POLICY RESEARCH
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# Devaluation in Low-Inflation Economies

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Devaluation — when supported by adequate demand policies — is more effective in low-inflation economies where it is a sporadic event. In low-inflation countries, a 50-percent devaluation typically depreciates the real exchange rate by about 30 percent in the long run, without leading to a permanent increase in inflation.

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## Summary findings

In the current period of "devaluation pessimism," devaluation is often seen as an instrument to accommodate inflation instead of one to change the real exchange rate and support external balance. Kiguel and Ghei argue that such pessimism has in some cases gone too far.

The real exchange rate is an endogenous variable, and whether devaluation can change the real exchange rate depends on other factors. But devaluation is not always evil, say Kiguel and Ghei, and in some cases it can improve macroeconomic performance. It is most effective if it corrects an initial situation where the currency is clearly overvalued. In low-inflation countries, devaluation is less likely to destabilize prices because there is less indexing.

Kiguel and Ghei examine the effect of maxi-devaluation in low-inflation countries on the real exchange rate, inflation, and growth. They use a sample of 33 maxi-devaluations (20 percent or larger) in economies that had low inflation before the devaluation and where the exchange rate had remained fixed for at least three years before the devaluation. Not surprisingly, most of these episodes occurred in the 1950s and 1960s, when fixed exchange rates and inflation were the norm.

The results indicate room for devaluation optimism. The authors find that devaluation is more effective in low-inflation economies where devaluation is a sporadic event — typically, effecting a real depreciation twice as large as that in inflationary economies. In low-inflation countries, a 50-percent devaluation typically succeeds in depreciating the real exchange rate by about 30 percent in the long run, without leading to a *permanent* increase in inflation. The authors also find that growth and exports increase after devaluation. Other findings:

- Countries determined to maintain price stability after devaluation can do so.
- In countries with low inflation that have not devalued for three years, a maxi-devaluation is not likely to move the economy into high inflation. Under most of the "most likely" scenarios, inflation will increase around 3 percentage points (or 35 percent of the original rate of inflation). Under the "best" scenarios, there is an increase in inflation the year before and the year of devaluation, but inflation then falls to a level slightly higher than the level before devaluation.
- Devaluation has a favorable impact on exports.
- The shift to a more flexible exchange-rate regime was not associated with complete loss of control of inflation. In most cases, inflation went up slightly — and in only a few cases (Ecuador, Israel, Mexico, and Zaire) dramatically. But the movement toward greater exchange-rate flexibility was not associated with complete loss of control of inflation. In Pakistan and Rwanda, inflation fell, and in most countries it averaged less than 20 percent.

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# DEVALUATIONS IN

# LOW INFLATION ECONOMIES

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and

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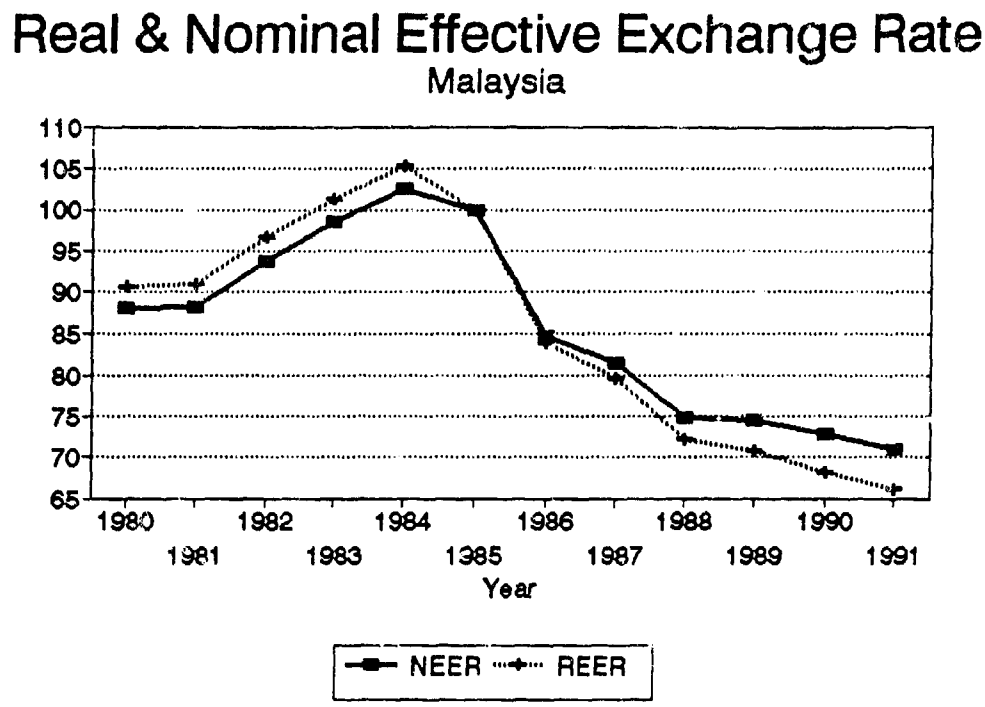
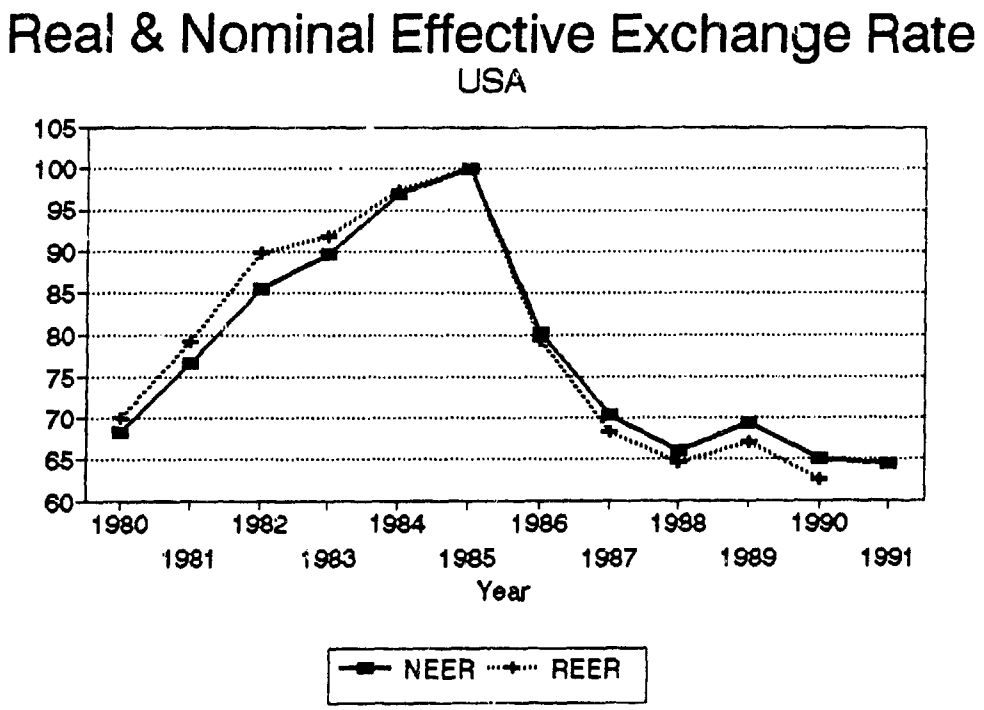
## I. Are Devaluations Effective in Changing the Real Exchange Rate?

