no	yes
Lesotho	no	yes
Liberia	no	yes
Libya	no	no
Madagascar	no	yes
Malawi	no	yes
Mali	no	no
Mauritania	no	yes
Mauritius	yes	yes
Morocco	yes	yes
Mozambique	no	yes
Namibia	no	yes
Nigeria	no	yes
Niger	no	yes
Rwanda	no	yes
Senegal	no	yes
Seychelles	no	yes
Sierra Leone	no	yes
Somalia	no	no
South Africa	yes	yes
Sudan	no	yes
Swaziland	no	yes
Sao Tome	no	yes
Tanzania	no	yes
Togo	no	yes
Tunisia	yes	yes
Uganda	no	yes
Zambia	no	yes
Zimbabwe	no	yes
Region: Oceania	***Access***	***Crisis in at least one year***
Fiji	yes	yes
Kiribati	no	no
Papua New Guinea	yes	yes
Samoa	no	yes
Solomon Island	no	yes
Tonga	no	yes
Vanuatu	no	yes

Region: Latin America	***Access***	***Crisis in at least one year***
Antigua and Barbuda	no	yes
Argentina	yes	yes
Aruba	no	yes
Bahamas	no	yes
Barbados	yes	yes
Belize	yes	no
Boliva	yes	yes
Brazil	yes	yes
Chile	yes	yes
Colombia	yes	yes
Costa Rica	yes	yes
Dominica	no	no
Dominican Rep.	yes	yes
Ecuador	yes	yes
El Salvador	yes	yes
Grenada	no	no
Guatemala	yes	yes
Guyana	no	yes
Haiti	no	yes
Honduras	yes	yes
Jamaica	yes	yes
Montserrat	no	no
Netherlands Antilles	no	no
Nicaragua	yes	yes
Panama	yes	yes
Paraguay	yes	yes
Peru	yes	yes
Mexico	yes	yes
St.Kitts	no	no
St.Lucia	no	no
St.Vincent	no	no
Suriname	no	no
Trinidad and Tobago	yes	yes
Uruguay	yes	yes
Venezuela	yes	yes

Table 2: Variable definitions and sources

Variable	*Definition*	*Source*	*Comments*
Dependent			
FDI / GDP	Direct investment in reporting economy divided by nominal GDP	IFS, line 78bed (line 99 for GDP)	Represents private inflows of each type of capital in each country; when data is missing in IFS, equivalent WDI data used
OI / GDP	Other investment liabilities divided by nominal GDP	IFS, line 78bid (line 99 for GDP)	Represents private inflows of each type of capital in each country; when data is missing in IFS, equivalent WDI data used
PI / GDP	Portfolio investment liabilities divided by nominal GDP	IFS, line 78bgd (line 99 for GDP)	Represents private inflows of each type of capital in each country; when data is missing in IFS, equivalent WDI data used
Objective			
IMF programs	Dummy taking value of 1 if country sign an IMF program in year t, 0 otherwise	IMF and own elaboration	Dummy takes 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 tis year and 1 next year.
of which SBA	Dummy taking value of 1 if country sign a SBA program in year t, 0 otherwise	The list of precautionary arrangements is taken from "Adapting precautionary arrangements to crisis prevention", prepared by th Policy Development and Review Department of the IMF (2003)	SBA: Stand-By Agreements; EFF: Extended Fund Facility; PRGF: Poverty Reduction and Growth Facility; SRF: Supplmental Reserve Facility
of which PRGF	Dummy taking value of 1 if country sign a PRGF program in year t, 0 otherwise		
of which SRF	Dummy taking value of 1 if country sign a SRF program in year t, 0 otherwise		In the regressions, SRF agreements are considered as SBA or EFF when they complement them.
of which EFF	Dummy taking value of 1 if country sign a EFF program in year t, 0 otherwise		
of which precautionary	Dummy taking value of 1 if country sign a precautionary program in year t, 0 otherwise		Precautionary arrangements are treated as a different category, as they could be both SBA or EFF arrangement
Size of program	Amount agreed in each type of program as percentage of country's quota in year program is signed	Own elaboration	---
Control			
a.- Long term potential growth and market size			
Investment rate	Fixed capital formation as percentage of GDP	WDI	Extended using national sources
Per capita GDP	PPP estimation of per capita GDP in each country	WDI	Extended using WEO database
Growth of exports	Exports yearly change in US dollars	IFS, line 70	Extended using national sources, WDI
Participating in trade bloc	Sum of total GDP in PPP terms of rest of participants in the bloc	WDI	Definition of well functioning trading blocs taken from Levy Yeyati, Stein and Daude (2002)
b.- Capacity to repay			
Foreign exchange reserves	Total foreign exchange reserves in thousands of US dollars	IFS, line 1ld	Completed with national sources
Total extenal debt / GDP	Public and private external debt divided by GDP	WDI	
Short term ext.debt / Reserves	External debt due within a year divided by foreign exchange reserves	WDI	
c.- Macroeconomic variables			
Domestic interest rate	Short term money market rate or equivalent	IFS, line 60	
Growth	Real GDP growth	IFS, line 99	
Rate of inflation	Yearly change in Consumer Price Index	IFS, line 64	Completed with WDI and national sources
Public sector balance	Surplus or deficit as a percentage of GDP	IFS, line 80 and line 99 for GDP	
d.- Other relevant variables			
Political freedom	Civil liberties index from Freedom House Scores, ranging form 1 (less free) to 7 (more free)	Freedom House	---
Valuation of investors	Moody's sovereign rating, transformed into numbers using a scale from 1 (C rating) to 23 (Aaa1)	Moody's	---
Capital controls	Dummy taking value of 1 if there exists controls, 0 otherwise	Arteta (2002)	Completed using IMF's "Exchange rate arrangements and exchange rate restrictions", assigning value of 1 if there exist controls on either capital markets securities, money markets instruments, direct investment and liquidation of direct investment
Determing subsamples			
a.- Countries with access to markets	Dummy taking value of 1 if country have a rating assigned by Moody's.	Own elaboration from Moody's	---
b.- Countries with sovereign crises	Dummy taking value of 1 if there was a sovereign default	Own elaboration from Standard & Poor's (2002)	---
c.- Countries with banking crises crises	Dummy taking value of 1 if there exist a systemic or non systemic banking crisis	Own elaboration from García Herrero and Del Rio (2002)	Lists completed with events pointed out in Bekaert and Harvey's "Chronology of important financial, economic and political events in emerging markets" news database
d.- Countries with exchange rate crises	Dummy taking value of 1 if there was a pressure on the exchange rate	Own elaboration from Bubula and Otker-Robe (2003)	Lists completed with events pointed out in Bekaert and Harvey's "Chronology of important financial, economic and political events in emerging markets" news database

