Does the Choice of Nominal Anchor Matter?

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Abstract

The conventional wisdom on nominal anchors is that exchange rate-based inflation stabilizations lead to economic booms while monetary-based stabilizations lead to recessions. This study finds strong evidence against this view. Rather than determining the path of economic growth, the choice of nominal anchor appears to be endogenously determined by the state of the economy. To peg or manage the exchange rate, a high level of international reserves is important, especially when a government's credibility is low after a period of high inflation. After controlling for the level of international reserves and the rate of inflation, growth after monetary-based stabilizations does not significantly differ from that following exchange rate-based stabilizations.

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I. Introduction

One of the most captivating questions in macroeconomics is whether anti-inflation programs lead to output and employment losses. Utilizing the traditional Phillips curve analysis, the answer would be yes: reducing inflation does indeed lead to a short-run loss of employment and output. More recently, however, several authors have suggested that the answer to this question depends inherently on the choice of the nominal anchor. Kiguel and Liviatan (1992), for example, examine inflation stabilization in several Latin American countries and Israel and report that "...stabilization programs that use the exchange rate as the main nominal anchor are often associated with a business cycle that begins with a boom and ends with a recession," whereas "stabilization programs that use the money supply as the nominal anchor generally induce the expected Phillips curve result: lower inflation is accompanied by a recession after the program is implemented."[1] Calvo and Végh (1994) summarize the choice between exchange rate-based stabilization (ERBS) and monetary-based stabilization (MBS) as one of "recession now versus later."[2]

While not everyone supports the view of a recession now versus later trade-off, there is typically wide support for the view that fixing the exchange rate, at least in the early stages of an inflation stabilization program, can facilitate the reduction of inflation with reduced transitional costs over just money-based programs (see, for example, Bruno 1993, Dornbusch and Werner 1994, Edwards 1995a, Fischer 1986, and Sachs 1996).

Numerous models have been developed over the last decade to explain this dichotomy between exchange rate- and monetary-based stabilizations. Dornbusch (1982) and Rodriguez

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[1]Végh (1992) makes similar observations.

[2]Similarly, the International Monetary Fund (IMF) considers the expansionary effects of ERBS and the contractionary effects of MBS to be an important stylized fact inflation stabilizations. See IMF Survey (1995).

(1982) propose the theory that reducing the rate of exchange-rate devaluation, in addition to sticky inflation and high capital mobility, would lead to lower real interest rates and, hence, an economic boom. Calvo (1986) and Calvo and Végh (1993) explain this behavior as a lack of credibility. If people believe that inflation will return, consumption will shift from the future to the present, leading to increased short-run economic activity. Others note the positive supply effects of reducing inflation on labor (Roldos 1993) or capital (Roldos 1995, and Uribe 1995). Rebelo and Végh (1995) analyze a two-sector, general equilibrium model in which the credibility effects on demand are augmented by supply-side effects.

A problem with existing theories and stylized facts is that the selection of a stabilization program is never a simple choice between an exchange rate or monetary anchor. Nor is the outcome of the two types of stabilization programs as consistent as the stylized facts make them appear. To use the exchange rate as a nominal anchor, a country with credibility problems first must have some international reserves to defend the exchange rate. Mexico's 1987 exchange rate-based stabilization, for example, used $7.2 billion of $12.5 billion in reserves in one year to maintain the policy. In 1995, Mexico's anemic level of international reserves and weakened credibility would have made it virtually impossible for the country to return to its highly managed exchange rate regime.

In other words, the choice of nominal anchor may be endogenously determined by the state of the economy. Those countries with ample international reserves, higher credibility, and better prospects for economic growth can pursue exchange rate-based stabilizations. Countries with fewer international reserves, diminished credibility, and weaker prospects for the future may have only the option of monetary-based stabilizations.[3] The observation that economic

[3]Of course, it may be the case that international reserves are also endogenously determined. Countries wishing to pursue a fixed exchange rate in the future may first begin to stabilize and build reserves.

growth appears to be higher after exchange rate-based stabilizations may simply be the result of better economic prospects before the stabilization began. Indeed, Edwards (1995b) finds strong evidence that the greater a country's history of political instability and past inflation, the less likely is the country to pursue a fixed exchange rate regime. Endogeneity implies that there is no simple recession now versus later trade-off in the choice of stabilization program.