We live in a period characterized by devaluation pessimism. As the world became more tolerant of inflation, following the collapse of the Bretton Woods era, inflation rates have been higher, and maxi-devaluations have been more frequently eroded by increases in domestic prices. Devaluations are now seen more often as an instrument to accommodate inflation instead of one that can be effective in changing the real exchange rate and support external balance. Recent empirical work on this topic by Kamin (1988) and Edwards (1989) by and large support this view. But is this skepticism about devaluations right? Has it always been this way?

In this paper we will argue that the new pessimism has gone too far, and that in fact there are numerous cases in which devaluations did, and will continue to work. We recognize that the real exchange rate is an endogenous variable, and that the effectiveness of devaluations to change the real exchange rate depends on other things. However, devaluations are not always evil, and that there are cases in which they can improve macroeconomic performance. Besides, in low inflation economies devaluations are less likely to destabilize prices because there is less indexation. Krugman (1991), in a recent illuminating paper shows that during the period of flexible exchange rates in the United States, movements in the real exchange rate have followed, almost one to one, changes in the nominal exchange rate (as shown in figure 1.a). Inflation did not increase in response to the nominal depreciations. Likewise, Malaysia is a good example of a low inflation developing country where movements in the real effective exchange rate mimic changes in the nominal rate. In addition, there are many examples of

**FIGURE 1**


Real & Nominal Effective Exchange Rate
Malaysia
110
105
100
95
90
85
80
75
70
65
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
Year
NEER
REER


Real & Nominal Effective Exchange Rate
USA
105
100
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1980
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Year
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REER

successful maxi-devaluations in developing countries during the years of the Bretton Woods system, such those of the Philippines in 1962, Venezuela in 1964 and India in 1966. In these episodes devaluations were effective in changing the real exchange rate without leading to a permanent increase in inflation. What explains the difference in the effectiveness of devaluations?

Part of the difference lies in the fact that a real depreciation was probably needed in these episodes. Real depreciations are required to deal with deteriorations in terms of trade, and are likely to result from a reduction in the budget deficit. The difference in outcome also lies in the longer term commitment to the fixed exchange rate system and low inflation. In this paper we examine the effect of maxi-devaluations on basic macroeconomic variables such as the real exchange rate, inflation, growth, etc. We use a restricted sample of 33 maxi-devaluations (20% or larger) in economies that had low inflation prior to the devaluation. In addition, in order to concentrate on episodes in which devaluations were an infrequent event, we imposed the constraint that the exchange rate had remained fixed for at least three years before the devaluation. Not surprisingly, most of these episodes occurred in the fifties and sixties, when fixed exchange rates and the inflation were the norm. We analyze the outcomes of these episodes using a methodology similar to Kamin.

Our results indicate that there is room for devaluation optimism. We find that devaluations are much more effective in low inflation economies where devaluations are a sporadic event, typically, they succeed in effecting a real depreciation which is twice as large as in inflationary economies. In low inflation economies, a 50% devaluation typically succeeds in depreciating the real exchange rate by about 35% in the longer term, without leading to a permanent increase in inflation. In addition, we find that growth and exports

increase after the devaluation, a result also found in previous studies.

The remainder of this paper will be organized as follows. We first present in more detail the evolution of some key macroeconomic variables after the devaluation. We compare our findings with those obtained for the broader sample of high and low inflation economies. In the next section we briefly trace the evolution of macroeconomic variables in these countries once they moved away from the fixed exchange rate. The purpose of this exercise is to examine whether the movement to exchange rate flexibility (usually through the adoption of a crawling peg) was associated with a permanent increase in inflation and worse overall macroeconomic performance. The experience in this area appears to be mixed, and not surprisingly, much depends on the way the policy makers manage basic macroeconomic policies, and how much commitment they had to the fixed exchange rate. We conclude with some reflections on the empirical findings presented in this paper.

