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BI-POLAR DISORDER: EXCHANGE RATE REGIMES,
ECONOMIC CRISES AND THE IMF.

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Bi-Polar Disorder: Exchange Rate Regimes, Economic Crises and the IMF.

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Over the course of the 1990s economists appeared to favour exchange rate regimes that were either completely flexible or rigidly fixed through mechanisms such as currency boards. According to this "bipolar" view of exchange rates, intermediate regimes were deemed to be ineffective and prone to crisis. This paper examines the link between exchange rate regimes and International Monetary Fund (IMF) programme use and finds fairly strong evidence that countries with intermediate exchange rate regimes are less likely to go to the IMF than others. To the extent that International Monetary Fund (IMF) programmes are a proxy for balance of payments difficulties, this finding supports the more recent, nuanced, literature on exchange rate regime choice.

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1.Introduction

The debate over the relative merits and demerits of alternative exchange rate regimes has been a central component of international macroeconomics for as long as the subject has existed. The issues involved, both theoretical and empirical, are complex. Even so, during the second half of the 1990s, and with a spate of economic crises in various parts of the world, a consensus of sorts appeared to form that any attempt to 'softly' manage exchange rates in a world of capital mobility was unwise. This it seemed had been a common feature of the crisis countries. Instead, the consensus view was that emerging and developing countries should opt for either of the corner solutions in preference to any intermediate exchange rate regime. The 'bi-polar' view was that hard pegging in the form of a currency union, or full exchange rate flexibility were superior to any regime in between the two and that either of the extreme exchange rate regimes would be less vulnerable to crisis.

However, the consensus was not complete; it was perhaps premature when evaluated against its theoretical and empirical justification. The bi-polar view was driven by a somewhat superficial analysis of a relatively small number of crisis countries over a relatively short period of time. The logic behind it seemed to be that the only pegging regime that would carry credibility with international capital markets would be a hard and immutable peg. Therefore if a country were not to select this alternative, it would be better to opt for full flexibility. But subsequent discussion has recalled the disadvantages of both hard pegging and free flexibility for emerging and developing countries; it has pointed to the fact that not all intermediate regimes have been vulnerable to crisis; and it has highlighted the difficulty of defining what constitutes a hard peg. After all, initially, and prior to the crisis in Argentina in the early 2000s currency boards were widely perceived as an example of hard pegging. Finally, credibility is more likely to be associated with the internal consistency of an array of macroeconomic policies. The sustainability of any exchange rate regime will depend importantly on the other macroeconomic policies that accompany it. This has led some to claim that it is not possible to say that any one particular exchange rate regime is universally preferable to any other.

Whilst the theoretical debate continues, a number of studies have begun to appear that try to test empirically and rigorously whether some exchange rate regimes are more commonly associated with crises than others. Although not always presented in this way, these studies examine the empirical support for the bi-polar view. Such studies raise a series of methodological issues. How are exchange rate regimes to be defined and captured empirically, and how are crises to be measured? They also carry with them important policy implications. If certain exchange rate regimes appear to be more sustainable and significantly less prone to crisis, surely this should feed into future decisions about the choice of exchange rate regime, and indeed to the advice proferred by the International Monetary Fund (IMF).

This paper seeks to contribute to the evolving literature which examines the association between exchange rate regimes and the incidence of crises. It differs from existing studies in various ways. First, it makes use of the Reinhart-Rogoff classification of exchange rate regimes (Reinhart and Rogoff, 2004) and therefore allows for the possibility that actual *de facto* regime choices may differ from announced *de jure* ones. Second, it uses IMF arrangements as a proxy for economic crisis. While some countries may encounter crises and still avoid borrowing from the IMF, it is reasonable to assume that all countries that negotiate active arrangements with the IMF are facing some type of economic crisis. All the cases of crisis during the 1990s that led up to the bi-polar consensus on exchange rate regimes involved IMF arrangements. But even if data on IMF arrangements fail to capture all crises as measured in other ways, such as those identified by using an index of foreign exchange market pressure, they do capture perfectly the incidence of IMF arrangements! Thus a more specific description of this paper is that it examines empirically the association between the involvement of the IMF in terms of negotiating programmes and the nature of the exchange rate regime. Is it empirically true that countries that have opted for the corner solutions are less likely to end up having to turn to the IMF for assistance, as the bi-polar view would suggest? Or, contrary to this view, is the selection of an intermediate exchange rate regime associated with a lower probability of an IMF arrangement? Or is there simply no association one way or the other?

The paper is organised in the following way. Section 2 provides a brief summary of the recent literature in order to put into context the new research reported in this paper. Section 3 explains the methodology adopted and the results discovered. Section 4 briefly examines the policy implications of the results. Finally, Section 5 summarises the principal contribution of the paper and conjectures about some possible explanations for the results that are discovered.

2. Exchange Rate Regimes, Crises and the IMF: A Contextual and Literature Review

In principle, all exchange rate regimes have well recognised potential advantages and disadvantages.[1] Firmly pegged rates may encourage foreign trade and investment, may impose discipline on domestic monetary and fiscal policy and may carry sufficient credibility to help avoid speculative attacks. But, in the long run and because things change, a pegged nominal exchange rate is likely to imply a disequilibrium real exchange rate, unless there is a significant degree of domestic price flexibility that allows the real exchange rate to alter. Without this, defending hard pegs may involve significant output losses.