Table 3: Main statistics of full sample

	Obs.	*Mean*	*Std. Dev.*	*Min*	*Max*	*Median*
Independent variables						
FDI /GDP	3441	2.33	5.31	-82.81	148.66	1.04
Other / GDP	3070	2.63	21.99	-385.77	399.48	2.09
Portfolio / GDP	1300	0.61	2.66	-40.08	39.63	0.08
Total flows / GDP	1273	5.54	22.17	-371.01	260.07	4.59
Objective variables [(1)]						
IMF program	1143	95,35%	---	3,57%	1330,0%	69,1%
of which SBA	520	77,48%	---	14,53%	1330,0%	54,4%
of which PRGF	537	98,90%	---	5,00%	220,0%	90,0%
of which SRF	8	373,38%	---	42,0%	1244,4%	293,9%
of which EFF	147	188,98%	---	35,0%	662,3%	150,0%
Precautionary arrangements	97	70,49%	---	18,0%	400,0%	40,0%
Regressors						
Investment rate	3820	23.04	9.59	1.63	113.58	21.82
Political freedom	3991	4.40	2.05	1	7	5
GDP per capita	3606	3784.19	3820.67	195.49	28255.60	2405.22
Growth	4127	3.54	7.68	-51.03	141.50	3.89
Change in exports	4118	12.54	45.54	-90.43	1483.63	7.80
Capital account restrictions	4190	0.84	0.37	0.00	1.00	1.00
Trade bloc	5073	50048.94	207429.40	0.00	1792227.00	0.00
Public sector balance / GDP	2853	-3.57	6.38	-66.23	68.67	-2.81
Domestic interest rate	2878	70.89	2041.78	0.35	107379.00	8.25
Rating	575	11.33	3.37	2.00	21.00	11.00
External debt / GDP	3415	65.92	87.16	0.00	1598.22	45.37
Short term ext. Debt / Reserves	3065	1281.88	10808.93	0.00	261218.40	69.67
Inflation	3923	57.91	538.61	-58.92	23773.10	8.98
Reserves	3953	2923.75	11478.36	0.01	291128.00	223.04

[(1)] Rather than the dummy variable of having a program or not, we report the size of the program, namely the amoung granted as a percentage of the country's quota.