This paper examines the question of whether the choice of nominal anchor, by itself, matters in affecting a nation's short-run economic growth. With data similar to that used in previous studies that examine ERBS and MBS (i.e., Kiguel and Liviatan 1992, Végh 1992, Calvo and Végh 1994, and Reinhart and Végh 1994), this study quantifies the importance and statistical significance of changes in output growth around inflation stabilizations and examines the likelihood that the choice of stabilization program is endogenously determined. After controlling for the level of international reserves and inflation, growth after monetary-based stabilizations does not differ significantly from that following exchange rate-based stabilizations.

II. Empirical Analysis

The following empirical analysis is designed to answer the question of whether the choice of nominal anchor matters, in an *ex ante* way, in affecting a nation's short-run economic growth. The choice of nominal anchor may have important effects on other economic variables, such as the distribution of output or the credibility of future stabilizations, but these effects are not addressed here.[4] The primary concern is whether the choice of nominal anchor alters the path of real output in periods following inflation stabilizations. To address this question, I first identify the stabilizations to be used in the analysis and discuss some inherent problems in their

[4]The overall characteristics of international business cycles in fixed and floating exchange rate regimes is well documented in Baxter and Stockman (1989). They find no evidence to suggest that the cyclic behavior of real macroeconomic aggregates depends systematically on the exchange-rate regime.

classification. Second, I provide a graphical analysis of growth, inflation, and money base growth around stabilization episodes. Finally, I present regression analysis of cross-country growth patterns before and after stabilizations and analyze the whether the choice of nominal anchor is endogenously determined by the state of the economy.

II.a. Defining Stabilizations

One of the most difficult tasks in distinguishing the output effects of inflation stabilizations is to identify the stabilizations. Because the results of this study should allow comparison with previous studies (i.e., the works of Kiguel and Liviatan 1992, Végh 1992, Calvo and Végh 1994, and Reinhart and Végh 1994), I have chosen a similar set of major stabilizations. These previous studies have based their choice of stabilizations on the program's sustained success in holding down inflation. Of course, this criterion alone could bias the results of any statistical procedure and is a relevant criticism of previous studies. By choosing, *ex post*, those countries that have successfully stabilized, these studies may bias the sample toward concluding that stabilization leads to economic growth. Because the main objective of this analysis is to determine any significant difference between monetary- and exchange rate-based stabilizations, bias should not be a large problem as long as the criterion for choosing monetary- and exchange rate-based stabilizations is the same.

Another difficulty is the problem of dating the stabilization. Does the program begin when it is announced or when inflation actually starts to decline? Dating a program a year earlier or later may affect conclusions about the program's success. For example, Uruguay announced an exchange rate-based stabilization program in October 1978, but inflation had peaked a year earlier. Did the stabilization begin in 1978 or 1977? To examine the sensitivity of the empirical results to this potential problem, both such dates are analyzed. One stabilization date is defined by the year in which the program was announced, as defined by

Calvo and Végh (1994). The other stabilization date is the year in which inflation actually peaked, as examined by Easterly (1995). In eight of the 12 exchange rate-based stabilizations analyzed (Table 1), inflation peaked a year or more before the stabilization program was announced. Inflation peaked three years prior to the announcement of Chile's 1978 exchange rate-based stabilization, during its 1975 monetary-based stabilization. Likewise, inflation peaked two years prior to the announcement of Argentina's 1991 exchange rate-based stabilization, during its 1989 monetary-based stabilization.

A related problem is how to distinguish between a monetary- and exchange rate-based stabilization. Sometimes a country will first stabilize monetary aggregates and then, a few years later, fix its exchange rate. In 1975, for example, Chile began a monetary-based inflation stabilization and steadily reduced inflation from 375 percent a year to nearly 10 percent in 1982. During this period of declining inflation, in 1978, the exchange rate was fixed. Was the 1978 fixed exchange rate a new stabilization episode or a continuation of the 1975 monetary-based stabilization? The same problem arises for the Argentinean monetary-based stabilization in 1989 and the subsequent exchange rate-based stabilization in 1991. The 1985 Bolivian monetary-based stabilization is also difficult to categorize because, although the government was intervening in the foreign exchange markets, it did not announce a particular exchange rate policy, nor did it target a particular exchange rate.[5] These inherent problems of categorization plague all studies on the subject. Unfortunately, there are no controlled laboratory experiments of inflation stabilizations. I offer a sensitivity analysis of how the results change when defining

[5]In fact, the question of a strict money-based stabilization can also be raised. Some money-based stabilizations may begin with an initial one-time increase in the money stock followed by a decline in the rate of money-growth. Other money-based stabilizations just follow a decline in the rate of money-growth. The behavior of economic growth, however, may differ between the two types of money-based stabilizations. See Uribe (1996) for an analysis of these possible effects.

stabilization by peak inflation instead of the announcement date.[6]

II.b How Do the Data Look?

