

Exchange Rate Regimes and Inflation in Developing Countries

by

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Preliminary version

Abstract

Previous research has suggested that pegged exchange rates are associated with lower inflation than floating rates. We find that this is certainly true for “hard” pegs. For “soft” pegs, where there are fewer obstacles to devaluation, the evidence is much more ambiguous and more consistent with the causality running from inflation to the exchange rate regime than *vice versa*. Countries with relatively low inflation tend to stay on a peg, whereas those with higher inflation tend to float or to switch between pegging and floating. There is a positive correlation between the number of regime switches and the average inflation rate.

JEL Classifications: F41

1. Introduction

Much has been written recently about the classification of exchange rate regimes, and their correlation with measures of macroeconomic performance such as inflation and growth. When official IMF classifications are used (which are essentially the declared regimes of each country), pegs tend to be associated with lower inflation than floats (Bleaney and Fielding, 2002; Edwards, 1993; Ghosh *et al.*, 1997; IMF, 1997). If exchange rate regimes are classified according to some measure of what governments do rather than what they say, quite different results can be obtained, although there is not yet agreement on the optimal *de facto* measures (Poirson 2001; Levy-Yeyati and Sturzenegger, 2001). Reinhart and Rogoff (2002) have extended the possibilities further by emphasising parallel-market rather than official exchange rates.

The overall picture is thus become increasingly unclear. We argue that the declared exchange rate regime (ERR) is important, and that much can be learnt from an analysis based on official IMF classifications. Our analysis starts from four principles.

- (1) The ERR-inflation relationship should be analysed separately for developing countries. Developing countries lack the institutional strength of advanced countries (they emerge as consistently inferior in multi-dimensional measures of institutional quality), and are thus more likely to depend on an exchange rate peg as a nominal anchor, rather than on domestic institutional arrangements. One index of this is that the median developing country has had significantly higher inflation than the median advanced country over the past twenty years.
- (2) There is no general answer to the question of how to classify exchange rate regimes. The answer depends on the issue under investigation. The appropriate classification is not likely to be the same according to whether the issue of interest is the degree of intervention or the ERR-inflation relationship. In the latter case, it is particularly important to avoid biasing the results by using a classification scheme in which arrangements designed to allow a pegged regime to adapt to high inflation – such as a pre-announced crawl – are treated as semi-floating.

- (3) Inflation in developing countries has fallen significantly during the 1990s, and therefore it is important to allow for and investigate shifts in the ERR-inflation relationship over time.
- (4) Because of the positively skewed nature of the inflation distribution, the treatment of outlying observations at the high end is important in any empirical analysis, and results needed to be tested for robustness to outliers.

The structure of our paper is as follows. In Section 2 we present a simple theoretical model. In Section 3 we discuss issues of exchange rate regime classification. Section 4 reports our results, and Section 5 concludes.

2. Theory

Suppose that the government cares about deviations of the real exchange rate from equilibrium, and about inflation relative to some target level. It may choose a floating exchange rate, in which case it can select monetary growth to hit its inflation target exactly, but must accept whatever degree of real exchange rate volatility the market delivers. Alternatively it can peg the exchange rate to some anchor currency which is characterised by low inflation (below the government's target), and can control real exchange rate volatility by the frequency of parity adjustments. The government's loss function is:

$$L = (d - d^*)^2 + bE(Q - Q^*)^2 + bnC \quad (1)$$

where d represents inflation in non-traded goods, d^* the target rate of d , Q the real exchange rate (in logs), and Q^* the equilibrium or target real exchange rate, C is a cost which is incurred if a pegged exchange rate is adjusted, n is the frequency of exchange rate adjustments, $b (> 0)$ is a preference parameter and E is the expectations operator. Equation (1) says that the government dislikes deviations of inflation from target, real exchange rate volatility, and exchange rate adjustments. The relative strengths of these dislikes are expressed by the parameters b and C .

The government operates monetary policy to fix a rate of inflation of non-traded goods (d). Consumer price inflation (p) is jointly determined by d , the rate of exchange rate appreciation (e) and foreign inflation (f) as follows:

$$p = a(f - e) + (1 - a)d \quad 0 < a < 1 \quad (2)$$

By definition the rate of change of the real exchange rate (the price of non-tradeables relative to tradeables) is given by:

$$q = d - f + e \quad (3)$$

In a pegged regime the government has two degrees of freedom. It can choose both inflation (d) and the frequency of devaluation (n) (assuming that $d^* > f$).¹ Given these, it is optimal for devaluations to compensate exactly for inflation differentials since the last devaluation, and this will determine the variance of Q . Between devaluations, Q increases at the rate $d - f$. Each devaluation is of size $(d - f)/n$, and

$$E(Q - Q^*)^2 = (d - f)^2/4n \quad (4)$$

Substitution from (4) into (2) and differentiation with respect to n and d yields the optimal solution:

$$d - f = 2n\sqrt{C} = 2(d^* - d)/(b\sqrt{C}) \quad (5)$$

Equation (5) shows that the government chooses an inflation rate that is intermediate between the foreign rate (f) and that which it would choose under flexible exchange rates (d^*). Note that, even though the exchange rate peg has no credibility in the sense that devaluations are known to occur with frequency n and to compensate fully for accumulated real appreciation, the peg still results in lower inflation. If the cost (C) of exchange rate adjustments is higher, or the government values real exchange rate stability more highly (b is higher), then inflation is lower and devaluations are less frequent.

¹ Clearly if $d^* = f$, no devaluation is ever necessary, and $Q = Q^*$ at all dates.