Flexible nominal exchange rates may allow an equilibrium real exchange rate to be maintained over time but may be volatile and discourage foreign trade and investment. They will impose fewer constraints on domestic macroeconomic policy but, as a consequence, may generate less confidence within capital markets.

Intermediate regimes may combine the best or worst of both worlds. The best would be where they limit volatility and the possibility that exchange rates will overshoot their long run equilibrium, but also provide some degree of discretion over the conduct of domestic macroeconomic policy. The worst would be where they generate neither the confidence associated with hard pegs nor the flexibility required to maintain equilibrium real rates. In these circumstances, and with mobile international capital, they may be particularly vulnerable to speculative attack.

It was this perceived shortcoming of intermediate exchange rate regimes, as well as the incidence of crises during the 1990s in countries that tried to manage their exchange rates and resist devaluation, that culminated in the bi-polar view that intermediate regimes were inferior to either of the extremes. Simultaneously, the existing currency crisis literature suggested that crises of either a first or second generation type were likely to be associated with a relatively weak commitment to manage exchange rates i.e. with intermediate exchange rate regimes lacking credibility[3] rather than with hard pegs or floating.

The bi-polar view has, however, been open to challenge. Intermediate regimes have not been readily abandoned and seem to work satisfactorily in some instances (Masson, 2001, Bubula and Otker-Robe, 2002, Corden, 2003, and Husain, Mody and Rogoff, 2005). Moreover, corner solutions are not insulated from market pressures and may be associated with exchange rate misalignments that undermine their sustainability (Williamson, 2000, Corden, 2003). Typical of those who have been sceptical of the bi-polar view, Frankel (1999) argues that no single exchange rate regime is right for all countries at all times.

Apart from the largely casual empiricism upon which 'bipolarism' has been based, and the better structured examination of case studies that is more nuanced (Corden 2003), there have been relatively few systematic empirical studies that have sought to examine the connection between exchange rate regimes and economic crisis.[4]

Defining them as sharp falls in the exchange rate, the IMF (1997) found that, over the period 1975-96, crises had occurred under all forms of *de jure* exchange rate regime. In a more recent study, and using the currency crises identified by Glick and Hutchison (1999), Ghosh, Gulde and Wolf (2003) find that firmly pegged regimes carry the lowest probability of crisis.[5] Bubula and Otker-Robe (2003) build on this work. They use their own *de facto* classification of exchange rate regimes and distinguish between soft and hard pegs. They define currency crises as episodes of severe market pressure as reflected by sharp movements in both exchange rates and interest rates. This allows them to identify speculative attacks that were successfully repelled as well as those that led to devaluations. They then measure how crisis-prone different regimes are by computing the frequency with which crises occurred under

each regime, rather than by examining the share of each regime in the total number of crises. They find that pegged regimes are more crisis-prone than floating regimes, particularly for developed and emerging market economies that are integrated with international capital markets. For 1990-2001 and across all countries they find that, although the polar extremes are not exempt from crisis, intermediate regimes – whatever precise form they take – are more crisis-prone; they interpret this as providing support for the bi-polar view.[6]

In a related study Husain, Mody and Rogoff (2005) (henceforth HMR) investigate the durability of exchange rate regimes. In the light of the bi-polar view one might expect intermediate exchange rate regimes to be less durable on average than hard pegs or fully floating regimes and for countries to exit from them. HMR discover a more complex picture. Using the Reinhart-Rogoff 'natural' classification of exchange rates, which they claim is superior to other available classifications because it distinguishes between freely floating and freely falling exchange rates (Reinhart and Rogoff, 2004), they find that countries benefit by having increasingly flexible exchange rate regimes as they become richer and more financially developed. For more advanced economies, flexible exchange rate regimes are more durable. On the other hand, for developing countries with little access to international capital markets, pegged regimes are 'notable for their durability'. For emerging market economies during the 1990s, by contrast, pegs are the least durable regime and carry a high risk of crisis. Contrary to what bipolarism would predict, HMR find that there is no tendency for intermediate exchange rate regimes to give way to regimes at the corners. This is especially the case in emerging economies where the bi-polar view might have been anticipated to be at its most relevant. For the two decades prior to 2001, when their data end, most emerging economies had opted for intermediate regimes and showed no inclination to move away from them. Indeed, the overall trend appears to be in the opposite direction away from pegging and towards intermediate exchange rate regimes.

HMR find that the incidence of 'twin' banking and currency crises in emerging economies is highest under pegged exchange rate regimes and that it declines as the exchange rate becomes more flexible.[7]

Although they may be resolved by deeper analysis and by greater disaggregation, the evidence reported above sends out mixed messages. Although some studies suggest that intermediate exchange rate regimes may be the most prone to crisis, others suggest that pegged rate regimes may carry a greater risk, particularly for countries that are internationally financially integrated. Moreover, the durability of intermediate regimes and the reluctance of many countries to abandon them appears to be inconsistent with the bi-polar view.

Different findings across the various studies may in part be accounted for by the country sample used, the time period studied, the way in which crises are measured and the classification of exchange rates adopted. There is growing agreement that it may be unsafe to use the official *de jure* classification of exchange rates since the way in which countries actually behave may differ from the way in which they announce they will behave.[8] There remains some disagreement over the best way of identifying crises and capturing market pressures.