Growth. Charts 1 and 2 show real GDP growth three years before and three years after the stabilization, as defined by the announcement date (the first column in Table 1). Data on yearly real GDP growth are from the Summers and Heston Penn World Tables (version 5.6) and are augmented by IMF data for the years after 1990.

As one can see by examining the charts, there is a wide variety of experience among countries that have used the exchange rate to stabilize inflation. Growth usually, but not always, increases in the year after the stabilization. Nor is growth sustained more than one year after the stabilization. In three of the 12 exchange rate-based stabilization experiences, a decline in growth occurred the year after stabilization (Brazil 1964, 1986 and Argentina 1991). Eight stabilization episodes experienced an increase in growth the year after stabilization (Argentina 1967, 1978, and 1985; Mexico 1987; Uruguay 1968, 1978, and 1991; and Israel 1985).[7] Real GDP growth did not change much after the stabilization in Chile in 1978. It is interesting to note that the rate of growth after the Argentina 1991, Brazil 1986, and Chile 1978 stabilizations appears to be a continuation of a change that began at least one to two years earlier.

For the six monetary-based stabilizations, the picture looks a bit more uniform in the year after the stabilization. Contrary to the conventional wisdom, real GDP tends to increase after MBS. Five of the six monetary-based stabilizations show higher growth; only Bolivia in

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[6]The cases of Argentina 1989 and Chile 1975 are excluded from the set of exchange rate-based stabilizations as defined by peak inflation (see Table 1) but are included in the set of exchange rate-based stabilizations as defined by the announcement date. This is because the exchange rate-based stabilization date as defined by peak inflation corresponds to the earlier date of money-based stabilization and cannot be included as an independent stabilization.

[7]In terms of peak inflation, two stabilization episodes (Argentina 1977 and Brazil 1964) experienced a decline in growth and six experienced an increase in growth (Argentina 1985, Brazil 1985, Mexico 1987, Uruguay 1968 and 1977, and Israel 1984).

1985 appears to fit the stylized facts of a monetary-based stabilization.

Chart 3a summarizes the pattern of real GDP growth around exchange rate- and monetary-based stabilizations.[8] Growth increases in the year after stabilization for both types of stabilizations. Although MBS starts from lower (indeed, negative) growth before stabilization, growth is higher in subsequent years. As the chart also indicates, the median of the sample follows quite closely the mean.

Chart 3b also summarizes the pattern of real GDP growth around monetary- and exchange rate-based stabilizations, but in this chart peak inflation around the announcement date of the program defines the year of stabilization. In addition, the exchange rate-based stabilizations of Chile 1978 and Argentina 1991 (where inflation peaked during previous money-based stabilizations) are excluded. When using peak inflation as the date of stabilization, the pattern of real GDP growth is even more alike between MBS and ERBS. In both programs, growth tends to bottom out during the year of stabilization and then improves. However, the level of growth that precedes and follows exchange rate-based programs is still much higher than the level of growth around monetary-based programs.

Inflation, money base growth, and devaluation. Analysis of the relationship among stabilization, inflation, money base growth, and devaluation is reflected in Charts 4 and 5. One of the most dramatic differences between exchange rate- and monetary-based stabilizations is in the rate of inflation. The median inflation rate during the year of stabilization for monetary-based stabilizations is 2,938 percent, while for exchange rate-based stabilizations it is 132 percent. This pattern, which has not been emphasized in the previous literature, is consistent with the hypothesis that the choice of stabilization is endogenously determined by the state of the economy.

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[8]The format for this chart was based on Easterly (1995).

To peg or manage the exchange rate, a high level of international reserves is useful, especially when the government's credibility is low after a period of high inflation. Those economies that experienced severe instability before a stabilization may not have the international reserves to fix or manage the exchange rate, so they choose a monetary-based stabilization. This appears to be the case. As shown in Chart 6, international reserves as a share of GDP the year before and during exchange rate-based stabilizations are nearly twice as high as those before monetary-based stabilizations. Reserves as a share of GDP at the time of exchange rate-based stabilizations are slightly above their long-run average from 1960-94. For monetary-based stabilizations, they are less than 40 percent of their long-run average.