This analysis suggests that, in differentiating between different types of pegged regimes, one should focus on the political cost or difficulty of adjusting the parity (i.e. C). Assuming that a pre-announced crawl effectively means C close to zero and an infinite value of n , a “soft” peg that can be converted into a pre-announced crawl at any time arguably has a low value of C . On the other hand, if parity changes require the agreement of other countries (as in the European Monetary System or the CFA), then C is likely to be higher. Currency board arrangements, in which domestic monetary policy is automatically tightened in response to foreign reserve losses, are generally backed by strong commitments not to devalue. We classify currency boards and the CFA countries as “hard pegs” on the grounds that they effectively have high values of C . Thus we anticipate lower inflation for hard pegs than for soft pegs, and (probably) for soft pegs than for floats.

This theoretical analysis also has relevance to the issue of *de jure* versus *de facto* classifications. If the cost of adjusting the parity (C) is regarded as essentially a “humiliation” cost of publicly visible changes in policy, it seems relevant to focus on the government’s declared ERR, because of the visibility factor.

3. Classification of Exchange Rate Regimes

There are two approaches to the problem of classifying exchange rate regimes: a *de jure* classification based on the stated commitment of the Central Bank and a *de facto* classification based on the observed behaviour of the exchange rate. The *de facto* approach was given impetus by the observation, after the Asian crisis, that many of the countries involved were effectively pegging to the U.S. dollar, even though their announced regime was a basket peg or even a managed float. The *de facto* approach is labour-intensive, and liable to produce strange results if an inappropriate procedure is used. It is probably best regarded as a useful check on the *de jure* classification.

We construct a data set based on IMF classifications. There are two main difficulties involved in this. One is that the IMF system has not remained invariant across years. The other is that there are more categories than can be conveniently used in an empirical test, so there is an aggregation problem. The most common way to deal with this aggregation problem is to reduce the categories to either two (pegged and floating) or three (pegged, intermediate and floating). We consider three types of classification, as shown in Table 1. The first one, hitherto called Classification One, considers three categories of exchange rate regimes – pegs, intermediate, floating. This is the method used by many previous authors (Collins (1996), Ghosh *et al.* (1997)², Bailiu, Lafrance and Perrault (2000), Bénassy-Quéré (2000), and Masson (2000)). It is not our preferred classification method, and we investigate it simply because it has been used frequently in the past.

Table 1. Alternative classifications of exchange rate regimes

<i>Classification 1</i>
1) Pegs : no separate legal tender and currency boards, pegged to a single currency and to a composite of currencies.
2) Intermediate : Limited flexibility with respect to a single currency, cooperative arrangements; crawling peg and bands.
3) Floating : other managed floating and independently floating.
<i>Classification 2</i>
1) Hard pegs : no separate legal tender (including CFA) and currency boards.
2) Broad Peg : Pegged to a single currency and to a composite of currencies, limited flexibility, crawling pegs and crawling bands.
3) Floating : other managed floating and independently floating.
<i>Classification 3</i>
1) No separate legal tender
2) Currency board
3) Peg to single currency
4) Peg to other single currencies
5) Peg to composite of currencies (includes SDR)
6) Crawling pegs and crawling bands
7) Limited Flexibility
8) Other Managed floating
9) Independently floating

² For the main results Ghosh *et al.* (1997) consider these three categories, which were disaggregated in nine categories for the robustness tests.

We have two major criticisms of Classification One. The first is the treatment of “crawling pegs and bands”. In Classification One these appear in the Intermediate category, presumably on the grounds that the authorities are not wedded to a fixed parity. It only takes a moment’s reflection to recognise that pegs only crawl *because* of a significant inflation problem. Classifying crawling pegs differently from other pegs is therefore likely to create a type of “classification endogeneity” in any test of the ERR/inflation relationship, whereby pegs with high inflation become categorised as non-pegs. Our second criticism of Classification One is that it makes no distinction between “soft” and “hard” pegs, although theory suggests that inflation rates may be quite different in the two categories (and empirical evidence supports this hypothesis - Bleaney and Fielding (2002) find a highly significant CFA effect). The distinction between soft and hard pegs (such as currency unions or currency boards) was not made in the IMF classification until December 31st 1997, but it is not difficult to reconstruct the category for previous years.

The third and last classification (Classification Three) represents the highest degree of disaggregation given the possibilities offered by the IMF report. It contains nine categories: no separate legal tender, currency board, peg to a single currency, peg to other single currency, peg to a composite of currencies, crawling peg and bands, limited flexibility, managed floating and independently floating. There may be relatively few countries in some of these disaggregated categories in any particular year.

The source for the classification of the exchange rate regime for each country was the IMF Annual Report on Exchange Arrangements and Exchange Restrictions. The layout of these reports has been changing over the years, which makes it difficult to create a consistent criterion for grouping all the countries over the years on exchange rate regime categories. Details of how we dealt with these issues appear in the Appendix.

4. Data and Descriptive Analysis

The countries in the sample are the low (\$755 or less), lower-middle (\$756-2,995), and upper-middle-income countries (\$2,996-9,265) according to the classification by the World Bank based on 2000 GNI per capita. From this first group of countries the sample was refined by the exclusion of the transition economies since their inflation pattern is influenced by other circumstances. Other countries which experienced periods of war or with incomplete data were also removed.

Annual data on macroeconomic variables are taken mainly from World Bank Development Report 2000. Since data were available until 1998 the series were extended with IMF Reports data.