## II. The Experience With Devaluations in Low Inflation Economies

### 1. Sample of Devaluations

We consider two groups. Group A consists of thirty three maxi-devaluation episodes between 1950 and 1990, most of them in developing countries (see table 1).[1] In all cases the nominal devaluation was 20 percent or larger. Thirty one devaluations were within the 20 to 140 percent range, with two outliers with 200 percent devaluations. We restricted the sample to low inflation economies (rates of inflation below 10%) which had not devalued three years prior and three years after the devaluation episode that we consider. This allows us to concentrate on episodes where one time

[1] The exceptions are France and Finland, two industrialized countries.

devaluations can be perceived as such, and have a good chance of having a lasting impact on the real exchange rate. In most of the cases though, no other devaluation took place over a seven year period. In some instances, e.g. Greece (1953), and Verezuela (1964), among others, the exchange rate remained fixed for over two decades.

The second group, group B, includes in addition to all the episodes presented in group A episodes in which there was another devaluation or a change to a crawling peg regime within three years of the initial devaluation.

We evaluate the effectiveness of the devaluation by comparing the evolution of key macroeconomic variables before and after it. In particular, we look at the extent to which the devaluation succeeded in changing the real exchange rate in the longer term, and whether it had any permanent effects on inflation, growth, export performance and on the holding of international reserves.

## 2. The Received Wisdom

We use Kamin (1988) study as the benchmark. His results are based on a sample of 50 to 90 (depending on data availability for different variables) devaluation episodes effected between 1953 and 1983. The minimum size of the devaluation was 15 percent. The methodology in that paper was to trace the evolution of some selected variables for seven years; the year of the devaluation (time T), three years before and three years after. Kamin explains the methodology in this way: "The value of the indicator for each year was then averaged (unweighted) with the corresponding values for every other devaluation episode in the sample. The result is the average, or stylized, time profile for that indicator over the course of the typical devaluation episode. In aggregating across episodes, both mean and median

averages were calculated." (p.7)

We can summarize the findings of his study as follows: **i.** devaluations on average had a small impact on the real exchange rate in longer term (i.e. after three years), with an average real depreciation between T and T-3 of 12% and a median of 9%; **ii.** inflation clearly increases relative to the rate prevailing three years prior to the devaluation (on average, by 10 percentage points, or 60% of the rate of inflation prevailing at T-3), the average increase is smaller when comparing T and T-3; **iii.** devaluations have a favorable impact on growth in the short term, there is an expansion relative to the year prior to the devaluation (devaluations thus appear to be expansionary in the short run). In the longer term, however the evidence is mixed. On the external accounts, export performance improves, but the strongest finding are for the first two years after the devaluations, the longer term effects are mixed. He also finds that there is some improvement in the trade balance immediately following the devaluation. This effect, however, is reversed and by the third year. Not surprisingly, he finds that reserves improve.

How likely are countries to be in group A or B? Based on the sample that we have, there is a 30% percent probability that a country that devalues once, will either effect another devaluation or move to a crawling peg within three years. This means that in most cases, countries that are determined to maintain price stability after the devaluation can succeed in doing so.

TABLE I(a)
MAXIDEVALUATION EPISODES
(low inflation only)

| COUNTRY | DEVALUATION | | |
|---|---|---|---|
| | YEAR | SIZE | NEXT |
| Ecuador | 1961 | 20.00 | 9 |
| Tunisia | 1957 | 20.00 | 7 |
| New Zealand | 1967 | 23.36 | 6 |
| Tunisia | 1964 | 23.81 | 11 |
| Egypt | 1962 | 23.91 | 17 |
| Sri Lanka | 1967 | 24.15 | 5 |
| Costa Rica | 1974 | 28.87 | 7 |
| Peru | 1958/59 | 28.89 | 9 |
| Finland | 1967 | 30.43 | 9 |
| Nepal | 1967 | 32.94 | 8 |
| Colombia | 1962 | 34.33 | 3 |
| France | 1957/58 | 36.81 | 11 |
| Venezuela | 1964 | 38.20 | 20 |
| Ecuador | 1970 | 38.89 | 12 |
| Finland | 1957 | 38.96 | 10 |
| Pakistan | 1955 | 43.17 | 18 |
| Peru | 1967 | 44.30 | 8 |
| Mexico | 1954 | 44.51 | 22 |
| Trinidad & Tobago | 1985 | 50.00 | 3 |
| India | 1966 | 58.66 | 8 |
| Syria | 1954 | 63.47 | 8 |
| Israel | 1962 | 66.67 | 5 |
| Burundi | 1965 | 75.00 | 11 |
| Egypt | 1979 | 78.89 | 10 |
| Jamaica | 1978 | 86.45 | 5 |
| Philippines | 1962 | 94.06 | 8 |
| Greece | 1953 | 100.00 | 22 |
| Rwanda | 1966 | 100.00 | 8 |
| Pakistan | 1972 | 130.15 | 10 |
| Colombia | 1957/58 | 134.11 | 4 |
| Iran | 1955 | 134.88 | 26 |
| Zaire | 1967 | 203.03 | 9 |
| Israel | 1953/54 | 257.78 | 8 |

*Notes*

Exchange rate is defined as local currency/US $
Next devauation: number of years until the next devaluation
No number for a maxi-devaluation accompanying a CERR

TABLE 1(b)
ALL MAXIDEVALUATION EPISODES
(Including those accompanying a CERR)