Table 4: Correlation matrix

	FDI/GDP	PI/GDP	OI/GDP	Ext.debt / GDP	Reserves	Change in exports	Domestic interest rate	Rating	Growth	GDP per capita	Inflation	Public balance	Political freedom	Trade bloc	Short term debt / reserves	Cap.account restrictions	Investment rate	IMF program	Total flows / GDP
FDI/GDP	1,00																		
PI/GDP	0,12	1,00																	
OI/GDP	0,03	-0,04	1,00																
Ext.debt/GDP	-0,04	-0,05	-0,12	1,00															
Reserves	0,08	0,13	-0,04	-0,07	1,00														
Change in exports	0,02	0,00	0,01	-0,04	-0,01	1,00													
Domestic interest rate	-0,02	0,00	0,01	0,15	0,00	-0,01	1,00												
Rating	0,18	0,14	0,10	-0,37	0,31	0,11	-0,13	1,00											
Growth	0,10	0,09	0,05	-0,10	0,04	0,19	-0,06	0,33	1,00										
GDP per capita	0,15	0,22	-0,01	-0,21	0,39	-0,03	-0,01	0,59	-0,01	1,00									
Inflation	-0,02	-0,01	-0,01	0,14	-0,01	-0,02	0,35	-0,18	-0,10	-0,03	1,00								
Public sector balance	0,09	-0,02	-0,02	-0,22	0,10	0,08	-0,08	0,36	0,08	0,23	-0,09	1,00							
Political freedom	-0,13	-0,12	-0,02	0,08	-0,01	0,04	0,00	-0,09	0,01	-0,33	0,02	-0,05	1,00						
Trade bloc	0,07	0,04	-0,01	-0,04	0,24	-0,02	0,01	0,00	0,00	0,23	0,01	0,14	-0,16	1,00					
Short term debt/reserves	-0,05	-0,02	-0,07	0,30	-0,03	-0,03	0,00	-0,07	0,10	-0,05	0,00	-0,08	0,08	-0,03	1,00				
Cap.account restrictions	-0,06	-0,03	0,00	0,01	-0,05	-0,02	0,01	-0,11	-0,08	-0,21	0,03	-0,09	0,05	-0,09	-0,04	1,00			
Investment rate	0,39	0,07	0,10	0,04	0,13	0,01	0,00	0,48	0,20	0,15	-0,04	-0,03	-0,12	0,05	-0,01	-0,08	1,00		
IMF program	0,02	-0,05	-0,07	0,22	-0,04	-0,03	-0,01	-0,45	-0,06	-0,15	-0,02	0,03	-0,07	0,09	0,01	0,06	-0,15	1,00	
Total flows / GDP	0,27	0,09	0,97	-0,11	0,00	0,03	-0,03	0,13	0,16	0,05	-0,02	-0,01	-0,07	0,01	-0,07	-0,03	0,22	-0,09	1,00

Table 5: Statistics with and without IMF programs/crises

	Whole Sample	Crisis	No crisis	IMF program	No IMF program	Crisis + IMF program	Countries that never had a program	Countries with at least one program	
								5 years before first	5 years after first
FDI / GDP	2.33	1.76	2.58	2.49	2.26	1.95	3.75	1.10	1.57
Other investment / GDP	2.63	0.41	0.70	0.48	3.67	-0.75	3.69	5.66	0.45
Portfolio investment / GDP	0.61	-0.17	4.03	0.44	0.70	0.33	0.93	0.39	0.49
Total flows / GDP (1)	5.54	1.56	7.44	2.81	7.05	0.44	8.77	11.76	2.52
Investment rate	23.04	20.44	24.14	20.77	23.98	19.54	26.43	22.84	20.76
Political freedom	4.40	4.80	4.85	4.15	4.48	4.13	4.12	4.94	4.33
GDP per capita	3784	3206	4063	2913	4180	2922	6342	2223	2760
Growth	3.54	2.16	4.08	2.81	3.84	2.60	4.62	1.24	2.44
Change in exports	12.54	8.19	14.09	9.93	13.35	7.55	14.09	9.42	11.93
Capital account restrictions	0.84	0.87	0.83	0.87	0.82	0.86	0.57	0.75	0.91
Trade bloc	50049	83939	39202	85870	40308	84293	558081	196592	334426
Public sector balance	-3.57	-4.27	-3.26	-3.22	-3.71	-3.23	-2.38	-6.53	-3.90
Domestic interest rate	70.89	198.58	12.23	31.85	91.36	48.30	9.68	370.04	62.17
Rating	11.33	9.72	12.02	9.38	12.52	8.45	13.63	11.20	10.17
External debt / GDP	65.92	98.97	50.30	93.89	53.20	102.46	33.55	65.92	87.30
Short term ext.debt / Reserves	1281.9	3204.0	301.9	1360.5	1240.8	2054.8	95.67	798.6	744.6
Inflation rate	57.91	129.36	28.72	36.17	65.79	49.19	28.24	186.77	55.52
Reserves	2924	3182	2823	2286	3177	2337	3678	894	1342

Table 6: Distribution of crises and IMF programs

Number of observations with an IMF program: percentage of total

	SBA	EFF	PRGF	SRF	Total programs	Precautionary
During crises	56.5	42.2	48.4	75.0	51.4	34.0
Sovereign	42.9	32.0	37.8	37.5	39.0	13.4
Banking	20.2	10.9	13.0	62.5	16.5	20.6
Exchange rate	6.7	6.1	6.1	37.5	6.8	6.2
Without crises	43.5	57.8	51.6	25.0	48.6	66.0
Total observations	520	147	537	8	1143	97

Memo: information about types of crises: percentage of total and coincidence of crises

% total crises		Observations	
Sovereign	72.9	Sovereign and banking	109
Banking	29.3	Sovereign and exchange rate	56
Exchange Rate	13.6	Banking and exchange rate	44