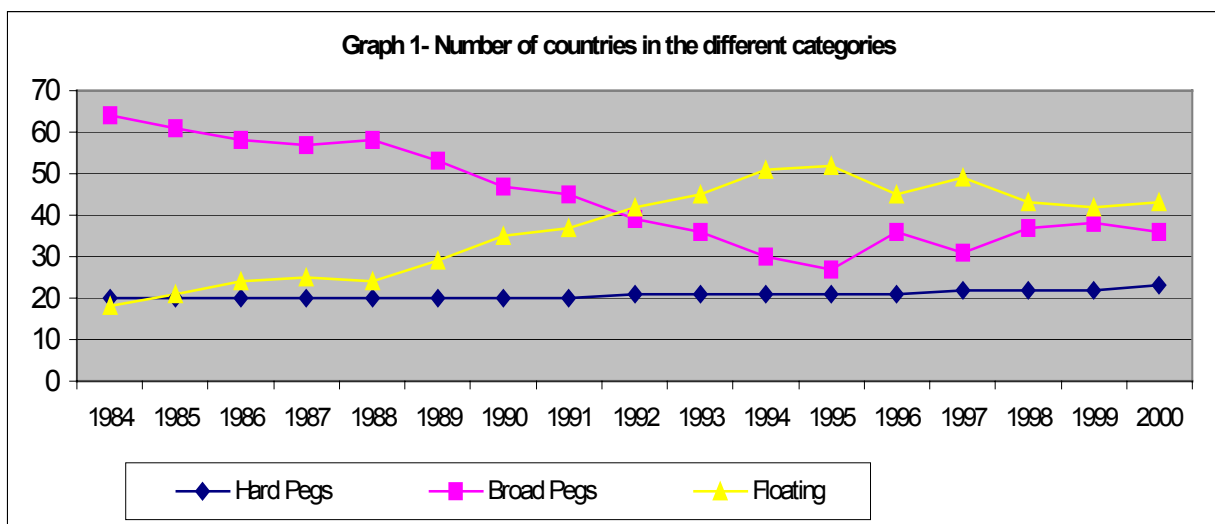
Deficit is the overall budget deficit including grants (%GDP). GDP per capita is the natural logarithm of GDP at constant 1995 US\$ divided by population.

Central Bank turnover data (frequency of change of Central Bank Governor) as a proxy for Central Bank independence comes from Jan Egbert and Jacob de Haan (2001).

To deal with the outlier problem we first transform the change in the logarithm of the consumer price index (π) into “transformed inflation” ($\pi/(1+\pi)$). This is a common practice to reduce the outlier effects of high-inflation observations, since it has a maximum of one, but makes little difference at low inflation. The same transformation was applied to money growth. In addition we explore the effect of excluding a group of high-inflation countries, which are defined as those with average inflation rates greater than 25% or with inflation in any one year greater than 170%. In general, to save space, we present results using only the subsample of countries (excluding this group); our findings are in fact similar for the whole sample.

Graph 1 shows the evolution of exchange rate regimes over time, using Classification Two. Broad Pegs have steadily declined in importance. In 1984 this was the dominant regime (62.7% of the sample, against 19.6% Hard Pegs, and 17.6% Floating regimes). From 1984 to 1995, 37 countries out of 102 abandoned Broad Peg

regimes. On the other hand Floating regimes have been the most frequently adopted: 34 countries adopted Floating regimes in this period. After 1995 this tendency was reversed: 9 countries switched to Broad Pegs (more precisely to Crawling Pegs and Bands and Pegs to a Single Currency), and 9 left Floating regimes.

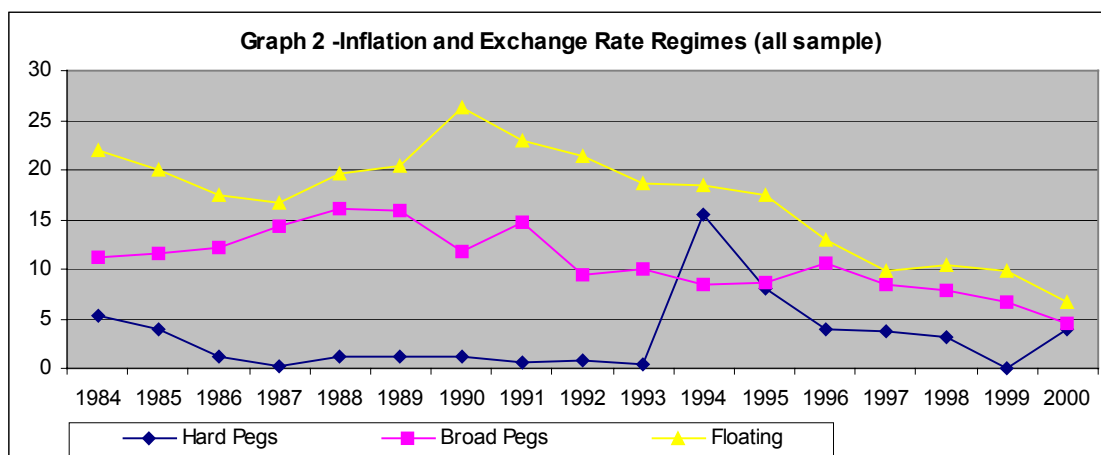


Peg to a Composite of Currencies was the regime most abandoned over the period, comprising 30 countries in 1984 and only 8 in 2000. Until 1995 this regime had a weight of around 50% in the Broad Pegs regimes. On the other hand Independently Floating, which was chosen by six countries in 1984, represented 26 countries in 2000. The number of countries classified as Hard Pegs is virtually unchanged over this period.