Another important feature of ERBS is that inflation and the rate of money growth typically peak one to two years before the year the stabilization was announced. This suggests that some type of stabilization may take place before the announced exchange rate program. Argentina 1967, 1978, and 1991; Chile 1978; Uruguay 1978, 1991; and Israel 1985 all had inflation and money base growth rates that peaked a year or more before the year of the announced ERBS. Chile 1978 and Argentina 1991 are certainly cases where monetary stabilizations were implemented several years earlier.

Charts 7a and 7b summarize the path of money base growth around stabilizations. Chart 7a shows money base growth centered around the announcement date of the programs and 7b shows the same but centered around the peak in inflation. Basically, the charts show that inflation peaks in the same year that the money base growth peaks, regardless of the type of stabilization (Chart 7b). The only difference between the stabilizations is that exchange rate-based programs are typically announced two years after the peak in inflation and money base growth (Chart 7a).

As has been discussed by Bruno (1991), Kiguel and Liviatan (1992), Végh (1992), and

others, in exchange rate-based stabilizations, the rate of inflation tends to fall more slowly than the rate of devaluation, which causes a real exchange rate appreciation. Not so widely known, however, is that the same is true for monetary-based stabilizations. In other words, real exchange rates tend to appreciate after both monetary- and exchange rate-based stabilizations. With the exception of Brazil 1990, all monetary-based stabilizations are followed by inflation falling more slowly than the exchange rate. Chart 8 summarizes the pattern of real exchange rate appreciation after monetary- and exchange rate-based stabilization.

III. Regression Analysis

The purpose of using regression analysis is to identify any statistically consistent relationship between the type of inflation stabilization followed and the behavior of real output. The hope is to capture any empirical regularity in output growth around stabilizations so that some distinguishing features of monetary- and exchange rate-based stabilizations can be identified.

The methodology used in this section is a variant of that used by Reinhart and Végh (1994) and Easterly (1995). Real GDP growth is regressed on a set of dummy variables, which represent the years before and after stabilization, to determine if there is any above or below trend real GDP growth around the year of stabilization.

Fixed-effects equations were run for both types of stabilization programs utilizing the entire pooled cross-country data set. The data cover the years 1960 to 1994. Three years before and three years after the stabilization are examined, as well as the year of stabilization itself. The equations estimated are

$$\hat{Y}_t = \sum_{i=1}^{n} \beta_i CountryDUM_i + \sum_{j=-3}^{+3} \gamma_j MBSDUM_j + \epsilon \qquad (1)$$

$$\hat{Y}_t = \sum_{i=1}^{n} \alpha_i CountryDUM_i + \sum_{j=-3}^{+3} \delta_j ERBSDUM_j + \mu \qquad (2)$$

where $\hat{Y}$ is real GDP growth, $CountryDUM_i$ are country *i's* fixed effect, $ERBSDUM_j$ and $MBSDUM_j$ are dummy variables for an exchange rate- and monetary-based stabilization and are equal to 1 in year j and zero otherwise. α, δ, β, and γ, are estimated coefficients, and μ and ϵ are iid error terms.

Table 2 shows the regression analysis for growth patterns before and after stabilizations.[9] The first two columns in the table examine the behavior of aggregate real GDP growth around stabilization dates that are defined by peak inflation. The first column looks at the behavior of real GDP for monetary-based stabilizations (equation 1), and the second column examines the behavior of real GDP for exchange rate-based stabilizations (equation 2).

For at least one year before monetary-based stabilizations, aggregate real GDP growth is significantly less than its long-run trend. In contrast, the years before exchange rate-based stabilizations are not marked by aggregate real GDP growth that is significantly less than the trend rate. In other words, the economies that followed a monetary-based stabilization were in much worse shape before stabilizing than those that picked an exchange rate-based stabilization (this was also seen visually in Charts 3a and 3b). This pattern is consistent with the hypothesis that the choice of nominal anchor is endogenously determined. In economies that have experienced severe declines in output before stabilization, international reserves may not be available, so, from the government's perspective, the best strategy for inflation stabilization is monetary-based stabilization. Similarly, some sort of monetary or fiscal stabilization may

[9]Because autocorrelation in the error term was detected, Park's method for first-order autocorrelation correction in panel data was implemented. The SAS procedure for time-series cross-section data analysis, PROC TSCS, was used with Park's method.

precede exchange rate-based stabilizations, so the actual output response after ERBS is small. For example, the 1975 Chilean monetary stabilization preceded its 1978 exchange rate-based stabilization, after which growth did not change appreciably.