APPENDIX 3:
Table 1: Country classification to choose case studies

Deciles	Average per capita GDP 1/ 2/	Investment Rate 2/
1st	Antigua, **Argentina,** Bahamas, Bahrain, Barbados, Cyprus, Ecuador, Gabon, Hong Kong, Israel, Kuwait, Saudi Arabia, Singapur, Uruguay	Algeria, Bahrain, Botswana, Bulgaria, Buthan, Gabon, Kiribati, Latvia, Romania, Russia, Singapore, St Kitts & Nevis, Turkmenistan
2d	**Brazil**, Estonia, Hungary, **Korea,** Malta, Oman, Panama, Russia, Seychelles, Slovak, South Africa, Trinidad and Tobago, Venezuela	Albania, Antigua, Congo, Cyprus, Dominica, Estonia, Hungary, Kirguistan, Poland, Slovak, Solomon,Tajikistan
3d	**Chile, Colombia**, Costa Rica, Fidji, Jamaica, Latvia, **Malaysia,** Mauricius, **Mexico,** Namibia, **Peru,** St Kitts and Nevis, St Lucia, Turkmenistan	Comoros, Georgia, Grenada, Jordan, Lesotho, Seychelles, St. Lucia, St. Vincent & the Grenadines, Uzbekistan, Vanuatu, Venezuela, Ukraine
4th	Algeria, Belize, Bulgaria, Costa Rica**,** Dominica, Grenada, Iran, Jordan, Kazakstan, Lebanon, Moldova, Romania, Turkey, Ukraine	Cape Verde, Egypt, Guinea Bissau, Guyana, Hong-Kong, **Korea, Malaysia,** Malta, Oman, Suriname, Swaziland, Thailand, Tonga, Tunisia
5th	Botswana, Djibuti, Dominican Republic, El Salvador, Georgia, Guatemala, Paraguay, St Vincent & the Grenadines, Tajikistan, Thailand, Tonga, Tunisia, Vanuatu	Costa Rica, Fidji, Indonesia, Iran, Israel, Lybia, Mauricius, Mauritania, Morrocco, Papua, Phillipines, Somalia, Syria, Togo
6th	Bolivia, Cape Verde, Comoros, Cote d`Ivoire, Haiti, Kirguistan, Kiribati, Morrocco, Phillipines, Senegal, Solomon, Syria, Uzbekistan, Zambia, Zimbabwe	**Argentina,** Belize, Cameroon, Dominican Republic, Ecuador, Fidji, Jamaica, Kenya, Malawi, **Mexico,** Paraguay, **Peru,** Trinidad and Tobago, Zambia
7th	Angola, Cameroon, Comoros, Egypt, Haiti, Honduras, Kirguistan, Nicaragua, Senegal, Solomon, Syria, Uzbekistan, Zambia Zimambwe	Barbados, **Brazil**, Burkina Fasso, **Chile,** Colombia, Cote d`Ivoire, Gambia, Honduras, Nicaragua, Nigeria, Saudi Arabia, South Africa, Sri Lanka

Deciles	Average per capita GDP 1/ 2/	Investment Rate 2/
8th	Benin, Central African Rep., Equatorial Guinea, Gambia, Ghana, Guinea, Indonesia, Mauritania, Mongolia, Sao Tome, Sierra Leona, Sri Lanka, Togo	Bahamas, El Salvador, Equatorial Guinea, Guinea, India, Kuwait, Mali, Namibia, Pakistan, Panama, Turkey, Uruguay, Zimbabwe
9th	Bangladesh, Bhutan, Congo, India, Kenia, Laos, Lesotho, Madagascar, Mali, Niger, Nigeria, Pakistan, Rwanda	Angola, Benin, Bolivia, Congo, Guatemala, Haiti, Myanmar, Nepal, Niger, Rwanda, Sudan, Vietnam
10th	Burkina Faso, Burundi, Cambodia, Chad, China, Ethiopia, Guinea-Bissau, Malawi, Mozambique, Nepal, Sudan, Tanzania, Uganda, Vietnam	Afghanistan, Bangladesh, Burundi, Cambodia, Central African Rep., Chad, Ethiopia, Ghana, Laos, Madagascar, Mozambique, Sao Tome, Senegal, Sierra Leona, Uganda

1/ In constant 1995 USD

2/ Averages for the period 1970-2002

The Brazilian crisis

In 1998 and 1999 Brazil underwent a financial crisis as a result of both external and domestic factors. On the external side Brazil suffered a contagion from the Russian crisis, and was affected by the distress facing Long Term Capital Management in the United States. On the domestic side the adoption of the Real Plan in 1994 had various side effects, such as an appreciating currency and the indexation of fiscal expenditures without hardly any indexation of revenues. These led to the widening of fiscal and current account deficits, which international investors started to perceive as an important weakness in the midst of the Asian crisis. A tightening in monetary policy and the announcement of a fiscal package to address the growing imbalances restored confidence relatively fast until the Russian crisis erupted. The authorities attempted to limit capital outflows with a further tightening of monetary policy but without much success. Brazil was, thus, forced to call in the IMF for assistance.

During the negotiations of the December 1998 program, the most controversial issues were the extent of the overvaluation of the Real and whether to maintain or not the crawling peg. Ultimately, the exchange rate regime was kept unchanged and the program conditionality focused mainly on regaining control on public finances. The rescue package included US$ 42 billion from the World Bank, the IDB, and bilateral creditors and combined an orthodox adjustment with structural reforms to curb fiscal spending. Notwithstanding the relatively large package with IMF financial support equivalent to about 730% of quota, the program failed to restore market confidence. There were two main reasons for this: the strong congressional opposition to the implementation of IMF conditionality and the unsustainability of the crawling peg, given the large and growing real exchange rate appreciation. The trigger of the collapse of the Real was the announcement by the governor of Minas Gerais of a moratorium of 90 days on state debt repayments. This introduced unsustainable pressures on the Real, forcing the authorities to abandon the peg in January 1999 and to further tighten monetary policy in order to avoid an excessive devaluation of the currency.