Inflation rates in developing countries began to decrease after 1990, except for 1994 when inflation increased considerably as a result of the devaluation in the CFA Zone. Since then inflation has been decreasing sharply all over the years.

Hard Peg is the category with lowest inflation over the period, with the exception of 1994 when the CFA Zone devalued (Graph 2). The average inflation 1984-2000 was 3.3% for Hard Pegs, 11.26% Broad Pegs and 16.52% for Floating regimes for the whole sample, and 3.05%, 7.9% and 10.17% respectively for the subsample.

Floater always have higher inflation than Broad Pegs, but the differential is highest during 1990-1995. This is also true for the subsample. In the 1990s inflation has decreased in both regimes, but the decrease is larger for Floating regimes.



A more detailed analysis arises from Classification Three (Graph 3). The categories with highest average inflation during 1984-2000 are Crawling Pegs and Bands and Floating regimes (around 18% and 12% for the whole sample and subsample respectively). Managed Floaters and Peg to a Single Currency have a similar inflation performance.

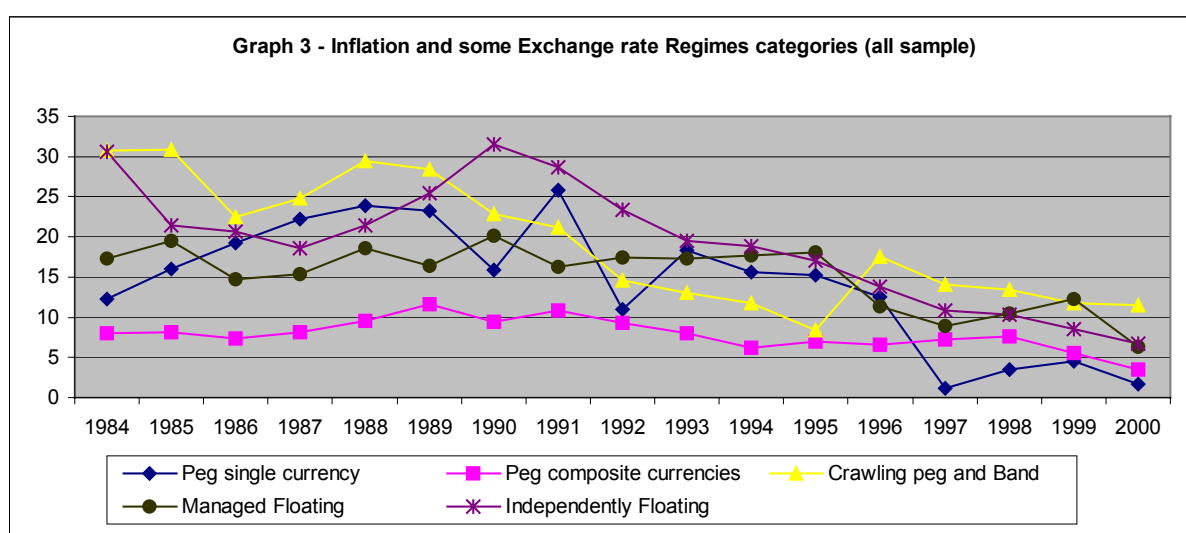
Disaggregating the Floating category into Managed and Independently Floating, it can be observed that after 1995 there is almost no difference between them, but in the 1989-1992 period Independently Floating experienced on average 10 pp higher inflation. Amongst the Broad Pegs, Peg to a Composite of Currencies has the lowest level of inflation until 1997. The average inflation for all the period was around 7pp lower compared to Peg to a Single Currency. This category also has the lowest level of variance.

In general, in all exchange rate regimes inflation has followed a similar trend: an increase at the end of 1980s and a decrease through the 1990s, with the exception of a few years, such as the Crawling Pegs in 1996, the Hard Pegs in 1994 and the Peg to a Single Currency in 1998 and 1999.

The difference between the maximum and minimum level of inflation across different exchange rate regimes decreased significantly after 1990, because the regimes with higher inflation rates decreased their levels significantly. After 1994 the difference became even narrower with the increasing inflation in Hard Pegs.

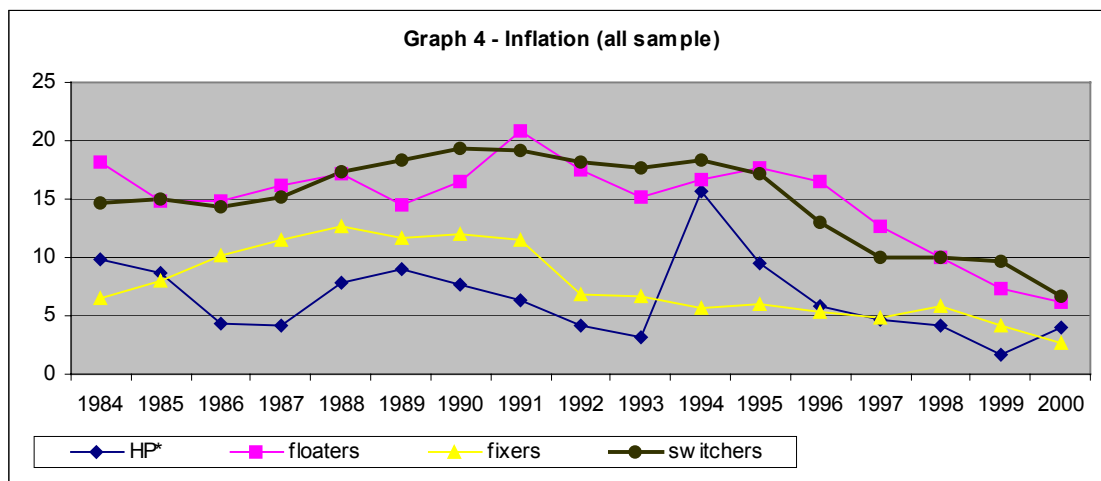
After 1996 there is a convergence in inflation levels across the different exchange rate regimes. That convergence happens mainly because of a decrease in inflation in Floating regimes and Crawling Bands and Pegs. The standard deviation of inflation across different exchange rate regimes decreased after 1990 and stabilized after 1994.