An alternative approach is to use IMF arrangements as a proxy for economic crisis. This measure will not be perfect. Some crisis countries – mainly, but not only, advanced economies – may be able to avoid borrowing from the Fund even during a crisis. Furthermore, it has been suggested that some governments may seek a Fund arrangement even when their economies are not in crisis, as a way of endorsing domestic economy policy or creating a 'scapegoat' (Vreeland, 2003).

But there remain logical reasons to believe that a country's proclivity to use IMF credits will be influenced by its choice of exchange rate regime. In order to borrow from the IMF countries have to be able to demonstrate a balance of payments 'need'. This need is conventionally associated with a current account deficit but could also reflect a turn around in capital flows. In either event governments have to make a choice about balance of payments policy. They could seek to adjust by devaluing the exchange rate (expenditure switching) or by compressing aggregate domestic demand (expenditure reduction). Alternatively they could seek to finance the deficit by foreign borrowing. If private capital markets or aid donors are not prepared to provide the finance (at least on their own), this will probably mean turning to the IMF. Other things being constant, countries that are more committed to defending the

exchange rate, ie. with pegged or managed exchange rate regimes, will be more likely to borrow from the IMF than those with flexible exchange rate regimes.

Studies that have sought to explain IMF lending have generally discovered that the nature of the official exchange rate regime is a significant factor (see for example Conway, 1994, Knight and Santaella, 1997, Bird, 1996, Thacker, 1999, Bird and Rowlands, 2001, 2005). In and of itself it is interesting to explore this issue in more detail. Does the *de jure* nature of the exchange rate regime significantly affect the probability of having an arrangement with the IMF, and if so, in what way? Is there a form of bi-polarity, as flexible exchange rates allow countries to avoid balance of payments crises, and hard pegs generate confidence in the disciplined conduct of domestic macroeconomic policy and a willingness to lend in capital markets, allowing hard peggers to by-pass the Fund? Or does the probability of involving the IMF diminish reasonably smoothly as the exchange rate regime becomes more flexible? It is these questions that the remainder of this paper examines. The policy implications are also important. What type of exchange rate regime is most likely to reduce a country's demand for IMF programmes?

3. An Empirical Analysis: Methodology and Results

To determine the relationship between exchange rate arrangements and the use of IMF programmes we first divide countries into groups based on their exchange rate regime, and then examine their propensity to sign IMF programmes. This simple examination and testing of probabilities is then supplemented with an empirical analysis of IMF programme signings using a probit estimation. We focus on emerging and developing countries since advanced countries have not used IMF sources since the mid 1970s.

Reinhart and Rogoff (2004) have argued persuasively that the traditional classification of exchange rate regimes is misleading, and offer an alternative classification system. We use their annual "coarse" classification system that divides exchange rate regimes into five categories.[9] According to their typology, category 1 one includes the most rigid or fixed exchange rate systems, including the use of another country's currency,

a formal peg or currency board, a *de facto* peg, or a pre-announced horizontal band that is narrow (less than two percent on either side of the peg). Higher categories are associated with more flexible regimes. Thus category 2 includes *de facto* and pre announced crawling pegs or bands with trading bands narrower than two percent around the announced value. Category 3 includes exchange rate regimes with wider crawling bands, moving bands, as well as managed floats. Categories 4 and 5 are 'freely floating' and 'freely falling', respectively.[10] A sixth category identifies exchange rate systems that cannot be identified due to missing data.

While there are strong *a priori* reasons for using the Reinhart and Rogoff (2004) classification, for robustness we also conducted the analysis for the traditional *de jure* IMF exchange rate classification. The IMF classification system has four regimes ranging from a fixed exchange rate (category 1) to pure floating (category 4). The simple correlation between these two competing classification systems is only 0.3339 for our sample of low and middle-income countries between 1974 and 2000 (not including the missing exchange rate systems in category 6 from Reinhart and Rogoff).[11] Despite this considerable divergence between the competing classification systems, the results reported later in this section are consistent for both of them.

We first examine the frequency of IMF programme signing for countries with different exchange rate regimes. Each observation corresponds to a particular country and year. Table 1 shows the percentage of countries with each exchange rate regime that signs an agreement either in the current year or the following year.[12]

TABLE 1 ABOUT HERE

The results from Table 1 indicate a pattern of IMF use that contradicts the bipolar view; countries with intermediate exchange rate regimes require IMF programmes less frequently than other countries.[13] For the most part these observed differences in probabilities are statistically significant. For the Reinhart and Rogoff classification, countries with exchange rate categories 1, 4 and 6 are statistically the same as the full sample in terms of propensities to sign IMF agreements in the current or following year. Countries with narrow or wide bands and managed floats have significantly lower propensities to sign an IMF agreement than the full sample (and are themselves

statistically indistinct) while the propensity for countries with freely falling currencies is significantly higher. The results for the IMF classification system are roughly similar. Countries with fixed exchange rate systems have a slightly lower probability of signing an IMF agreement. The intermediate exchange rate regimes of crawling pegs and similar arrangements are associated with significantly lower propensities to sign an IMF agreement than the average, or than fixed exchange rate regimes. Countries with managed floats and pure floating exchange rates have significantly elevated propensities of ending up with an IMF programme.