These events led to a reconsideration of the program, so that several changes were introduced in March. The most significant one was the introduction of an inflation target mechanism to guide monetary policy in the new floating exchange rate regime. Fiscal conditionality was substantially reinforced, with a review of both the fiscal adjustment and the structural fiscal reforms contemplated in the original program. Additionally, private sector involvement was requested from international commercial banks, which were asked to maintain their inter-bank credit lines for at least six months. This second package managed to stabilize the exchange rate and to restore market confidence, and Brazil began to recover from the crisis faster than expected, partly thanks to a substantial resumption of FDI flows. In 1999, in contrast to the projected decline of 3.8%, GDP grew by 0.8%, and in 2000 GDP grew by 4.4%.

Table 2:
Policy Response to the crisis in Brazil[22] [23]

		t-1	t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Crawling peg maintained	Crawling peg dropped (Jan. 99). Free float adopted.	Flexible exchange rate regime					
	Monetary policy	Monetary policy aimed at sustaining the peg	Adoption of an inflation-targeting framework. (March 99 program review)	Monetary policy relaxed as inflation remains under control	Gradual relaxation of monetary policy. The introduction of an inflation target system considered as one of the major successes of the reviewed programme.				
	Fiscal policy	Fiscal adjustment announced (Obj: primary surplus of 2.6%)	Reinforcement of fiscal adjustment in March 99 review. (Obj: 3.1% GDP primary surplus in 1999, 3.25% in 2000 and 3.35% in 2001)	Primary surplus targets met					
Structural reforms	**Fiscal measures**	Commitment to pass a fiscal responsibility law	Preparation of law's draft	Draft of fiscal responsibility law submitted to Congress	Negotiation of the Fiscal Responsibility law in Congress			Fiscal responsibility law passed.	
		Social security and pension reform	Limited progress				Halted progress. Congressional opposition		
		Structural tax reform	Limited progress because of congressional opposition						
	Financial and corporate sector measures	Improvements in financial sector regulation	Limited progress						
	Liberalization measures	Labor market reform	Limited progress						
Other	**Private Sector Involvement**	Limited voluntary PSI considered in the program	Renewed efforts for promoting voluntary PSI among major creditor banks.	Limited promotion of voluntary PSI.	None				

[22] Original programme in December 02, 1998 (t-1). Reviewed programme in March 30, 1999 (t)
[23] SRF expired in t+3. SBA expired in t+12.

The Korean crisis

After several years of impressive economic performance, in 1998 the South Korean economy suffered a severe financial crisis which came as a surprise to most international observers. The moral hazard problem stemming from an implicit government safety net for financial institutions and the lack of strong supervision had resulted in complex networks of connected lending, a deterioration in the quality of investment and a build-up of non-performing loans. Additionally, certain shortcomings in the design of the financial liberalization process favoured external short-term borrowing, resulting in substantial maturity and currency mismatches.

As international investors begun to reduce their exposure to the region after the Thai crisis and the collapse of the Hong Kong stock exchange, the Korean won was put under pressure, making it difficult for Korean banks and corporations to roll-over existing debts and to obtain fresh loans. The authorities initially responded with interventions in support of the won which were ineffective and led to a gradual depletion of official reserves, setting the stage for a speculative attack on the won. Monetary policy was briefly contracted, increasing the difficulties that the corporate and financial sectors were facing. This policy mix did not succeed, and by October 1997 speculative pressures became unsustainable. In November the authorities were forced to stop supporting the won, and requested an IMF program to cope with the financial crisis.

In December 4, 1997, a rescue package was put forward, consisting of a substantially front loaded three year SBA, amounting to US$ 21 billion approved under the exceptional emergency financing mechanism. This was complemented by US$ 14 billion provided by the World Bank and the Asian Development Bank, and by a second line of defence amounting to US$ 20 billion provided by bilateral donors. The conditionality attached to this package consisted mainly of a tightening of monetary and fiscal policy, and an ambitious program of structural reforms aimed at restructuring the financial sector, and at improving corporate governance. However, this rescue package did not succeed in restoring market confidence. A first reason was the uncertainty that resulted from the presidential elections regarding the new government's commitment to the IMF program. A second one was the press dissemination of information about the very low stock of usable reserves, which reinforced speculative pressures on the won. Third, monetary and fiscal conditionality was considered too contractive for the country's circumstances. Fourth, the program itself was considered too small when it became clear that the second line of defence would not be really made available. In fact, it has been argued that by including a second line of defence the real extent of the financial gap required to rescue Korea was revealed.

After the explicit support of the new government to the IMF policy prescriptions, the rescue strategy was redesigned by including private sector involvement. In fact, in December 24, a group of major international banks agreed to rollover interbank debt. Although in 1998 the Korean economy contracted by almost 6% the effect of the crisis was shorter than expected, and in 1999 economic growth resumed at a spectacular rate: 10.9%. The program conditionality was met throughout the process.