Although after 1996 the difference in inflation across different exchange rate regimes became smaller in absolute terms (all regimes have lower inflation, with the exception of the Hard Pegs) the proportional difference remains the same as in the 1980s. 1990-1995 corresponds to the period when the proportional difference in inflation performance between different exchange rate regimes is highest.



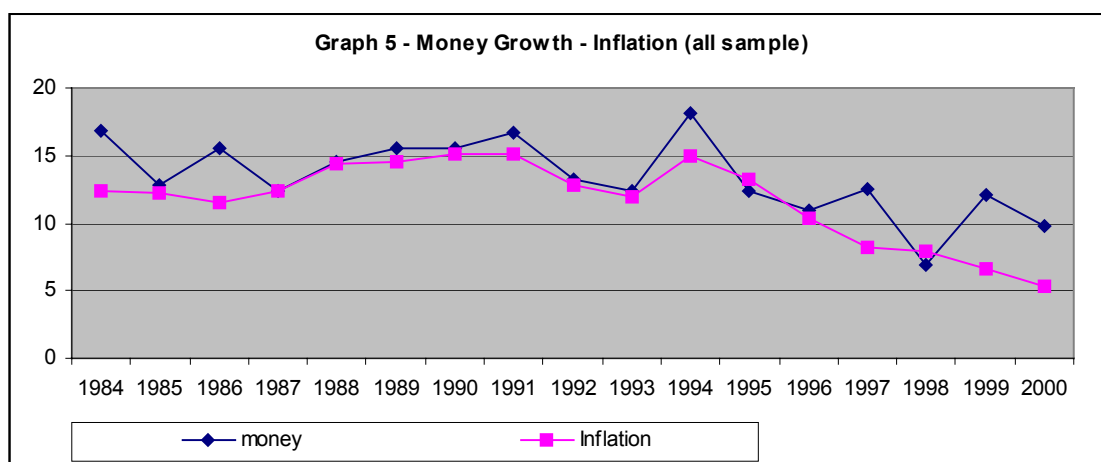
Some countries stayed on the same regime throughout the period and some switched regime. We split the countries into four categories: those which were on a Hard Peg in at least one year (Hard Peggers); those that were on a broad peg for every year or every year but one (Fixers); those that floated in every year or every year but one (Floaters); and the remainder (Switchers). The Switchers and the Floaters have higher inflation levels when compared with Fixers and Hard Peggers (Graph 4). Hard Peggers have the lowest inflation rate with the exception for 1994. Floaters always have higher inflation than Fixers, around 7.2 pp and 3.9 pp higher for the whole sample and the subsample respectively. Dividing Switchers into those currently floating (SWFloat) and those currently pegging (SWBP), we see that SWFloat and SWBP have a quite similar

performance, apart from 1990-1994 period when SWFloat has noticeably higher inflation. Separating Switchers according to the number of switches, for the whole sample, the countries that switched three times or more had 10.5 pp higher average inflation than the ones that never switched, around 5 pp more than the ones that switched once and more than 3 pp than the ones that switched twice. For the subsample these differences are smaller, but the pattern is the same.



Money Growth

Money growth and inflation have been following the same trend, but the relation between them is closest during the 1980s and early 1990s (graph 5). In 1994, 1997 and 1999 and 2000 money growth is considerably higher than inflation. Considering the whole sample, it can be seen that in the 1990s money growth has been decreasing with the exception of 1994.



Comparing both variables across exchange rate regimes, it can be observed that money growth and inflation moved more closely together with floating regimes than with Hard Pegs or Broad Pegs. Across all categories the Fixers are the regime where the difference between money growth and inflation is highest.

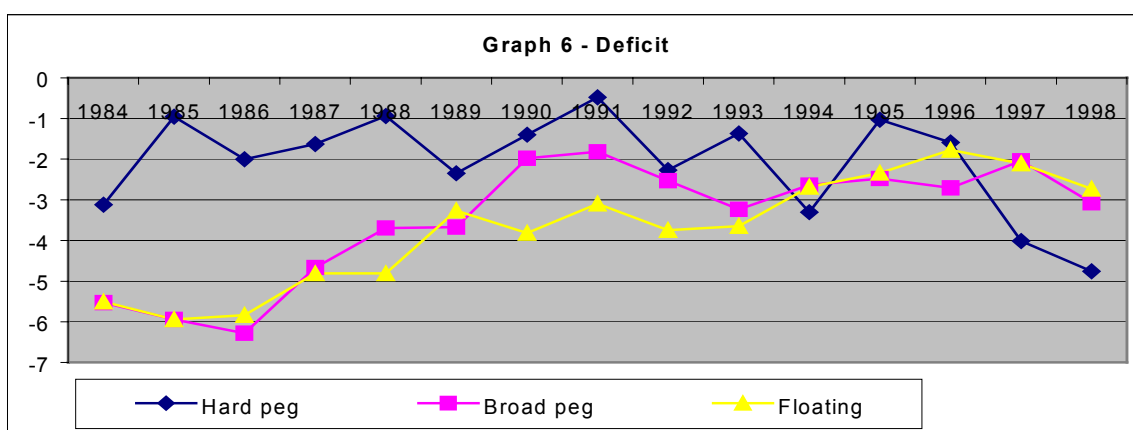
The relationship between money growth and exchange rate regimes is the same as the relation between inflation and exchange rate regimes. The Floating regimes have the highest and the Hard Pegs the lowest levels of money growth, with the exception of 1994. Until 1996, Floating regimes had on average 7 pp higher money growth rates than Broad pegs, the difference between them being highest in 1990-1995 period.