In terms of determining if there is a "recession now versus later" trade-off, the crucial question is: What is the pattern of growth in the years following the stabilization? For both types of stabilizations, growth during the year of stabilization is less than the trend rate of growth. Looking at the first year after stabilization, however, one can see that growth improved after both exchange rate-based and monetary-based stabilizations. Growth after exchange rate-based stabilizations was above trend, although not significantly different from the trend. Growth after monetary-based stabilization was still below trend, but greater than the growth rate during the year of the stabilization. Contrary to the stylized facts of monetary- and exchange rate-based stabilizations, there does not appear to be a significant pattern of further decline after monetary-based stabilizations. Both policies can produce improved growth after stabilizing inflation.

The fact that growth is significantly below trend after monetary-based stabilizations is not necessarily an indication that money-based stabilization leads to recession. Growth is closer to trend the year after the stabilization than during the year of stabilization. In fact, growth continues to improve for at least three years after stabilization.

How much do these results depend on the definition of stabilization? To determine the robustness of these results, I include the announced date of stabilization as defined by Calvo and Végh (1994). The results when using this definition are shown in columns 3 and 4. There is little difference between the results in columns 3 and 4 and those in columns 1 and 2. There is a slight increase in growth after the first year of both exchange rate-based and monetary-based stabilizations, and growth after exchange rate-based stabilizations becomes significantly greater

than the trend in the first year after stabilization.[10]

Table 3 shows results of the same experiment as Table 2 but with per capita real GDP growth rather than aggregate real GDP growth as the dependent variable. The results using per capita real GDP growth are essentially the same as those using aggregate real GDP growth.

III.a. Endogeneity in the Choice of Stabilization Program

Although economic growth improves after both exchange rate- and monetary-based inflation stabilizations, the absolute level of growth is lower before and after monetary-based stabilizations. The hypothesis presented earlier suggested that perhaps the choice of stabilization is an endogenous one. Governments with little inflation-fighting credibility and no international reserves may have to choose a monetary-based program. In models where a country's choice to follow a fixed exchange rate represents a greater commitment to lower inflation than simply establishing a monetary growth target, the issue of feasibility seems to be ignored. In some models, it is assumed that the government decision maker bears a fixed cost of deviating from an exchange rate commitment, such as a loss of offices or a loss of market confidence. In other models, a fixed exchange rate may signal something about a government's preference for inflation.[11] These ideas imply that countries with weak credibility but a true desire to achieve lower inflation would find an exchange rate-based stabilization a superior strategy to follow because economic agents more quickly lower their inflation expectations. This is the reasoning behind Jeffrey Sachs' (1996) advocacy of pegged exchange rates for transition economies such as those of Eastern Europe and the former Soviet Union.

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[10]Another test of robustness was done that changed the announcement year of stabilization to the following year if the announcement was made in the last quarter of the year. So, for example, Mexico's December 1987 stabilization was classified as a 1988 stabilization. The basic results, however, were not altered with this change.

[11]For example, see Devarajan and Rodrik (1992). For a general discussion of macroeconomic policy and credibility issues, see Persson and Tabellini (1990).

It is not clear, however, why a country with a history of high inflation should be able to more credibly commit itself to fixing the exchange rate than to maintaining a monetary growth rule. In fact, attempting to stabilize inflation with a fixed exchange rate but no international reserves and a history of price instability is probably less credible than a monetary growth rule. The all-or-nothing nature of the fixed exchange rate commitment implies that it has little chance of being kept.[12] As a result, the credibility of the inflation-fighting program and, hence, the choice of nominal anchor, may be endogenously determined by the state of the economy.

The question addressed in this section is: After controlling for inflation and the level of international reserves, is the level of economic growth after monetary-based programs significantly less than that of exchange rate-based programs? If the level of international reserves and the rate of inflation can predict a monetary-based stabilization, the inclusion of these factors in the growth equation may reduce or eliminate the differential growth rates between monetary- and exchange rate-based stabilizations. Monetary-based stabilizations may not cause low growth but may themselves be chosen in times of low growth and low international reserves.[13]

Before examining the role of international reserves and inflation in determining money-based stabilizations, I examine a benchmark model of intervention. The model is designed to

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[12]Drazen (1996) makes the important point that if the public takes into consideration the environment in which a "tough" policy is followed, than a tough today may not signal more credibility but may be associated with less credibility. For example, if sticking to a fixed exchange rate regime today increases the unemployment rate and political problems tomorrow, then the credibility the public assigns to the policy may fall because the political environment of policymaker is taken into account. Drazen notes that "today's choices affect tomorrow's environment in such a way that playing tough may lower the credibility of a tough policy."