| COUNTRY | DEVALUATION | | |
|---|---|---|---|
| | YEAR | SIZE | NEXT |
| Sri Lanka | 1975 | 15.24 | .. |
| Ecuador | 1961 | 20.00 | 9 |
| Tunisia | 1957 | 20.00 | 7 |
| Israel | 1971 | 20.00 | 3 |
| Tunisia | 1981 | 23.16 | .. |
| New Zealand | 1967 | 23.36 | 6 |
| Tunisia | 1964 | 23.81 | 11 |
| Egypt | 1962 | 23.91 | 17 |
| Sri Lanka | 1967 | 24.15 | 5 |
| Costa Rica | 1974 | 28.87 | 7 |
| Peru | 1958/59 | 28.89 | 9 |
| Pakistan | 1982 | 29.70 | .. |
| Finland | 1967 | 30.43 | 9 |
| Burundi | 1983 | 30.48 | .. |
| Ecuador | 1982 | 32.60 | .. |
| Nepal | 1967 | 32.94 | 8 |
| Colombia | 1962 | 34.33 | 3 |
| France | 1957/58 | 36.81 | 11 |
| Venezuela | 1964 | 38.20 | 20 |
| Ecuador | 1970 | 38.89 | 12 |
| Finland | 1957 | 38.96 | 10 |
| Israel | 1974 | 42.86 | .. |
| Pakistan | 1955 | 43.17 | 18 |
| Peru | 1967 | 44.30 | 8 |
| Mexico | 1954 | 44.51 | 22 |
| Trinidad & Tobago | 1985 | 50.00 | 3 |
| Philippines | 1981 | 52.68 | .. |
| India | 1966 | 58.66 | 8 |
| Syria | 1954 | 63.47 | 8 |
| Philippines | 1970 | 63.74 | 11 |
| Israel | 1962 | 66.67 | 5 |
| Peru | 1975-76 | 70.44 | .. |
| Venezuela | 1984 | 74.42 | .. |
| Burundi | 1965 | 75.00 | 11 |
| Egypt | 1979 | 78.89 | 10 |
| Jamaica | 1983 | 84.00 | .. |
| Jamaica | 1978 | 86.45 | 5 |
| Philippines | 1962 | 94.06 | 8 |
| Greece | 1953 | 100.00 | 22 |
| Rwanda | 1966 | 100.00 | 8 |
| Pakistan | 1972 | 130.15 | 10 |
| Colombia | 1957/58 | 134.11 | 4 |
| Iran | 1955 | 134.88 | 26 |
| Argentina | 1955 | 158.23 | .. |
| Zaire | 1967 | 203.03 | 9 |
| Israel | 1953/54 | 257.78 | 8 |
| Costa Rica | 1981 | 321.12 | .. |

*Notes*

Exchange rate is defined as local currency/US $
Next devaluation: number of years until the next devaluation
No number for a maxi-devaluation accompanying a CERR

## 3. The Impact of Devaluations

### 3.a the Real Exchange Rate

The first question that we address is how effective are devaluations in changing the real exchange rate in low inflation economies[2]. The evolution of the mean and median of this variable for 33 devaluation episodes included in group A is shown in table 2.a. This sample is restricted to countries that did not devalue three years before and three years after the devaluation. In the typical episode the real exchange rate appreciates prior to the devaluation and then depreciates. On average devaluations were an effective instrument for changing the real exchange rate, as they succeeded in effecting a 32% real depreciation between T-1 and T+3. Our results indicate that devaluations are more powerful instruments for changing the real exchange rate than the works of Kamin (1988) or Edwards (1989) suggest. Their works indicate that during the same time span devaluations changed the real exchange rate between 10 and 14%.

The main reason for the difference is that we concentrate on low inflation economies, where prices and wages are more sticky and hence devaluations have a better chance of changing relative prices. The problem with restricting our analysis to group A episodes is that it can be argued that we were are only evaluating successful episodes. Countries did not have to devalue again precisely because the initial devaluation was successful.

The broader sample, group B, allows to answer the following question: what happen to the real exchange rate if we consider countries that did not devalue during the three years prior to time T, but that either maintained a

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[2] The real exchange rate is defined as $EP^*/P$, where E, the nominal exchange rate is in local currency per US dollar. A depreciation is represented by an increase and an appreciation by a decrease in the real exchange rate.

fixed exchange rate or had one or more devaluations (or shifted to a crawling pet) within the period T, T+3. The outcomes of this exercise are shown in table 2.b. While the means and medians are slightly larger, the results are not significantly differently (neither statistically or quantitatively). The main difference, as expected, is that countries that followed more aggressive exchange rate policies (i.e. devalued more often) were able to effect larger real depreciations.

TABLE 2
The Real Exchange Rate

a. Group A

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (%) (T+3,T-3) | Difference (%) (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 87.08 | 81.72 | 107.23 | 104.98 | 24.68 | 32.11 |
| Median | 83.50 | 70.25 | 101.44 | 96.8 | 14.68 | 24.70 |
| T-Statistic | -- | -- | -- | -- | 5.02* | 6.34* |

b. Group B

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (%) (T+3,T-3) | Difference (%) (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 89.51 | 85.82 | 112.33 | 116.02 | 31.90 | 36.80 |
| Median | 89.83 | 84.81 | 101.5 | 102.55 | 21.43 | 24.82 |
| T-Statistic | -- | -- | -- | -- | 5.53* | 6.68* |

* Significant at the 5% level
** Significant at the 10% level

How much of the initial devaluation is eroded by increases in domestic prices? We address this issue by running a regression between the change in the real exchange rate and the size of the nominal devaluation. We first get the estimates for episodes in group A. For this group we calculate the estimates for the entire sample, excluding the two outlying observations where the nominal devaluation exceeded 200 percent. The remaining 31 observations

were split into two sub-samples, depending on whether the devaluation was greater or smaller than 50 percent. The results of the regression are shown in table 3.a.

TABLE 3.a
Results of Regressions
Dependent Variable: DRER(T+3,T-1)

| Regressor | Sample 1 (all) | Sample 2 ( <= 50 %) | Sample 3 ( >= 50 %) |
|---|---|---|---|
| Constant | -9.55<br>(-1.73) | -3.93<br>(-0.39) | -0.94<br>(-0.04) |
| Devaluation | 0.73<br>(8.76) | 0.52<br>(1.70) | 0.65<br>(2.92) |
| $R^2$<br>DW | 0.72<br>2.23 | 0.52<br>1.70 | 0.65<br>2.30 |

The results indicate that in countries where devaluations are an infrequent event, around 60% of the nominal devaluation is not eroded by increases in domestic prices.