After 1995 the money growth rates across the exchange rate regimes converge. Again, this is because of a consistent decrease in Floating regimes and an increase in Hard Pegs during the 1990s. The Broad Pegs decreased their rate of money growth in late 1990s to a much smaller degree than the Floating regimes.

Amongst the Broad Pegs, until 1997, Peg to Composite of Currencies have lower money growth than the others, and Crawling Peg and Band the highest. Independently Floating and Managed Floating have almost the same levels of money growth, with the exception of 1989-1991 period, when Independently Floating had around 10pp higher.

Floater and Switchers have the highest and the Hard Pegs the lowest levels of money growth. However after 1994 this last category increased its money growth rate considerably.

Floating and Broad Peg regimes have decreased their budget deficits until 1996 (graph 6), when they started an increasing trend (data is available until 1998). They follow a similar decreasing trend with the exception of the 1990-1993 period when Floaters have a slightly higher deficit. Hard Pegs are the category with the smallest deficit until 1996, but with fluctuations in the 1990s.



Across all exchange rate regimes it can be observed that Peg to a Single Currency and Managed Floating have the highest deficit levels. Managed Floating has almost a linear decreasing trend, but the Peg to a Single Currency has a big increase in deficits from 1991 to 1994; in 1992-1995 Peg to a Single Currency have the highest level. Amongst Broad Pegs, Crawling Band and Pegs have the lowest deficits and in 1990-1995 have the lowest compared to all exchange rate regimes. During the 1980s after Hard Heds, Floating regimes were the ones that perform best.

Fixers have experienced decreasing growth rate during the 1990s. After 1996 all regimes (switcher, floaters and fixers) have had decreasing GDP growth rates.

5. Empirical Analysis

The results presented here are only for the subsample (excluding high-inflation countries) and using Classification Two. The regressions were run for two subperiods 1984-1995 and 1996-2000, to allow for the apparent differences between these two periods highlighted in the previous section. All the regressions contain year dummies (taking the value one in a particular year and zero in other years), so as to prevent the results being distorted by shifts in average inflation rates and in the popularity of exchange rate regimes over time.

Table 2 shows that Hard Pegs were associated with significantly lower inflation on average than Broad Pegs (the omitted category), whilst Floating was associated with significantly higher inflation. Although the differences are smaller for 1996-2000, they are still statistically significant.

In Tables 3 and 4 the sample is subdivided into those countries that stuck to the same regime throughout, and those that switched regime. In Table 3 the omitted category is the countries which stayed on a Broad Peg. The results are similar to Table 2, except that the Hard Peg coefficient is closer to zero whilst the Floating coefficient is larger. This indicates that countries which stayed on a Broad Peg tended to have lower inflation than Switchers who happened to be pegged at the time.

Table 4 shows that, of countries that switched between Floating and a Broad Peg, there was no significant difference in inflation rates according to their exchange rate regime in that year.

Tables 5, 6 and 7 present equivalent regressions for narrow money growth. The results are broadly similar to those for inflation, except that Hard Pegs appear to be more different from the rest than was the case for inflation (i.e. the coefficient is more negative, although generally it has a lower *t*-statistic because money growth is more volatile and the standard error of the regression is higher). Again, there is no difference between Switchers currently pegging and those currently floating (Table 7). Broad Peggers and Floaters do not have significantly different money growth rates after 1995, whether or not Switchers are excluded from the regression (Tables 5 and 6).

Table 8 brings out the point that “Fixers” (countries which have stayed on a Broad Peg) have significantly lower inflation than Switchers who are currently pegging (the omitted category in this regression), whilst countries currently Floating do not have significantly higher inflation than the omitted category. What this shows is that the difference in average inflation rates between Floaters and Broad Peggers that emerges from Table 2 is entirely the effect of the Fixers – those who have never left a Broad Peg.

This creates a strong suspicion that, for countries not on Hard Pegs, it is inflation that determines ERR choice rather than *vice versa*. With reasonably low inflation, countries are content to stay pegged. With higher inflation, they either float or at least experiment with floating, sometimes switching back to a peg as part of a stabilisation plan, and the ERR which they choose makes no difference to their inflation experience. As mentioned earlier, there is a positive correlation between the number of ERR switches over the period and the average inflation rate of a country, which again suggests that causality runs from inflation to the ERR.

Table 9 uses the Switchers and Floaters sample to test whether central bank independence helps to explain differences in inflation rates. The measure of central bank independence used is the turnover rate of the central bank governor, with a higher turnover rate indicating less independence. The Table shows that inflation is significantly positively correlated with the turnover rate. Table 10 also shows that the Fixers, who have lower average inflation, tend to have lower turnover rates.

6. Conclusions

The theoretical analysis suggested that inflation would be lower in pegs where there are greater constraints on devaluation (pegs are “harder”). We find that hard pegs (no separate legal tender or currency board) are associated with much greater monetary and fiscal discipline. Inflation, money growth rates are all significantly lower for hard pegs than for other exchange rate regimes.