It is possible that the correlation between exchange rate regime and IMF programme use reported in Table 1 is spurious in the sense of reflecting the influence of other variables. To examine this possibility, we estimated a probit model of IMF programme signings. We selected explanatory variables that are commonly used in the literature on IMF programme signing.[14] We focus primarily on the economic variables in the results presented here.[15] The explanatory variables reflect domestic economic performance (per capita GNP, GDP growth), balance of payments performance (reserve levels, changes in reserves, the current account balance, current account balance changes, and real exchange rate depreciation) international indebtedness (the debt service ratio, changes in the debt service ratio, the publicly guaranteed external debt to GDP level, and indicators of past, present, and imminent future rescheduling needs) and past IMF programme use (which has often been found to be the most significant explanatory factor). Finally, we include the Reinhart and Rogoff exchange rate classification in both a linear and squared form. The results are presented in Table 2.

TABLE 2 ABOUT HERE

The exchange rate variables have statistically significant coefficient estimates that are consistent with the results reported in Table 1. Intermediate exchange rate regimes have a significantly lower statistical association with the subsequent signing of an IMF programme than their more rigid or more flexible alternatives. Solving for the minimum of the quadratic equation in exchange rate classes that is implicit in the probit estimation, it is apparent that countries with category 3 exchange rate regimes

(including exchange rates with wider bands and managed floats) have the least likelihood of signing an IMF agreement, *ceteris paribus*.

This basic result is confirmed when the estimation is reproduced using dummy variables for the main categories in place of the linear and quadratic representation of the Reinhart and Rogoff classification scale. One equation used four dummy variables to represent categories 1, 2, 3, and 4 and 5 together. A second equation combined the two intermediate categories (2 and 3) together as one variable. In these supplementary estimations the highest probability of signing an IMF agreement is associated with the fixed exchange rate regimes, the second highest coefficient for the flexible category, and the lowest for the intermediate categories. [16]

To try and understand further this phenomenon, and to investigate the robustness of the results, we examined the association between exchange rate regimes and IMF programmes across different time periods and for different levels of per capita income. The sample was first divided into the 1974-1989 and 1990-2000 periods. The results for these sub periods, reported in Table 3, are consistent with those for the full sample. Countries with intermediate exchange rate regimes (classes 2 and 3) have the least propensity to go to the IMF for an agreement for both time periods. Countries with fixed exchange rates have slightly higher rates of IMF use than the norm for the full sample. Not surprisingly, those countries with 'freely falling' currencies have the highest rate of IMF programme use. It is important to note, however, that the small numbers of countries with freely floating exchange rates had relatively low rates of IMF use in the second sub period.

TABLE 3 ABOUT HERE

We also divided the sample into a low income group and a middle income group (see Table 4).[17] As before, poor countries with fixed exchange rate regimes had slightly above average rates of IMF programme use. Poor countries with intermediate exchange rate regimes (2 and 3) had lower than average use. Poor countries with freely floating or freely falling exchange rates had higher than average propensities to turn to the IMF. By contrast, the better off countries in the sample exhibited a more varied relationship between their exchange rate regime and their use of IMF

programmes. Not surprisingly, their overall use of IMF programmes was less than for the poorer countries. The lowest use of IMF programmes was for the very few cases of free floating. The next lowest use of IMF programmes was for countries with narrow-band intermediate regimes, followed closely by the regimes on either side (categories 1 and 3). Finally, and as would be expected, better off countries experiencing freely falling exchange rates had by far the highest rate of IMF programme use. These countries were able to operate fixed exchange rate regimes without needing to go to the IMF as frequently as the poorer countries. Indeed from the data for better off countries in Table 4, it is difficult to make a convincing case for the superiority of any particular exchange rate regime in terms of being able to avoid IMF programmes. Free floating has the best record but the number of observations is small.

TABLE 4 ABOUT HERE

Next, we examined the relationship between changes in exchange rate regime and IMF programme use. Table 5 shows the data for IMF programme use according to initial and final exchange rate regime, indicating the proportion of countries that signed an IMF agreement during the current or subsequent year, and the number of observations in each category. The survival rate of exchange rate regimes (the proportion of cases in which a specific exchange rate regime survived for the next period) is also provided.

TABLE 5 ABOUT HERE

Our data indicate that regime change is generally associated with more intense use of IMF programmes. [18] While moving to freely floating exchange rates was not common, moving to a 'freely falling' exchange rate regime was the most frequently observed regime switch, though presumably not one that was chosen voluntarily. For those countries that rejected freely flexible exchange rates, the intermediate regimes (categories 2 and 3) were the most frequently chosen options for countries switching exchange rate regimes. When countries switched into or away from these intermediate regimes, their reliance on the IMF was generally lower, as shown more clearly in Table 6.

TABLE 6 ABOUT HERE

Finally, following on from the assertions in the literature regarding the role of capital controls, we investigated the link between the presence of controls and the incidence of IMF programmes. The general proposition is that controls help to limit the difficulties surrounding balance of payments problems, and their presence might therefore be presumed to significantly decrease the need to approach the IMF for assistance. Data on the presence of controls are taken from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions, though there are problems with these data (Rowlands, 1999). [19]

Table 7 shows the relationship between exchange rate regimes and the presence of capital controls. Aside from the general prevalence of controls in developing and emerging markets for the 1974-2000 period (with controls being present in 84 percent of the cases), countries are more likely to have such controls when their exchange rates are relatively flexible. This is somewhat unexpected, as the traditional "trilemma" in international monetary economics suggests that controls (or the avoidance of free capital movements) are likely to accompany fixed exchange rates as a means of acquiring a degree of autonomy for monetary policy.