Table 3:
Policy Response to the crisis in Korea[24] [25]

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Adoption of a managed float.	Central bank support to the won.	Relaxation of support to the won.	Further relaxation of support to the won.			
	Monetary Policy	Tight Monetary policy: overnight rate increased from 12.7% to 25%, and to 34%.	Tight monetary policy: overnight call rates maintained at 20- 25%.	Substantial relaxation of monetary policy.		Moderate relaxation of monetary policy		Interest rates stabilized at around 5%.
	Fiscal Policy	Commitment to a small fiscal surplus: 1% of GDP in 1998.	Automatic stabilizers let to work.	Expansionary fiscal policy.		Budget deficit of 4% of GDP in 1998.	Return to a more neutral fiscal policy	
Structural reforms	**Fiscal measures**	None						
	Financial and corporate sector measures	Financial sector restructuring: closure of non viable banks, restructuring and recapitalization plans for viable institutions.	6 commercial banks and 16 merchant banks closed / merged. Govnt. takes control of 2 large banks	Closure of unviable banks continues. Reluctance to close major banks.	Legislation passed to write down equity of failed banks.			Despite some delays in implementation, government commitment to restructuring.
		Reinforcement of the regulatory and supervisory framework.	Independence granted to central bank. Supervisory single agency created.	Introduction of new provisioning and loan classification regulations.			Introduction of rules for stronger risk management in forex operations.	
		Corporate sector reform: new accounting and disclosure standards, new bankruptcy procedure		Strong initial commitment to corporate sector reforms	Corporate sector reform gradually delayed in parallel with economic stabilization.			
	Liberalization measures	Trade liberalization	Limited progress					
		Market labour liberalization	Lay-offs agreed by unions.	None				
Other	**Private Sector Involvement**	Coordinated debt rollover agreement.	Korean short term debt rescheduled. Maturities extended.	None				

[24] Original programme in December 04, 1998 (t). Reviewed programme in December 24, 1998 (t)
[25] SRF expired in t+4. SBA expired in t+12.

The Malaysian crisis

As in Korea, in Malaysia the main source of vulnerability was the weakness of the domestic financial sector, with a large stock of bad loans fuelled by the government's lax regulations on collateral based loans, by the burst of a stock exchange bubble, and by various economic policies aimed at benefiting certain ethnic groups. Malaysia was also very exposed to speculation due to the importance of ringgit off-shore operations in Singapore. As a response to the balance of payment pressures interest rates were raised, government spending was cut, and the authorities expressed their commitment to a more flexible exchange rate regime. This orthodox policy mix, however, did not succeed in stabilizing the situation.

The introduction of various fiscal stimuli, together with a relaxation of monetary policy around the summer of 1998 marked the beginning of Malaysia's departure from orthodoxy in crisis resolution. These measures, however, failed to reactivate the economy because the liquidity that the authorities were pumping into the system was leaking abroad as a result of the continued speculation against the currency. In order to tackle this problem, the authorities introduced capital controls in September, making all offshore ringgit transactions illegal forcing to repatriate ringgits held abroad, pegging the exchange rate, reducing interest rates substantially, announcing an expansionary budget, bailing out troubled firms and urging domestic banks to resume their lending. Various measures were also implemented to restructure the financial and corporate sector through the establishment of an asset management company (Danaharta) and a vehicle company to recapitalize banks (Danamodal). In the last quarter of 1998 the Malaysian economy started to display some signs of recovery, and by 1999 its GDP recorded a growth rate of 4.7%. After 1999 Malaysia has moved back towards financial liberalization as capital controls have been gradually dismantled.

One of the most vividly discussed issues in the aftermath of the Asian crisis has been whether the Malaysian response was more successful than the others in mitigating the impact of the crisis, i.e. whether there was an alternative path to the IMF rescue packages. On the one hand, it has been argued that capital controls were fairly successful in segmenting Malaysian capital markets from international financial markets, and in curtailing speculation and offshore trading in ringgits, enabling the authorities to maintain and stabilize a fixed exchange rate, and to gain control over the monetary policy. On the other hand, there is less evidence on whether the successful implementation of capital controls led to a faster or less costly recovery from the crisis. It has been argued that Malaysia returned to a growth path thanks to exogenous factors such as the stabilization of regional financial markets, and the 75 basis points cut of the Federal Reserve interest rate. Others have argued that Malaysia's situation was less vulnerable than that of the other Asian Tigers, and that, accordingly, its crisis should have been less damaging and the recovery faster. Finally, some have suggested that the Malaysian policy mix might have jeopardized future growth by allowing inefficient firms to survive through the bailouts, and by having permanently reduced the willingness of international investors to invest in Malaysia.