[13]Including inflation and international reserves as the only factors determining the type of stabilization program is a very stringent test. Other factors, such as fiscal spending, market liberalization, and deregulation, are certainly important elements in determining movements in economic growth and may also differ between types of stabilization programs.

address the question of whether the pattern of growth differs between stabilizations. It differs from the previous analysis in two important ways. First, lagged values of the growth are included in the equation to explicitly account for the dynamic behavior of economic growth. Second, a dummy variable for the year after all stabilizations is included along with a dummy variable for the year after just monetary-based stabilizations. By including both dummy variables in the equation, examining the coefficient on monetary based-stabilizations provides a simple test of whether growth differs between the two types of stabilizations. The benchmark intervention model under consideration is the following:[14]

$$\hat{Y}_t = \sum_{i=1}^{n} \alpha_i CountryDUM_i + \beta_1 \hat{Y}_{t-1} + \beta_2 \hat{Y}_{t-2} + \beta_3 ALLDUM + \beta_4 MBSDUM + \mu \qquad (3)$$

Where $\hat{Y}$ is real GDP growth, $CountryDUM_i$ is country *i*'s fixed effect, *ALLDUM* is a dummy variable for all inflation stabilization programs and is equal to 1 in the year after the stabilization and zero otherwise, *MBSDUM* is a dummy variable for only monetary-based stabilizations and is equal to 1 in the year after the stabilization and zero otherwise, α and β are estimated coefficients, and μ is an iid error term.

If growth the year after monetary-based stabilizations is significantly lower than exchange rate-based stabilizations, the coefficient on *MBSDUM*, β_4, should be negative and significantly different from zero.

β_1 and β_2 indicate the growth dynamics after shocks. It is expected that the effects of shocks are temporary, which implies that $0 < |\beta_1 + \beta_2| < 1$. Because growth is expected to improve gradually after negative shocks (or decline after positive shocks), it is expected that $0 < \beta_1 < 1$. β_2 may either be positive or negative, depending on whether growth monotonically

[14]See Vandaele (1983, chapter 14) for a description of similar intervention models.

approaches its trend or overshoots it.

Columns 1 and 2 in Table 4 show the estimation results of equation 3 using peak inflation and the announcement of the program as alternate stabilization dates. As expected, $0 < |\beta_1 + \beta_2| < 1$ and $0 < \beta_1 < 1$, implying that the effects of shocks are temporary and gradually return to trend. Because $\beta_2 < 0$, growth overshoots its trend rate and then returns to it. No signs of autocorrelation are detected across equations.

The positive coefficient on *ALLDUM*, which is significant in the case of stabilizations defined by the announcement date, suggests that average growth the year after all stabilizations is above trend, which is consistent with the findings of Bruno and Easterly (1995). The negative and significant coefficient on *MBSDUM* suggests that growth the year after monetary-based stabilizations is significantly below that of exchange rate-based stabilizations. These results confirm that the level of growth the year after monetary-based stabilizations is significantly less than that of exchange rate-based stabilizations.

The essential question is, however: How much of that difference in growth can be accounted for by the government's endogenous choice of the inflation-fighting program? Are monetary-based inflation stabilization programs typically chosen in periods of higher inflation and lower international reserves? To address this question, columns 3 and 4 and columns 5 and 6 in Table 4 include contemporaneous and lagged inflation rates and the share of international reserves in GDP. If the rate of inflation and the level of international reserves are important determinates of the choice of stabilization, including these variables in the regression equation may eliminate the significance of the monetary-based intervention dummy variable.

Before the results are presented, however, it is important to remember the difference between the date of stabilization defined by the announcement date and the peak inflation date. The announcement date refers to the date that the government publicly committed to a

program. In the case of exchange rate-based programs, this date refers to the date that an explicit exchange rate commitment was made. In other words, it is the date the government committed itself to defending the exchange rate with its stock international reserves. As mentioned earlier, the announcement date for exchange rate-based stabilizations does not always coincide with the date of peak inflation (indeed, in most cases it does not) because of steps taken in previous periods to reduce inflation by other means. International reserves are expected to be important only in the decision to fix the exchange rate, and not in the decision to merely reduce inflation. Thus, it is the announcement date that is relevant for examining the endogeneity of the choice of program.

As shown in columns 3 and 4 in Table 4, the inclusion of contemporaneous inflation (INF_t) in the model substantially reduces the significance of monetary-based stabilizations.[15] Monetary-based stabilizations take place in periods of higher inflation than do exchange rate-based stabilizations. As expected, these results hold only for stabilization dates defined by the announced commitment to fixed exchange rates or monetary stability. Lagged inflation (INF_{t-1}) does not appear to play a significant role in determining growth or in altering the significance of monetary-based stabilizations.