TABLE 7 ABOUT HERE

In terms of the effects on a country's proclivity to adopt an IMF programme, the presence of capital account controls had little effect. Indeed, independent of the exchange rate regime (with the exception of the freely falling category) countries with capital controls use IMF programmes with greater frequency. When an additional variable indicating the presence of capital controls is included in the full sample estimations its estimated coefficient is negative but statistically insignificant. When this new equation is estimated for each exchange rate category separately, the presence of controls has a statistically significant negative effect on a country's proclivity to turn to the IMF only when it has a freely falling exchange rate. This negative effect dominates when the regression is re-estimated for the flexible regime

(categories 4 and 5 combined), though the estimated coefficient has a weak level of significance (at the 5.4% level only).[20]

Therefore the evidence indicates quite strongly that countries with intermediate exchange rate regimes are less reliant on IMF programmes, an indication of their greater independent sustainability. When regime changes occur, these intermediate regimes are less likely to require IMF assistance to smooth the transition, and when adopted as a consequence of regime change, are similarly more self-sustaining. Finally, the sustainability of the intermediate regimes does not seem to rely on the use of controls on capital flows.

4. Policy Implications

The bi-polar approach to choosing exchange rate regimes argues in favor of either hard pegs such as currency union or dollarisation at one end of the spectrum or full flexibility at the other. It does not advocate one of the corners specifically. From a policy point of view what it opposes is any type of intermediate regime such as soft pegs or managed floating, which it presents as being particularly vulnerable to crisis unless bolstered by capital controls.

The IMF gives advice to its 184 members countries on the choice of exchange rate regime both as part of its regular Article IV consultations and as part of the negotiations that lead to IMF programmes. But what advice should it give? It has sometimes seemed a little uncertain and has changed its view with respect to individual countries over time. This vacillation has perhaps been especially the case in terms of currency boards and dollarisation. Of course in the case of (quasi) hard pegs an important issue is their effect on market confidence. An exchange rate regime choice that seems unwise *ex ante* and would not have been recommended by the Fund may *ex post* be defended. A situation may arise therefore where the Fund would not have advocated a particular regime, but once adopted would not advocate its abandonment either since this would adversely affect a government's reputation.

Although it is difficult to identify a 'Fund view' on exchange rate regimes, statements by senior members of the Fund in the early 2000s hinted at a preference for flexible

exchange rates. Certainly the Fund has been associated with the idea that soft pegging is unsustainable, and in this regard has aligned itself to some extent with the bi-polar approach (Fischer, 2001).

The new results reported in this paper suggest, however, that if the IMF is seeking to minimize the claims on its resources and to ensure that countries do not become recidivists or frequent uses, it would be unwise to universally advise developing and emerging economies to avoid intermediate exchange rate regimes. Indeed, if anything our results generally imply just the opposite. It is attempts to firmly peg exchange rates that carry a relatively higher risk of needing IMF assistance. The Fund should perhaps express a greater degree of agnosticism regarding exchange rate choice for its developing and emerging market members. It should certainly not be prejudiced against intermediate regimes and should not align itself with bipolarism. Its advice about exchange rate regimes should be flexible and it should not seek to eliminate intermediate regimes at the outset. The middle ground may remain fertile, and perhaps more fertile than the extremes. [21]

Similarly, countries themselves might rightly be more assertive in their choice of exchange rate system. Assuming that they wish to minimize reliance on the IMF, the adoption of intermediate regimes might be quite sensible for many governments. Of course the choice of exchange rate regime will depend on many conditions, including those that help determine the stability of the adopted system. But what factors influence the sustainability of exchange rate regimes? Our study does not allow us to say with certainty, but it is possible to make some suggestions. These conjectures we confine to the next and final section of the paper.

5. Concluding Remarks

At the end of the 1990s, and in the aftermath or a series of crises in emerging economies, a consensus formed around the bi-polar approach to choosing exchange rate regimes. The IMF appeared to be part of the consensus. The approach suggested that developing and emerging economies should opt for either firm fixity or for free flexibility but nothing in between. However, detractors from the consensus remained

unconvinced and there has been little attempt to systematically test the bi-polar approach or more generally the association between exchange rate regimes and the incidence of economic crises.

This study seeks to make a contribution by examining the association between exchange rate regimes, using the Reinhart-Rogoff classification, and the incidence of IMF programmes, which are in some sense a proxy measure of economic crisis but are of interest in and of themselves. We find that the evidence is inconsistent with bi-polarism. Across a full sample of developing and emerging countries over 1974-2000 intermediate exchange rate regimes are significantly less likely to be associated with IMF programmes than either firmly fixed regimes or freely flexible regimes. Pegged rate systems carry with them the highest probability of IMF involvement.

Although we merely set out to investigate an empirical relationship, it may be interesting to conjecture why we find what we do. Countries with fixed exchange rates have stated a preference for not using the currency value as an instrument for adjusting to balance of payments disequilibria. This means that when balance of payments deficits occur, they either need to adjust by other means or they need to finance them, effectively borrowing to defend the pegged exchange rate. Unless it can be switched by using policies apart from the exchange rate, expenditure will have to be reduced. Expenditure reduction will lead to output losses and will be politically unpopular. Therefore countries with pegged exchange rate regimes will be particularly likely to end up borrowing from the IMF. Overall, this is what we find.