Table 3.b
Results of Regressions
Dependent Variable: DRER(T+3,T-1)

| Regressor | Sample 1 (all) | Sample 2 ( <= 50 %) | Sample 3 ( >= 50 %) |
|---|---|---|---|
| Constant | -3.88<br>(-0.47) | 47.78<br>(2.07) | -20.40<br>1-1.1 |
| Devaluation | 0.72<br>(5.72) | -0.95<br>(-1.31) | 0.91<br>(4.94) |
| $R^2$<br>DW | 0.42<br>1.20 | 0.03<br>1.40 | 0.56<br>1.26 |

We then extend the analysis for Group B, and found that while maxi-devaluations (in excess of 50%) continue to be effective, smaller devaluations (between 20 and 50%) are now eroded by increases in domestic prices (in fact the coefficient is negative, though not statistically significant). This

indicates that, a priori, small devaluations are more likely to be eroded than large ones.

3.b Inflation

A key question is whether devaluations lead to a permanent increase in inflation. We address this issue examining the experiences of groups A and B. This split of the sample is useful, with group A providing the "best" and group B the "most likely" scenarios.

The results for group B (shown in table 4.b) indicate that inflation is likely to rise by about 3 percentage points (from 8% at T-1 to 11% at T+3). The increase is somewhat larger (3.5 percentage points) and statistically significant if we compare T-3 to T+3. What these results indicate is that if we look at countries that have low inflation and have not devalued for three years, a maxi-devaluation is not likely to move the economy into high inflation. In most cases, inflation is going to increase around 3 percentage points (or 35% relative to the original rate of inflation).

The results for Group A are, not surprisingly, more favorable regarding inflation. Table 4.a shows that the changes in inflation are small and not statistically significant. Based on the t-tests, we cannot reject the hypothesis that the change in inflation is zero over the period under consideration. In other words, the results obtained indicate that the devaluation did not significantly change inflation in the longer term. Nonetheless, we observe an increase in inflation in the year prior to devaluation and, of course, in the year of the devaluation. Inflation then falls to a level that is slightly higher than the one prior to the devaluation.

TABLE 4
Inflation

a. Group A

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (%) (T+3,T-3) | Difference (%) (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 5.69 | 6.99 | 8.01 | 6.33 | 0.72 | -0.62 |
| Median | 3.63 | 4.73 | 5.63 | 5.10 | 1.56 | -0.43 |
| T-Statistic | -- | -- | -- | -- | 0.47 | -0.35 |

b. Group B

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (%) (T+3,T-3) | Difference (%) (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 7.57 | 8.01 | 10.41 | 10.85 | 3.43 | 2.84 |
| Median | 5.85 | 6.28 | 8.36 | 6.44 | 2.67 | 0.57 |
| T-Statistic | -- | -- | -- | -- | 1.71** | 1.38 |

* Significant at the 5% level
** Significant at the 10% level

3.c Growth

The impact on GDP is similar to the one described Kamin's study and is not very different for both groups (see tables 5).[3] GDP typically falls prior to the devaluation (usually the year before), and this is followed by a spurt of growth in time T+1, which tapers off by T+3. The mean exhibits a larger increase than the median. There is no statistical evidence that growth increases in the longer term (T+3) relative to 3 years prior to the devaluation. Using t-tests, we cannot reject the hypothesis that the difference in the rate of growth is zero between time T+3 and T-1 as well as between T+3 and T-3.

[3] Since the results are similar for both groups we only present those for group B, the larger sample. This is also the case for the comparisons that we do later in this section (e.g. exports, international reserves, etc.).

TABLE 5
Rate of Growth of Real GDP
a. Group A

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (T+3,T-3) | Difference (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 4.40 | 4.17 | 4.93 | 4.89 | 0.62 | 0.73 |
| Median | 5.13 | 5.10 | 4.40 | 5.08 | 0.71 | 0.70 |
| T-Statistic | -- | -- | -- | -- | 1.09 | 1.08 |

3.d Exports

We examine this issue by comparing the evolution of the ratio of exports to GDP before and after the devaluation. The results for group B are shown in table 6. We find that the ratio of exports to GDP, on average, falls prior to the devaluation and then rises. Exports, as a proportion to GDP rise for both time periods, (T+3,T-3) and (T+3,T-1). However, the null hypothesis that the change in exports is zero cannot be rejected for the time period (T+3,T-3). From the t-statistic obtained, the hypothesis that the increase in exports to GDP is zero for the period (T+3,T-1) cannot be accepted at the 10 percent level of significance. Thus, there is only weak support for the traditional view that devaluations have a favorable impact on exports. The empirical evidence provides no support for the possibility of perverse contractionary effects of devaluation on exports.

TABLE 6
Exports to GDP

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (T+3,T-3) | Difference (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 16.18 | 15.43 | 16.39 | 17.41 | 1.23 | 1.98 |
| Median | 14.30 | 14.13 | 13.53 | 16.95 | 1.20 | 1.68 |
| T-Statistic | -- | -- | -- | -- | 1.75** | 3.20* |

3.e International Reserves

We use the ratio of non-gold reserves to imports to study the impact on the balance of payments for group B (the results are very similar for A). The results shown in table 7 indicate that the ratio of reserves to imports decline prior to the devaluation, reaching its lowest level in the year immediately preceding the devaluation. This ratio rises after the devaluation. By T+3, the ratio of reserves to imports is higner, on average, than it was at time T-3. However, we cannot reject the hypothesis that the difference in the value of the indicator is zero for the time period between T+3 and T-3. The t-test indicates clearly that there is a significant improvement in the reserve position of the devaluing countries by time T+3, relative to time T-1. The data seems to indicate that the maxi-devaluation followed a balance of payments crisis, as reserves fall beyond some minimum acceptable level.