Columns 5 and 6 in Table 4 include the contemporaneous and lagged share of international reserves in GDP. Consistent with the hypothesis that international reserves are an important element behind the government's willingness to pursue a fixed-exchange rate policy, we see that the lagged share of international reserves in GDP ($SRES_{t-1}$) dramatically reduces the significance of the monetary-based intervention dummy variable. As before, this result holds only holds for stabilizations defined by the announced commitment to fixed exchange rates or

[15]All the results of Table 4 are essentially the unchanged when money base growth is substituted for inflation.

monetary stability. Once the endogenous determinates of stabilizations are controlled for, there does not appear to be a significant difference in the level of growth between monetary- and exchange rate-based stabilizations.

A more direct way determining whether the choice of stabilization is endogenous is by examining whether the type of stabilization can be predicted by the size of international reserves. The question is: Are exchange rate-based stabilizations more likely to be chosen in countries with relatively higher or lower international reserves?[16]

To address this question, a multinomial logit analysis of the following model is performed:[17]

$$Prob(T=j) = \frac{e^{[\sum_{i=1}^{n} \beta_{ij} CountryDUM_i] + \alpha_j SRESQ}}{1 + \sum_{k=1}^{j} e^{[\sum_{i=1}^{n} \beta_{ik} CountryDUM_i] + \alpha_k SRESQ}}$$

For j = 1, 2.

$$Prob(T=0) = \frac{1}{1 + \sum_{k=1}^{j} e^{[\sum_{i=1}^{n} \beta_{ik} CountryDUM_i] + \alpha_k SRESQ}}$$

Where $T=1$ is an exchange rate-based stabilization (ERB), $T=2$ is no stabilization (N), and $T=0$ is a monetary-based stabilization (MB). *SRESQ* is the quartile value of the share of international reserves in GDP. *SRESQ* takes the value of 4 if the share of international reserves

[16]Given the previous analysis, it is likely that past inflation also would be important in predicting the type of nominal anchor. However, due to the small frequency of observations on exchange rate- and monetary-based stabilizations, and large number of fixed effects, the equation's degrees of freedom were too small to estimate the full model. In a separate multinomial analysis that included only inflation, I found that higher inflation was negatively related to the choice of a exchange rate-based stabilization but was not statistically significant.

[17]See Greene (1993, 666-67) for a discussion of multinomial logit models.

in GDP falls in the highest quartile of observations; it takes the value of 3 in the third quartile, and so on. The same data set described earlier is used.

As seen in Table 5, the share of international reserves in GDP is an important and significant predictor of the type of stabilization. For example, moving up one quartile in the share of international reserves in GDP (*SRESQ*), say from the second quartile to third quartile, would increase the probability of an exchange rate-based over a monetary-based stabilization by a factor of 9.1 ($d(P_{ERB}/P_{MB})/dSRESQ|_{SRESQ=2} = e^{-1.326 + 1.549*2} * 1.549 = 9.1$).

IV. Concluding Remarks

At first glance, many of the results presented in this study are not inconsistent with previous studies on the choice of nominal anchor. Indeed, like previous work, this study indicates that the rate of economic growth is lower after monetary-based stabilizations than after exchange rate-based stabilizations. What is different about this study, however, is the analysis of the dynamics of economic growth and the potential endogeneity in the choice of the stabilization program. If the choice of a monetary versus exchange rate-based stabilization is endogenously determined by the level of international reserves and the height of past inflation, and if these factors are highly correlated with the state of the economy and prospects for future growth, then it is likely that the economic environment determines the type of stabilization. The evidence suggests that this is the case.

In general, the economies of those countries that choose monetary-based stabilizations appear to be in much worse shape before inflation stabilization than those that choose exchange rate-based stabilization. In the years prior to monetary-based stabilization, economic growth is lower, international reserves are lower, and inflation is higher than in the years prior to exchange rate-based stabilizations. Because a high level of international reserves is important when a government wants to fix its exchange rate, it is only natural that governments would opt

for exchange rate-based stabilizations only when international reserves are relatively high. It may also be the case that governments stabilize inflation and deliberately build reserves prior to managing the exchange rate. In fact, money base growth tends to peak one to two years before exchange rate-based stabilizations. Growth after monetary-based stabilizations is not significantly different from exchange rate-based stabilizations when the analysis controls for the level of international reserves and the rate of inflation, . Contrary to the "recession-now-versus-later" hypothesis, the growth dynamics of monetary-based stabilizations are similar to those of exchange rate-based stabilizations—that is, growth improves after both types of stabilization.