Intermediate exchange rate regimes allow governments more degrees of policy freedom. Exchange rates can be altered in circumstances other than in a crisis when a large devaluation may be unavoidable. Moreover, there is some scope for independent fiscal and monetary policy to achieve domestic objectives. This is the textbook case for intermediate regimes. Where the policy discretion is sensibly used, balance of payments crises can be avoided and therefore also the need to turn to the Fund for assistance.

If this is a reasonable interpretation of our findings it suggests that Corden (2003) is indeed correct that one can be "too sensational" about the choice of exchange rate

regime. It is the package of macroeconomic policies that is important rather than any particular component of the package in isolation. Are the policies consistent, in which case the exchange rate regime will be sustainable, or are they not, in which case it won't. The crises in the 1990s which were widely associated with intermediate exchange rate regimes are, according to this view, more accurately interpreted as reflecting an inappropriate mix of macroeconomic policies. Of course these crises may also be interpreted in other ways, including as manifestations of systemic problems resulting from speculation and volatility in international capital markets.

Political variables will influence the extent to which certain packages of policies are sustainable. For example, firm exchange rate pegging will be difficult to sustain in circumstances where balance of payments deficits need to be corrected and there is strong political resistance to rising unemployment and falling living standards. An interesting case study might be Argentina's currency board which survived the tequila effect of the Mexican crisis in 1994 but was unable to withstand the economic and political pressures placed on it at the beginning of the 2000s. Europe is a case where it may be possible to sustain a currency union because of the strong political motivation towards integration.

Flexible exchange rate regimes allow the greatest discretion in terms of domestic fiscal and monetary policy. But again the discretion may be misused with large fiscal deficits leading to monetary expansion and nominal exchange rate depreciation. Combined with the problem of excessive volatility, it is feasible to see why countries with flexible exchange rate regimes may still end up with IMF programmes, even though this may be a less common occurrence than it is for countries with fixed rates.

Compared with the alternatives, intermediate exchange rate regimes may, in principle, provide an appropriate blend of macroeconomic discipline on the one hand, and the ability to avoid unacceptable output losses on the other. When governments opt for a consistent package of macroeconomic policies which is generally perceived as such, and appear committed to maintaining a steady policy course, there is little reason to believe that confidence will be eroded in capital markets. Indeed it may be fostered. In these circumstances, economic crises can be avoided and it will be unnecessary to borrow from the IMF. In the light of our results, the IMF should be encouraging

countries to come up with consistent overall macroeconomic strategies rather than persuading them to opt for any particular exchange rate regime. However, the Fund's advice should certainly not understate the attractions of packages based on intermediate exchange rate regimes, or overstate the attractions of those based on the polar extremes.

Table 1: The probabilities of signing an IMF agreement, by exchange rate regime (1974-2000)

Classification system	Exchange Rate Classification	Probability of signing an IMF agreement		Number of observations (current / following)
		Current Year	Following Year	
Reinhart and Rogoff classification	All types	0.227	0.230	2282/2268
	1 (most fixed)	0.257	0.248	769/767
	2 (narrow bands)	0.176*	0.177*	539/540
	3 (wider bands, managed float)	0.163*	0.177*	528/526
	4 (freely floating)	0.351	0.25	37/40
	5 (freely falling)	0.331*	0.354*	347/333
	6 (missing)	0.177	0.226	62/62
IMF classification	All types	0.192	0.193	3104/3069
	1 (fixed)	0.159*	0.169*	2039/2026
	2 (limited flexibility)	0.085*	0.039*	82/77
	3 (managed floating)	0.243*	0.246*	618/617
	4 (floating)	0.312*	0.287*	365/349

* indicates statistically distinct from the "all types" sample at the 5% level.

Table 2: Probit results for explaining the signing of an IMF agreement in the following year[#]

Explanatory variable	Estimated coefficient	Normal test statistic
Constant	-0.39	-1.65
GNP per capita	0.0000073	0.23
GDP growth	-0.297**	-3.46
Reserve-to-import ratio	-0.631*	-2.46
% change in reserves-to-imports	-0.000811	-1.40
Current Account Balance/GDP	0.418	0.53
% change in the current account	0.0000669	1.2
Real exchange rate depreciation	-0.0003	-0.81
Debt service-to-exports ratio	0.387	1.42
% change in the debt-service ratio	0.000473**	3.30
Public external debt –to-GDP ratio	0.0278	0.36
Current rescheduling	-0.813**	-3.05
Reschedulings in past years	0.153	1.43
Rescheduling required next year	0.491**	3.40
Past IMF agreements	0.832**	7.44
Exchange rate regime	-0.38*	-2.38
Square of the exchange rate regime	0.0623*	2.39
Number of observations	1166	
Pseudo-R squared	0.1482	

The estimation was run on Stata using the robust probit estimation procedure with countries identified as the cluster.
**, * refer to statistical significance at the 1% and 2% levels for two-tailed tests, respectively.