TABLE 7
Reserves to Imports

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (T+3,T-3) | Difference (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 26.36 | 21.12 | 25.5 | 29.84 | 3.99 | 8.72 |
| Median | 19.89 | 15.26 | 17.51 | 25.39 | 7.75 | 9.39 |
| T-Statistic | -- | -- | -- | -- | 1.04 | 3.10* |

3.f Parallel Exchange Rate

The data on reserves suggests that devaluations were effected to deal with balance of payments crisis. This appears to be confirmed by those episodes for which data on the parallel exchange rate is available. At times of balance of payments crisis the premium on the parallel exchange rate tends to rise in anticipation of a devaluation. In table 8 we show the evolution of the premium on the parallel exchange rate (usually illegal) around the period of the devaluation. There is a sharp increase in the parallel premium prior to the devaluation. The premium reaches its peak in the year immediately

preceding the devaluation, and there is a sharp decline after it, which persists till time T+3. The null hypothesis that the change in the parallel premium is zero could not be accepted, using the t-test. For this sample, then, the devaluation was successful in dramatically reducing the size of the parallel premium and maintaining it at the new lower level. This seems to indicate that a large part of the misalignment in the official rate was corrected by the devaluation.

TABLE 8
The Parallel Premium

| Statistic | Level T-3 | Level T-1 | Level T | Level T+3 | Difference (T+3,T-3) | Difference (T+3,T-1) |
|---|---|---|---|---|---|---|
| Mean | 46.76 | 74.71 | 27.17 | 23.20 | -24.09 | -52.02 |
| Median | 33.16 | 52.67 | 18.18 | 6.94 | -8.48 | -37.02 |
| T-Statistic | -- | -- | -- | -- | -3.40* | -3.72* |

## III. ABANDONMENT OF THE FIXED EXCHANGE RATE SYSTEM

Most of the countries in our sample eventually moved out of the fixed exchange rate system, and in most cases they adopted some form of crawling peg. Only Syria and Trinidad and Tobago are still under a fixed exchange rate. Table 9 provides basic information on timing and characteristics of the movement to exchange rate flexibility. There is a first group of countries that shifted between 1973 and 1976, at the time of the oil shocks. This coincides with the end of the Bretton Woods era, and the wider acceptance of greater flexibility on exchange rate management among economists and policy makers. The second shift came in the early eighties, mainly in response to the debt crisis.

Colombia and Egypt are two outliers within this group. Colombia was the first country to move to a crawling (in 1967), largely as a way to avoid the

recurrent cycles in the real exchange rate resulting from rates of inflation that while low, were higher that international levels. Egypt is a late comer to the shift in exchange rate regime, because adjustment was undertaken at a later stage.

In most countries the shift to a more flexible exchange rate regime was accompanied by a maxi-devaluation (usually within a year of the change). As can be noticed from the third column in table 9, the largest one was in Costa Rica (320 percent), though in most cases the devaluations were much smaller. Only six countries shifted to a crawling peg without an initial devaluation.

Was the shift in exchange rate regime was associated with an increase in inflation? After all, the fixed exchange rate served as an anchor for domestic prices and contributed to the maintenance of fiscal prudence and overall macroeconomic stability. The last three columns show the average inflation rate for the three years prior to the devaluation, and three years after.

In most cases inflation went up, and in a few instances the increases were dramatic (e.g. Israel, Zaire, Mexico, and Ecuador). However, the evidence does not indicate that the movement to greater exchange rate flexibility was associated with complete loss of control of inflation. In Pakistan and Rwanda inflation in fact fell, while in most countries it remained on average below 20 percent.

Table 10.a shows average indicators of policy and performance before and after the change of exchange rate system for the full sample. The change of exchange rate regime was effective in achieving a real depreciation (of approximately 16%), both in the medium and long term. Inflation on average increased from 12% before the devaluation to 24% after, and hence remained at moderate levels. In most cases inflation remained in moderate range even the

longer term. The average inflation in these episodes for a period comprising ten years after the devaluation was 26%, with a median of 16%.

It is useful to examine the longer term impact of the change of regime. For this purpose we divide the sample and examine separately the poor performers, e.g. those countries that combined relatively high inflation rates (above 20 percent or higher) and low growth, from the good performers. There were eight countries in the poor performance group, the rest being the good performers. The basic data for each of these groups is presented in tables 10.b and 10.c.

In both groups, the change in exchange rate regime was associated with a depreciation of the real exchange rate. On average, the real depreciation was greater for the "poor" performance countries. Inflation, on average was higher after the change of regime for all countries. It should be pointed out that those countries that lost macroeconomic stability had higher rates of inflations prior to the change of regime. Countries that had inflation below 10% did not lose control over inflation.

Growth was clearly higher in the countries that managed to maintain lower rates of inflations. The size of the budget deficits did not increase significantly after the change of regime in neither group (in fact in most cases they fell), although the magnitudes appear to be high. This indicates hat the change of exchange rate probably motivated by underlying large eficits. However, once the deficits were reduced inflation did not come down (perhaps because it was accommodated by exchange rate policy).