Table 4: Policy Responses to the crisis in Malaysia

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Ringgit on a depreciating trend since June 97			Pegging of the ringgit (Sept.)	Pegged exchange rate		
	Monetary policy	Monetary policy tightened to counter inflationary consequences of the depreciation of ringgit			Monetary policy eased in July and Sept after introducing capital controls.	Further easing of monetary policy		
	Fiscal policy	The fiscal budget surplus projection for 1998 is revised downward.	First fiscal stimulus (March)		Second fiscal stimulus (July)	1998 fiscal deficit: 1,5% GDP. First deficit registered since 1991.	Fiscal stimulus for 1999. Federal deficit projection of 5.5% of GDP	
Structural reforms	**Fiscal measures**	None						
	Financial and Corporate Sector measures	Beginning of a limited effort to consolidate the finance company sector			Creation of public asset management companies recapitalize banks	Banksordered to sell non performing loans at market value to public asset management companies		
			Introduction of new rules for risk management in banks. Loan classification and provision requirements tightened.	Changes in public disclosure requirements for banks	None			
			Establishment of committee to design a new framework for corporate governance		Companies Act is reviewed to strengthen corporate governance		Disclosure requirements enhanced	
	Liberalization measures	None			Measures passed to increase labour market flexibility	None		
Other	**Capital controls**	None			Introduction of capital controls		Introduction of the exit levy system	

The Colombian crisis

The twin Colombian crises were caused by a combination of external and domestic factors. On the external side, Colombia underwent a terms of trade deterioration and the emergence of a substantial current account deficit (5.7% of GDP) in the second half of the 90's, together with a progressive deterioration of financing conditions as a result of continued political uncertainty and instability in emerging markets. On the domestic side, the economy displayed various macroeconomic imbalances such as a large and rising budget deficit (primary deficit of 4.3% of GDP in 1997) and a marked increase in domestic and external debt. The fiscal problem was primarily a result of the Colombian decentralization process and the system of revenue transfers to territorial governments. Additionally, the financial sector was weak due to the economic slowdown, the undercapitalization of several banks, an inadequate framework for supervision, a reduction in intermediation margins, and important maturities and currency mismatches.

These factors contributed to unsettle international investors, and in 1998 Colombia experienced a reversal of the substantial volume of capital inflows that the country had been attracting until 1997. The reversal of capital flows introduced downward pressures on the Peso, forcing the authorities to tighten monetary policy, and to depreciate the currency in September 1998 and in June 1999. As the Central Bank raised interest rates to defend the Peso, the situation of financial intermediaries further deteriorated. Unproductive assets in the financial system increased from slightly over 3% in 1997 to almost 8% in 1999, profits and solvency collapsed and the sector registered a dramatic fall in its net worth (Arias, 2002). The original policy mix was unsuccessful in restoring market confidence, and in September 1999 the authorities were forced to float the Peso, abandoning the target zone regime that had been in place since 1994. The floating of the Peso was backed with measures to curb fiscal spending and the implementation of various structural reforms, especially in the financial sector. This policy mix was more successful in restoring market confidence. By year 2000 the Colombian economy was out of the recession, and the Peso was experiencing a moderate appreciation. Nevertheless, the performance of the Colombian economy in recent years has been rather disappointing, partly due to the fact that it is still struggling to overcome some of the sources of vulnerability that led to the crisis, especially in the financial sector.

The policy mix implemented by the Colombian authorities was backed by an IMF Extended Fund Facility approved in December 1999. However, Colombia was not included in the sub-sample of countries with an IMF program for three reasons. First, the Fund facility was approved almost two years after the beginning of the crisis. By then the Peso had been floated and was registering a moderate appreciation. Second, the funds committed by the IMF were never disbursed, which, together with the timing of the program, suggests that it was a crisis prevention tool rather than a crisis resolution tool. Third, the adoption of an IMF program did not imply a substantial realignment in the Colombian policies and, in contrast with the Malaysian case, Colombia did never depart from orthodoxy in order to cope with the crises.

Table 5: Policy Response to the crisis in Colombia

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Exchange rate band depreciated	Depretiation pressures continue.		Exchange rate band widened and depreciated (June)	The peso allowed to float (Sept.)	Moderate appreciation of the peso	
	Monetary policy	Monetary policy tightened as a result of pressures on the peso		Gradual relaxation of monetary policy				
	Fiscal policy	Contractionary fiscal package including spending cuts and rise in fuel tax	Fiscal package does not reduce fiscal deficit due to recession and revenue sharing agreements.	Deterioration of fiscal situation		New fiscal package approved.	Wage freeze for government employees	Failure of the fiscal contraction.
Structural reforms	**Fiscal measures**	Widening of VAT tax base and strengthening of tax enforcement as part of the fiscal package.	None			Reform of the revenue sharing system passed. Limited reform of the pension system.	The tax system that results from the various reforms considered complex and distortionary	
	Financial and Corporate sector measures		Program to recapitalize viable banks and to deal with public banks.	The government begins to close unviable banks and to take over troubled banks.	Financial sector reform law passed. Strengthening of the banking supervisor.	Banks recapitalization plan reinforced. Financed by a public agency	Final debt relief package for mortgage owners passed.	
	Liberalization measures	None						
Other	**IMF**	No IMF programme in place. Colombian economic policies, however, broadly in line with IMF recommendations					EFF programme approved as part of an economic recovery plan.	