Table 3: The probabilities of signing an IMF agreement (1974-1989 and 1990-2000)

Regime type	Early period (1974-1989)			Later period (1990-2000)		
	This year	Next year	Sample	This year	Next year	Sample
All types	0.221	0.223	1324/1306	0.236	0.239	958/962
1 (most fixed)	0.253	0.251	466/462	0.264	0.243	303/305
2 (narrow bands)	0.162	0.170	297/294	0.194	0.187	242/246
3 (wider,managed)	0.178	0.185	343/340	0.135	0.161	185/186
4 (freely floating)	0.571	0.308	14/13	0.217	0.222	23/27
5 (freely falling)	0.302	0.309	172/165	0.360	0.399	175/168
4&5 (flexible)	0.323	.309	186/178	0.343	0.374	198/195
6 (missing)	0.156	0.219	32/32	0.200	0.233	30/30

Table 4: The probabilities of signing an IMF agreement (by income group)

Regime type	Poorer developing group			Richer developing group		
	This year	Next year	Sample	This year	Next year	Sample
All types	0.256	0.262	1105/1097	0.210	0.205	1899/1904
1 (hard fixed)	0.272	0.266	580/579	0.193	0.182	669/676
2 (narrow bands)	0.224	0.257	143/140	0.177	0.163	463/467
3 (wider,managed)	0.225	0.233	227/223	0.188	0.196	431/433
4 (freely floating)	0.414	0.290	29/31	0.125	0.111	8/9
5 (freely falling)	0.263	0.308	95/91	0.361	0.375	269/259
4&5 (flexible)	0.298	0.303	124/122	0.354	0.366	277/268
6 (missing)	0.152	0.242	33/33	0.153	0.133	59/60

Table 5: Exchange rate regime survival and change and IMF programme use.

Current Regime	1		2		3		4		5		6		
Previous Regime	sign % [a]	# obs.	sign %	# obs.	sign %	# obs.	sign %	# obs.	sign %	# obs.	sign %	# obs.	Survival rate [c]
1	**36**	**793**	29	24	44	9	100	1 [d]	90	10	50	2	94.2%
2	36	14	**27**	**505**	38	24	0	1	50	8	0	2	91.2%
3	75	4	29	17	**27**	**479**	100	1	43	40	0	2	88.2%
4	0	1	0	1	100	1	**36**	**28**	68	6	0	0	75.7%
5	83	12	53	19	43	30	88	8	**50**	**295**	50	4	80.2%
6	40	5	0	1	0	2	0	1	100	1	**37**	**52**	80.0%

Bold numbers identify continuing regimes
a: percentage of cases in which the country signed an IMF agreement in the current or next year.
b: number of country-years for which the previous and current year regime combinations were observed.
c: percentage of countries that had a particular exchange rate regime in the current and previous year.
d: There was only one country that started with a pure fixed exchange rate and moved to a pure floating exchange rate: Nicaragua in 1979. While the Nicaraguan government signed an agreement with the IMF the year it changed its exchange rate regime, it also changed its political regime and the programme was terminated after only three months.

Table 6: IMF signing and average number of months of agreement when the exchange rate regime changes.

Initial regime	Number of obs.	% signed	Number of months	Final regime	Number of obs.	% signed	Number of months
1	51	43	9.8	1	41	48	12.6
2	52	35	7.8	2	73	36	9.2
3	72	38	8.3	3	73	37	8.3
4	10	50	11.6	4	16	63	14.0
5	89	48	13.3	5	96	48	10.4
6	14	43	10.1	6	13	23	8.2

Table 7: The incidence of capital controls for different exchange rate regimes.

Exchange Rate Regime	Number of observations	Percentage with controls
All	2670	84.3
1 (most fixed)	909	80.4
2 (narrow bands)	652	76.7
3 (wider,managed)	598	93.1
4 (freely floating)	56	100
5 (freely falling)	386	88.1
4 and 5 (flexible)	442	89.6
6 (missing)	69	95.7

Appendix: Data definitions and sources.

"Signing of an IMF agreement in the following year". A binary variable indicating that a high conditionality IMF agreement (Stand-by, EFF, SAF/ESAF/PRGF)is signed in the following calendar year, given that a country was eligible to sign one. Source: IMF, *Annual report*, various years.

"GNP per capita". GNI per capita in thousands of $U.S., Atlas method (World Bank, *World Development Indicator*) deflated by U.S. consumer price index (IMF: *IMF Financial Statistics*).

"GDP growth". Percentage change in GDP from the previous year (annual %). Source: World Bank, *World Development Indicators*.

"Reserves-to-imports". Total foreign reserves divided by total imports of goods and services (both in current $US). Source: World Bank, *Global Development Indicators*.

"% change in reserves-to-imports". The percentage change in the reserves-to-import ratio from the previous year to the current year, as a proportion of the previous year.

"Current Account Balannce/GDP". The current account balance divided by total GDP (both in current $US). Source: World Bank, *Global Development Indicators*.

"% change in the current account". The percentage change in the current account balance from the previous year to the current year, expressed as a percentage of the previous year.
Source: World Bank, *Global Development Indicators*.

"Real exchange rate depreciation". The official number of domestic currency units per $U.S. multiplied by the ratio of the U.S. consumer price index to the country's consumer price index. This number is calculated for the current year and for three years previously (adjusting for changes in base years) and the difference between the two is expressed as a proportion of the value from three years before. Source: World Bank, *World Development Indicators*.

"Debt-service ratio". Total long-term debt service payments divided by total exports of goods and services (all in U.S. dollars). Source: World Bank, *World Development Indicators*.

"% change in the debt-service-ratio". The percentage change in the total debt service payments-to- exports ratio from the previous year to the current year, expressed as a percentage of the previous year.

"Public external debt-to-GDP ratio". The ratio of public and publicly guaranteed long-term debt expressed as a ratio of total GDP. Source: World Bank, *World Development Indicators*.

"Current rescheduling". A binary indicator of whether or not the country had to reschedule some portion of its debt (principal or interest, official or private) in the current year, which requires by convention an IMF agreement to be in place. Source: World Bank, *Global Development Finance*.