Previous research suggests that soft pegs are associated with lower inflation than floats, and we were able to generate a similar result. Further exploration of the data showed, however, that the real difference is between permanent peggers and the rest (switchers and floaters). The permanent soft peggers have higher inflation than hard peggers but lower inflation than switchers and floaters. Switchers and floaters do not differ significantly in their inflation rates, and switchers currently floating had similar inflation rates to switchers currently pegging. Moreover there was a positive correlation

between the number of regime switches over the period and the average inflation rate. Our interpretation of this is that a soft peg does not act as a significant constraint on monetary growth and inflation. Instead, these variables affect exchange rate regime choice. Countries with low inflation are more likely to stay on a peg. Those with higher inflation either float permanently, or switch between floating and pegging (e.g. because they attempt an exchange-rate-based stabilisation).

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Table 2: Transformed Inflation and Exchange rate regimes

Period: 1984-1995		Period: 1996-2000	
Hard Pegs	-5.418*** (-9.01)	Hard Pegs	-3.418*** (-4.68)
Floating	2.809*** (4.88)	Floating	1.933*** (3.15)
Sample size: 835 R-squared: 0.1846 Standard Error: 6.832		Sample size: 355 R-squared: 0.1773 Standard Error: 5.0916	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs Dependent Variable: Transformed Inflation			

Table 3: Transformed Inflation and Exchange rate regimes (**Switchers excluded from the sample**)

Period: 1984-1995		Period: 1996-2000	
Hard Pegs	-3.606*** (-5.6)	Hard Pegs	-2.129*** (-3.17)
Floating	3.768*** (4.68)	Floating	2.711*** (3.32)
Sample size: 483 R-squared: 0.2018 Standard Error: 6.3716		Sample size: 197 R-squared: 0.2082 Standard Error: 4.2098	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs Dependent Variable: Transformed Inflation			

Table 4: Transformed Inflation and Exchange rate regimes (**Switchers sample**)

Period: 1984-1995		Period: 1996-2000	
Floating	1.426 (1.64)	Floating	0.0586 (0.06)
Sample size: 352 R-squared: 0.0568 Standard Error: 7.1346		Sample size: 158 R-squared: 0.060 Standard Error: 5.8771	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs and Hard Pegs Dependent Variable: Transformed Inflation			

Table 5: Money Growth and Exchange rate regimes

Period: 1984-1995		Period: 1996-2000	
Hard Pegs	-7.242*** (-7.03)	Hard Pegs	-3.459** (-2.01)
Floating	2.443*** (2.47)	Floating	1.760 (1.21)
Sample size: 829 R-squared: 0.1111 Standard Error: 11.686		Sample size: 349 R-squared: 0.0585 Standard Error: 11.919	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs Dependent Variable: Money Growth			

Table 6 Money growth and Exchange rate regimes (Switchers excluded from the sample)

Period: 1984-1995		Period: 1996-2000	
Hard Pegs	-5.683*** (-4.24)	Hard Pegs	-3.982 (-2.51)
Floating	4.65** (2.78)	Floating	2.457 (1.28)
Sample size: 481 R-squared: 0.1238 Standard Error: 13.218		Sample size: 194 R-squared: 0.1121 Standard Error: 9.8268	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs Dependent Variable: Money growth			

Table 7 Money growth and Exchange rate regimes (Switchers sample)

Period: 1984-1995		Period: 1996-2000	
Floating	0.234 (0.22)	Floating	1.829 (0.74)
Sample size: 348 R-squared: 0.0521 Standard Error: 8.8663		Sample size: 155 R-squared: 0.0355 Standard Error: 14.199	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs and Hard Pegs Dependent Variable: Money growth			

Table 8 Transformed inflation and Exchange rate regimes

Period: 1984-1995		Period: 1996-2000	
Hard pegs	-7.418*** (-11.08)	Hard Pegs	-5.302*** (-5.94)
Fixers	-4.126*** (-6.25)	Fixers	-3.134*** (-3.57)
Floating	0.763 (1.17)	Floating	0.064 (0.08)
Sample size: 835 R-squared: 0.2216 Standard Error: 6.6792		Sample size: 355 R-squared: 0.2064 Standard Error: 5.0081	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs that have floated at some time Dependent Variable: Transformed Inflation			

Table 9 Exchange Rate Regimes and Turnover Rates of Central Bank Governors (**Switchers and Floaters sample**)

Period: 1984-2000	
Floating	0.193 (0.29)
Turnover	5.108*** (3.11)
Sample size: 520 R-squared: 0.0757 Standard Error: 6.906	
Dummy years: yes Dropped Exchange rate regime: Broad Pegs and Hard Pegs Dependent Variable: Transformed Inflation	

Table 10. Average Turnover Rate of Central Bank Governors

Average Turnover Rate	1980s	1990s (until 1998)
Fixers	0.1425	0.138
Switchers	0.217	0.198
Floaters	0.3	0.17

APPENDIX

Until 1995 the IMF reports three basic exchange rate arrangements:

a) peg to a single currency distinguishing between i) U.S. dollar, ii) pound sterling, iii) the French franc, iv) peg to other currencies and v) peg to a composite of currencies being indicated when the composite is a Special Drawing Rights (SDR). b) limited flexibility with respect to i) single currency and ii) co-operative arrangements; and c) more flexible arrangements: i) adjusted according to a set of indicators, ii) other managed floating, iii) independently floating.

In the IMF Reports relating to 1997 and 1998 the “Flexibility limited” category does not consider any more the subdivision into “single currency” and “cooperative arrangements”. Amongst the “More flexible arrangements”, the “adjusted according to a set of indicators” disappears, therefore presenting only “Managed floating” category, (which includes what was considered till then as “adjusted according to a set of indicators” and “other managed floating”).