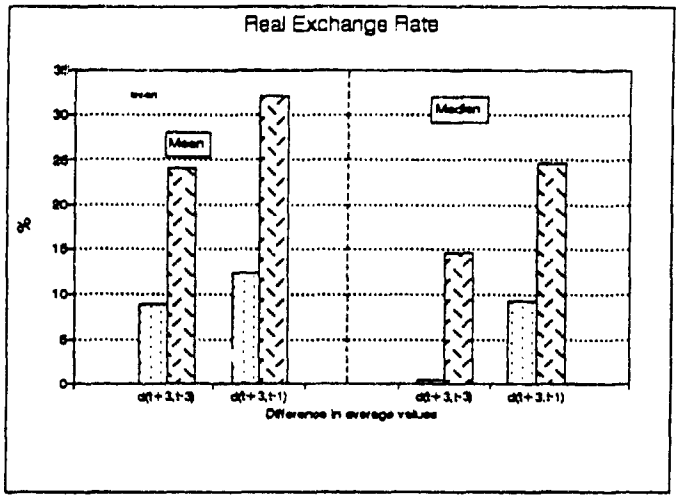
Finally, external indicators convey a mixed message. The resource balance improved for the group as a whole, though the improvement was bigger i the "poor" performance countries (perhaps because of the real depreciation was larger and undertook a larger fiscal adjustment). The average exports to

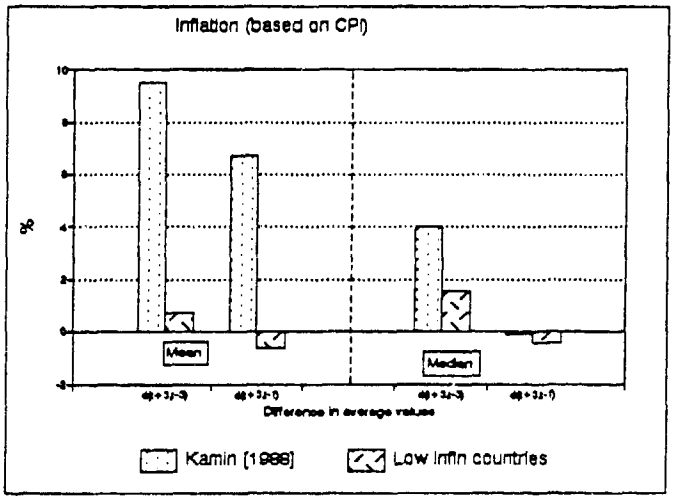
GDP ratio exhibits virtually no change for the entire sample, though the "poor" performers did better in this area.

## IV. FINAL REMARKS

Figure 2 provides a useful summary of the main findings of this paper. This figure summarizes and compares Kamin's results, which based on a larger sample of devaluations, to ours, which concentrates on low inflation economies. There is a clear contrast regarding the effectiveness of devaluations to affect the real exchange rate, with our results providing much more room for devaluation optimism in low inflation economies with a tradition of a fixed exchange rate. The outcome on inflation is also more positive for the low inflation economies, as we do not observe any significant increase in inflation. Finally, both studies find the devaluations have a favorable impact on growth, although the outcome is more lasting in countries that manage to maintain low inflation.

Figure 2


Real Exchange Rate
Mean
Median
%
Difference in average values


Inflation (based on CPI)
Mean
Median
%
Difference in average values
Kamin [1998]
Low inflin countries

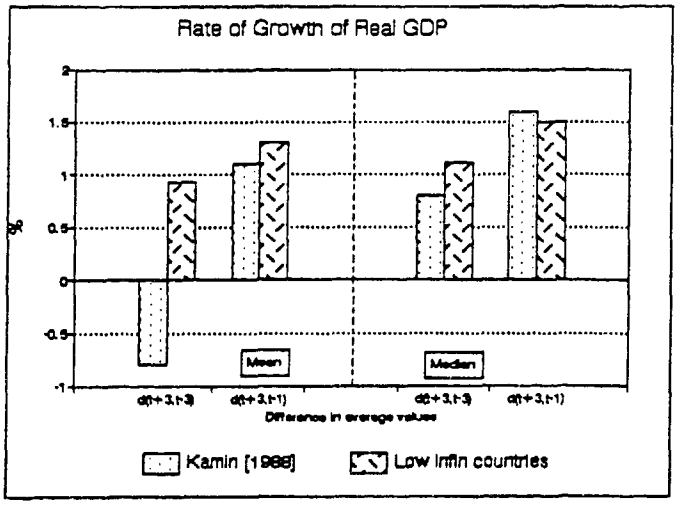

Rate of Growth of Real GDP
Mean
Median
%
Difference in average values
Kamin [1998]
Low inflin countries

TABLE 9
Features of the Change in Exchange Rate Regime

| Country | Year of CERR | CERR with maxi-devaluation (size of maxi-devaluation) | Average Inflation before CERR (%) | Average Inflation after CERR (%) |
|---|---|---|---|---|
| Argentina | 1955 | Yes (158.23%) | 15.50 | 23.24 |
| Colombia | 1967 | No | 13.67 | 7.61 |
| India | 1972 | No | 2.92 | 17.09 |
| Israel | 1974 | Yes (42.86%) | 14.96 | 35.11 |
| Finland | 1975 | No | 11.60 | 11.61 |
| Greece | 1975 | No | 15.58 | 12.67 |
| Peru | 1975 | Yes (54.16%) | 11.20 | 43.13 |
| Sri Lanka | 1975 | Yes (76.26%) | 9.43 | 4.90 |
| Zaire | 19 6 | Yes (72.18%) | 24.59 | 72.92 |
| Iran | 1980 | No | 16.50 | 20.88 |
| Costa Rica | 1981 | Yes (321.12%) | 11.11 | 44.90 |
| Mexico | 1981 | Yes (267.84%) | 20.67 | 75.41 |
| Nepal | 1981 | No | 8.53 | 8.97 |
| Philippines | 1981 | Yes (52.68%) | 14.36 | 23.53 |
| Tunisia | 1981 | Yes (23.16%) | 7.70 | 10.36 |
| Ecuador | 1982 | Yes (32.60%) | 13.25 | 35.88 |
| Pakistan | 1982 | Yes (29.70%) | 10.70 | 6.07 |
| Burundi | 1983 | Yes (30.46%) | 6.76 | 6.63 |
| Jamaica | 1983 | Yes (84.00%) | 15.53 | 22.86 |
| Rwanda | 1983 | No | 8.75 | 2.02 |
| Venezuela | 1984 | Yes (74.42%) | 10.69 | 17.02 |
| Egypt | 1989 | Yes (57.14%) | 20.41 | 16.76 |

Notes:
Average inflation figures are the mean inflation for three years before and after the year od the change of the exchange rate regime. Inflation is based on the CPI (from the IFS).