"Reschedulings in past years". The number of years out of the previous two years in which a country rescheduled some portion of its official or private interest or principal repayments. Source: World Bank, *Global Development Finance*.

"Rescheduling required next year". A binary indicator of whether or not the country is about to reschedule some portion of its debt (principal or interest, official or private) in the following year, which requires by convention an IMF agreement to be in place. Source: World Bank, *Global Development Finance*.

"Past IMF agreements". A binary variable indicating whether an IMF arrangement has been in place for the country in any of the previous two years. Source: IMF, *IMF Annual Report* various years.

"Exchange rate regime". The numerical category of exchange rate regime, on a scale from 1 to 5 moving from the least flexible to the most flexible. A sixth category was for unclassified regimes. Source: Reinhart and Rogoff (2004).

Notes

1. For a comprehensive and up-to-date review of the issues see Corden (2003). For a more succinct summary see Bird (2002).

2. For discussion of the bi-polar view see, for example, Eichengreen (1994), Fischer (2001), Goldstein (1999), Mussa and others (2000). For a comprehensive and excellent review of the arguments for and against alternative exchange rate regimes see Corden (2003).

3. Eichengreen (1994) provides a summary of currency crisis models.

4. Note here that the issue of interest is the nature of the exchange rate regime rather than changes in the exchange rate. During a crisis it is likely that, whatever the regime, the exchange rate will be adjusted and will depreciate.

5. Other definitions of crisis are available. Thus Berg, Borensztein and Pattillo (2004) identify crises as having occurred when the weighted average of one-month changes in exchange rates and reserves is more than three country specific standard deviations above the country average.

6. Although they also state that 'the appropriate support is not as overwhelming as one would expect', (Bubula and Otker-Robe, 2003, p. 19). It is perhaps interesting that they expected the evidence to be 'overwhelming' given the theoretical ambivalence discussed earlier in this paper.

7. Using a different measure of crisis, Bordo et al (2001) find that for emerging economies pegs and limited flexibility carry a significantly higher risk of currency crisis than either managed or freely floating regimes.

8. Of the various classifications available which include Levy-Yeyati and Sturzenegger, 2002, there are certain advantages associated with the one constructed by Reinhart and Rogoff (2004) as explained in Husain, Mody and Rogoff (2004). See Nitithanprapas and Willett (2002) for a further discussion of the issues involved in classifying exchange rate regimes.

9. Available at http://www.wam.umd.edu/~creinhar/Links.html

10. The distinction between 'freely floating' and 'freely falling' makes sense for Reinhart and Rogoff (2004) in terms of classifying exchanges rate regimes, but is less helpful when considering exchange rate regime choice. Few countries would choose to have, nor could they engineer a 'freely falling' exchange rate. So categories 4 and 5 could be seen as one exchange rate regime choice (perfectly flexible).

11. Reinhart and Rogoff report a full sample correlation of 0.42.

12. Both of these probabilities are potentially relevant since the operation of a certain exchange rate regime may contribute to the onset of economic

problems and an IMF programme in the current year or in the future. If the exchange rate regime is changed as a consequence of these economic difficulties, the signing of the agreement may be incorrectly attributed to the regime that was established after the crisis.

13. We re-tested the results in Table 1 using the number of months in a year during which a country was under an IMF programme. The results correspond to those presented in Table 1. Essentially this test implies that the results are not arising as a consequence of countries with intermediate exchange rate regimes signing longer-term agreements with the Fund.

14. Bird (1996), Bird and Rowlands (2001), Conway (1994), Joyce (1992), Knight and Santaella (1997), Thacker (1999), and Vreeland (2003).

15. Alternative models using additional political and institutional variables were also estimated, but the key results are comparable to those reported here.

16. It should be noted that when the flexible exchange rate category was left divided into the original "freely floating" and "freely falling" categories, the former had the lowest association with IMF agreements and the latter the highest. The fixed exchange rate category coefficient in the estimations was always statistically significantly higher than for the other categories. In one form of the estimating equation, however, the estimated coefficient for the flexible category was different from that of the intermediate category only with a somewhat weaker level of statistical significance.

17. We identified countries as low income or middle income for the full sample, regardless of per capita income changes over time. The GNP per capita (Atlas method) average was $US 590 for the low-income group, and $US 3686 for the middle-income group. To some extent this may proxy for the degree of financial development and allows us to see whether increasing financial development and liberalisation undermines the association between intermediate exchange rate regimes and the incidence of IMF programmes.

18. This relationship may vary over time. The IMF (2004) finds that 'countries are no more likely to alter their exchange rate regime at the outset of a Fund-supported program than otherwise.'

19. These data are far from ideal, as the IMF itself recognized in 1997 when it began publishing a more detailed account of capital controls in its member states. For the most part the new reporting system seemed to yield a series that corresponded well to the earlier reporting system. The measure, however, remains a crude one. In his analysis of capital account liberalization and IMF programme and resource use, Rowlands (1999) discusses additional problems with the data.

20. In one estimation, capital controls did appear to have a strongly significant negative effect on the probability of an IMF programme. This occurred when the constant was left out of the equation. Given the high correlation between

the presence of controls and the constant, this result was considered to reflect multicollinearity rather than a reliable result.

21. For a further discussion of the potentially superior policy tradeoffs offered by intermediate regimes, see Bénassy-Quéré and Cœruré (2001).

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