After 1998 IMF reports a more detailed classification considering eight categories: no separate legal tender, currency boards, conventional pegged arrangement (making distinction if it is a single currency or a composite of currencies), pegged exchange rate within horizontal bands, crawling pegs, crawling bands, managed floating with no-preannounced path for the exchange rate (dirty float) and independently floating. Lately, the IMF is aware that *de facto* exchange rate arrangements are different than the one announced by the countries, therefore, now IMF considers *de facto* policies in its classification. For instance, Jordan who in the years 1999 and 2000 had a *de jure* peg to the SRD but a *de facto* peg to the U.S. dollar is classified as peg to a single currency.

Since the construction of the classifications based on IMF Reports are not straightforward, some operations and assumptions had to be done, which were the following.

The crawling peg and bands category was disaggregated from the “Managed floating” category (IMF Report relating to 1996 and 1997). Looking at the countries which we suspect were crawling bands and pegs (Brazil, Chile, Colombia, Costa Rica, Honduras, Nicaragua, Sri Lanka, Tunisia, Turkey, Uruguay and Venezuela), we analysed

the behaviour of the monthly exchange rate which suggest a crawling peg/band behaviour except in the case of Colombia. This classification does not coincide with that of Ghosh *et al.* (1997), which considers that only Chile has a crawling band in the period in analysis.

For 1998-2000 period we assume that currencies maintain the peg as before in order to distinguish peg to a single currency and peg to a composite of currencies, which are aggregated under “Other conventional fixed peg arrangements” category in IMF Reports.

The hard peg categories required the separation of these categories from the pegs to a single currency reported until 1997.

The countries considered as *no separate legal tender* were the following: i) the East Caribbean Common Market (ECCM): Antigua and Barbuda, Dominica, Grenada, St. Lucia and St. Vincent and Grenadines (St. Kitts and Nevis is not considered in the sample); ii) the CFA Franc Zone: the West African Economy and Monetary Union (WAEMU): Benin, Burkina Faso, Côte d’Ivoire, Guinea-Bissau (which became part of French Franc Zone on 1st May 1997), Mali, Niger, Senegal and Togo. The Central African Economy and Monetary Community (CAEMC): Cameroon, Central African Republic, Republic of Congo, Equatorial Guinea and Gabon (although Comoros has the same arrangement with the French Treasury as do the CFA Franc Zone Countries is classified as peg); iii) Panama which adopted the dollar as legal tender in 1904. Considered as *Currency Boards* were Djibouti and Argentina. Argentina set up its currency board in 1991, however since the inflation figure for 1991 will reflect pre-CB events, so the hard peg dummy starts in 1992.

Exchange Rate Regime Classification

Classifications		As Reported by IMF for Exchange Rate Arrangements		
		Till 1995	1996-1997	1998-2000
Classification 1	Pegs	Peg to a single and composite of currencies	Peg to a single and composite of currencies	Other conventional fixed peg arrangements
	Intermediate	Limited flexibility with respect to a single currency and cooperative arrangements and more flexible arrangements adjusted according to a set of indicators (which corresponds to crawling bands and pegs)	Flexibility limited and the crawling bands and pegs subset from Managed floating category	Pegged exchange rate within horizontal bands; Crawling bands and pegs.
	Floating	Other managed floating and independently floating	Managed floating (after excluded the crawling pegs and band) and independently floating	Managed floating with no preannounced path for the exchange rates and independently floating
Classification 2	Hard pegs	Subset from the pegs to a single currency	Subset from the pegs to a single currency	No separate legal tender and currency boards
	Broad Pegs	Peg to a single and composite of currencies, limited flexibility with respect to a single currency and cooperative arrangements, and more flexible arrangements adjusted according to a set of indicators	Pegged to a single and composite of currencies, flexibility limited and the crawling pegs/bands subset from managed floating	conventional peg arrangements, pegged exchange rate within horizontal bands, crawling pegs and bands
	Floating	Other managed floating and independently floating	Managed floating (after excluded the crawling peg/band) and Independently floating	Managed floating with no pre-announced path for the exchange rate and Independently Floating

	Classifications	As Reported by IMF for Exchange Rate Arrangements		
		Till 1995	1996-1997	1998-2000
Classification 3	No separate Legal tender	Subset from Peg to a single currency	Subset from Peg to a single currency	No separate legal tender
	Currency Board	Subset from peg to a single currency	Subset from peg to a single currency	Currency board
	Peg to a single currency (USD, FF, GBP)	Peg to a single currency (report provides information which is the anchor currency)	Peg to a single currency (report provides information which is the anchor currency)	Subset from Conventional Peg arrangements (is assumed that the currency keeps the same anchor)
	Peg to Other Single currency	Peg to a single currency (report provides information which is the anchor currency)	Peg to a single currency (report provides information which is the anchor currency)	Subset from Conventional Peg arrangements (is assumed that the currency keeps the same anchor)
	Crawling Peg/Band	More Flexible arrangements adjusted according to a set of indicators	Subset from Managed Floating according to the analysis of the exchange rate behaviour	Crawling pegs and Bands
	Limited Flexibility	Limited Flexibility with respect to a single currency and cooperative arrangements	Flexibility limited	Pegged exchange rate within horizontal bands
	Managed Floating	Other managed floating	Managed floating after excluded the crawling peg/band	Managed floating with no pre-announced path for the exchange rate
	Independently Floating	Independently floating	Independently floating	Independently floating