Table 10.a
Change of Exchange Rate Regime (CERR)
Full Sample

| Indicator | Statistic | Level before CERR | Level three years after CERR | Change in indicator |
|---|---|---|---|---|
| RER | Mean | 95.81 | 112.48 | 17.76 |
| | Median | 97.85 | 103.49 | 5.76 |
| Inflation (%) | Mean | 12.93 | 23.62 | 10.69 |
| | Median | 12.43 | 17.06 | 4.63 |
| | Maximum | 24.59 | 75.41 | .. |
| | Minimum | 2.92 | 2.02 | . |
| Real GDP (% rate of growth) | Mean | 3.90 | 2.88 | -1.02 |
| | Median | 4.35 | 2.68 | -1.67 |
| | Maximum | 9.41 | 10.86 | .. |
| | Minimum | -5.98 | -1.39 | .. |
| Fiscal Deficit/GDP (%) | Mean | 5.11 | 5.01 | 0.69 |
| | Median | 3.19 | 4.81 | 2.27 |
| | Maximum | 17.47 | 17.52 | .. |
| | Minimum | -1.64 | -1.08 | .. |
| Exports/GDP (real, %) | Mean | 16.13 | 16.51 | 0.38 |
| | Median | 13.41 | 14.85 | 1.44 |
| Resource Balance/GDP (%, real) | Mean | -5.90 | -4.45 | 1.46 |
| | Median | -5.42 | -4.17 | 1.25 |

Notes:
Level of indicator os the average for three years before an after the change in the exchange rate regime.

Change in the indicator is the difference between the average value of the indicator three years before and after the CERR.

TABLE 10.b
Change of Exchange Rate Regime (CERR)
Cases of Macroeconomic Collapse

| Indicator | Statistic | Before CERR | After CERR (Incl. Year of CERR) | After CERR (Excl. Year of CERR) |
|---|---|---|---|---|
| RER | Mean | 95.91 | 117.19 | 120.71 |
| | Median | 93.15 | 123.53 | 127.83 |
| Inflation (%) | Mean | 15.64 | 51.64 | 53.65 |
| | Median | 14.10 | 47.99 | 48.25 |
| | Maximum | 24.59 | 105.59 | 112.18 |
| | Minimum | 10.69 | 18.54 | 16.76 |
| Real GDP (% rog) | Mean | 4.49 | 1.82 | 1.73 |
| | Median | 4.36 | 1.93 | 1.67 |
| | Maximum | 9.41 | 3.71 | 3.40 |
| | Minimum | -1.75 | 0.16 | -0.62 |
| Fis.Def/GDP (%) | Mean | 8.24 | 7.54 | 7.13 |
| | Median | 5.92 | 4.78 | 4.26 |
| | Maximum | 22.05 | 17.79 | 17.36 |
| | Minimum | 0.62 | 1.29 | 1.56 |
| Exports/GDP (%) | Mean | 15.90 | 18.79 | 18.93 |
| | Median | 19.54 | 20.89 | 21.20 |
| Res.Bal/GDP (%) | Mean | -5.11 | -1.82 | -1.24 |
| | Median | -1.84 | 0.22 | 0.41 |

Notes:
Before CERR: Statistic calculated using indicator values for three years preceding the year of change of the exchange rate regime.
After CERR: Statistic calculated using indicator values for ten years or till last period for which data are available (whichever is shorter) following the year of change of the exchange rate regime.
Incl. Year of CERR: Statistic calculated including the value of the indicator for the year of the change in the exchange rate regime.
Excl. Year of CERR: Statistic calculated excluding the value of the indicator for the year of the change in the exchange rate regime.

TABLE 10.c
Change of Exchange Rate Regime (CERR)
Non-Collapse Cases

| Indicator | Statistic | Before CERR | After CERR (Incl. Year of CERR) | After CERR (Excl. Year of CERR) |
|---|---|---|---|---|
| RER | Mean | 93.86 | 103.72 | 104.78 |
| | Median | 97.94 | 107.68 | 108.45 |
| Inflation (%) | Mean | 9.84 | 11.71 | 11.79 |
| | Median | 8.75 | 10.61 | 10.77 |
| | Maximum | 16.50 | 19.54 | 19.40 |
| | Minimum | 2.92 | 3.28 | 2.62 |
| Real GDP (% rog) | Mean | 3.80 | 3.51 | 3.53 |
| | Median | 4.52 | 3.56 | 3.98 |
| | Maximum | 7.30 | 6.20 | 6.16 |
| | Minimum | -5.98 | 0.48 | -0.31 |
| Fis.Def/GDP (%) | Mean | 4.74 | 5.69 | 5.57 |
| | Median | 2.90 | 5.18 | 5.43 |
| | Maximum | 15.74 | 11.20 | 11.15 |
| | Minimum | 0.93 | 0.72 | 0.76 |
| Exports/GDP (%) | Mean | 16.74 | 15.81 | 15.73 |
| | Median | 12.68 | 12.64 | 11.54 |
| Res.Bal/GDP (%) | Mean | -4.82 | -4.59 | -4.61 |
| | Median | -5.42 | -6.37 | -6.46 |

Notes:
Before CERR: Statistic calculated using indicator values for three years preceding the year of change of the exchange rate regime.
After CERR: Statistic calculated using indicator values for ten years or till last period for which data are available (whichever is shorter) following the year of change of the exchange rate regime.
Incl. Year of CERR: Statistic calculated including the value of the indicator for the year of the change in the exchange rate regime.
Excl. Year of CERR: Statistic calculated excluding the value of the indicator for the year of the change in the exchange rate regime.

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