Table 6: Major policies implemented in Argentina[26]

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Currency board						
	Monetary policy	No sovereignty on monetary policy						
	Fiscal policy	Shortfalls in government revenues tend to increase budget deficit	Federal government deficit: 1.3% of GDP. Provincial government deficit: 0.8% of GDP	The government compensates the revenue shortfall and meets all the IMF's program performance criteria.	Deterioration of public finances. Setting of adverse dynamics in public debt		Federal deficit: 2.5% of GDP. Provincial deficit: 1.3% of GDP	Further deterioration of public finances.
Structural reforms	**Fiscal measures**		Approval of a Tax Reform aimed at improving efficiency and equity and at promoting the competitiveness of the economy	New tax legislation removing a prior bias in favour of debt financing		Fiscal Convertibility Law passed: increase in personal income and wealth tax, widening of VAT, effort at improving tax compliance. Fiscal Responsibility Law passed.	A Federal Commitment reached to constrain provincial expenditures	
	Financial and Corporate sector measures	None						
	Liberalization measures			Measures to increase labour flexibility in small and medium enterprises	Progress in privatization: the government sells its stakes in the former state oil company.	None		
Other				Unrest among international investors after comments in favour of a moratorium on foreign debt payments from the part of presidential candidates			Presidential elections	IMF approves US$ 7.2 billion precautionary 3 year SBA arrangement

[26] The original programme due to expire in t+12. However, new 17-months SBA signed in t+4.

Table 7: Major policies implemented in Chile

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Pre-announced crawling band to USD widened from +/-2.75% to +/-3.5%. Central Bank intervenes to avoid depreciation	Pre-announced crawling band to US dollar widened from +/-3.5% to +/-8%	Pre-announced crawling band: +/- 8%		Adoption of a free floating regime	*De facto* managed floating	
	Monetary policy	Sharp tightening of monetary policy. Interest rates raised from 8.5% to 14%	Relaxation of monetary policy (interest rates fall from 14% to 7.8%)	Interest rates fall from 7.8% to 7%	Interest rates fall from 7% to 5%	Full adoption of inflation targeting Monetary rule: inflation in a 2-4 percent range	Interest rates unchanged	
	Fiscal policy	Prudent fiscal policy		Easing of fiscal policy	Introduction of a fiscal stimulus package	Expansionary fiscal policy		Fiscal policy tightened
Structural reforms	**Fiscal measures**	None						
	Financial and Corporate measures	None						
	Liberalization measures	None		Unilateral reduction of uniform external tariff by 1 percentage point	Continuation of the privatization programme		3 water companies privatized, 4 seaports and various road concessions granted in 1999	Unilateral reduction of uniform external tariff by 1 percentage point

Table 8: Major policies implemented in Mexico

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	Managed floating regime.		Interventions of the bank of Mexico to offset appreciation of the peso	Managed Floating Regime			
	Monetary policy	Tight monetary policy		Monetary policy objective for 1999: to bring inflation below 13 percent. Tightening of monetary policy following the Brazilian crisis	Tight monetary policy		Inflation objective for 1999 met. Monetary policy eased	Monetary policy objective for 2000: to bring inflation below 10 percent
	Fiscal policy	Contractionary fiscal policy to compensate the effects of external shocks and the fall in oil prices			Financial strengthening program for 1999-2001 to ensure refinancing of Mexican public debt		1999 fiscal targets met	
Structural reforms	**Fiscal measures**	None						
	Financial and Corporate sector measures			New banking legislation. Increased transparency to restructure banks. Creation of new agency to manage the deposit insurance and liabilities of the restructuring			Various legal initiatives to protect debtors and creditors and to introduce a new corporate bankruptcy law	Improvements in regulatory framework
	Liberalization measures		Removal of all limits of foreign investment in Mexican banks	None				
Other actions	**IMF**	No IMF programme in place. Policies broadly in line with IMF recommendations.			IMF approves US$ 4.234 billion 17 months SBA arrangement			

Table 9: Major policies implemented in Peru[27]

		t	t+1	t+2	t+3	t+4	t+5	t+6
Macroeconomic policies	**Exchange rate policies**	*De jure* flexible exchange rate regime. *De facto* crawling +/- 2% band aroud the US dollar			*De jure* flexible exchange rate regime. *De facto* peg to the US dollar			
	Monetary policy	Prudent monetary policy. Limited impact of the Peruvian monetary policy in the context of a highly dolarized economy		Inflation target range for 1999: 5 - 6 percent			Inflation in 1999: 3.7 percent	Inflation target range at the end of 2000: 3.5 - 4 percent
	Fiscal policy	Tight fiscal policy	Fiscal policy begins to be eased	Fiscal policy eased: reduction in the primary surplus projections for 1999		Fall in tax collection leads to an expansion of the fiscal deficit	1999 fiscal deficit: 3% of GDP	Expansionary fiscal policy
Structural reforms	**Fiscal measures**	None					Fiscal responsibility and transparency law setting limits for deficit, government expenditure and public debt	
	Financial and Corporate sector measures	None			Bank reform strengthens supervision, increases efficiency of liquidation procedures and improves coordination among regulators	None		
	Liberalization measures	None				Agricultural land securitizing Postponement of various privatization projects.		Bidding on gas extraction
Other		Peace agreement reached with Ecuador	Peru graduates from Paris club rescheduling		New precautionary arrangement with the IMF (3 year EFF, US$ 512 million)		The IMF performance criteria for December 1999 are not met	

[27] Precautionary programme expiration in t+12.

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