An important avenue for future research is to formally endogenize the choice of nominal anchor and explore how other factors, such as a country's susceptibility to external shocks, influence the choice of stabilization plan. Ultimately, the question of policy credibility and its relationship (or lack of relationship) to the choice of nominal anchor is what lies at the heart of the debate between exchange rate- and monetary-based stabilization.

References

Baxter, Marianne, and Alan C. Stockman (1989), "Business Cycles and the Exchange-Rate Regime: Some International Evidence," *Journal of Monetary Economics* 23: 377-400.

Bruno, Michael (1991), "High Inflation and the Nominal Anchors of an Open Economy," Princeton Essays in International Finance, no. 193 (June).

_____ (1993), *Crisis, Stabilization, and Economic Reform: Therapy by Consensus* (Oxford: Clarendon Press).

_____, and William Easterly (1995), "Inflation and Long-Run Growth," NBER Working paper no. 5209 (August).

Calvo, Guillermo A. (1986), "Temporary Stabilization: Predetermined Exchange Rates," *Journal of Political Economy* 94:1319-29.

_____, and Carlos A. Végh (1993), "Exchange Rate-Based Stabilization under Imperfect Credibility," in Helmut Frisch and Andreas Worgotter (eds.), *Open Economy Macroeconomics* (London: MacMillan) 3-28.

_____, and _____ (1994), "Inflation Stabilization and Nominal Anchors," *Contemporary Economic Policy* 3 (April): 35-45.

Devarajan, Shantanayan, and Dani Rodrik (1992), "Do the Benefits of Fixed Exchange Rates Outweigh Their Costs? The CFA Zone in Africa," in Ian Goldin and Alan Winters (eds.), *Open Economies: Structural Adjustment and Agriculture* (Cambridge: Cambridge University Press).

Dornbusch, Rudiger (1982), "Stabilization Policies in Developing Countries: What Have We Learned?" *World Development*, 10: 701-8.

_____, and Alejandro Werner (1994), "Mexico: Stabilization, Reform, and No Growth," *Brookings Papers on Economic Activity 1*: 253-315.

Drazen, Allan (1996), "Policy Signaling in the Open Economy: A Re-examination," Working Paper 19, University of Maryland, March.

Edwards, Sebastian (1995a), "Exchange Rates, Inflation and Disinflation: Latin American Experiences," in Sebastian Edwards (ed.), *Capital Controls, Exchange Rates and Monetary Policy in the World Economy* (New York: Cambridge University Press).

_____ (1995b), "Exchange Rate Anchors and Inflation: A Political Economy Approach," in Sylvester Eijffinger and Harry Huizinga (eds.), *Positive Political Economy: Theory and Evidence*, (New York: John Wiley & Sons).

Easterly, William (1995), "When Is Stabilization Expansionary?" mimeo, the World Bank.

Fischer, Stanley (1986), "Exchange Rate versus Monetary Targets in Disinflation," In *Indexing, Inflation and Economic Policy*, by Stanley Fischer. (Cambridge, Mass.: MIT Press).

Greene, William H. (1993), *Econometric Analysis* (New York: Macmillan).

IMF Survey (1995), "Using Exchange Rate Anchors in Adjustment Programs: When and How?" November 20, 361-63.

Kiguel, Miguel, and Nissan Liviatan (1992), "The Business Cycle Associated with Exchange Rate Based Stabilization, " *The World Bank Economic Review,* 6(2): 279-305.

Persson, Torten, and Guido Tabellini (1990), *Macroeconomic Policy, Credibility and Politics* (New York: Harwood).

Rebelo, Sergio, and Carlos A. Végh (1995), "Real Effects of Exchange-Rate-Based Stabilizations: An Analysis of Competing Theories," *NBER Macroeconomics Annual,* (Cambridge, Mass.: National Bureau of Economic Research).

Reinhart, Carmen M., and Carlos A. Végh (1994), "Inflation Stabilization in Chronic Inflation Countries: The Empirical Evidence," mimeo, IMF.

Rodriguez, Carlos A. (1982), "The Argentine Stabilization Plan of December 20th," *World Development*, 10: 801-11.

Roldos, Jorge (1993), "On Credible Disinflation," Working Paper 93/90 (Washington, D.C.: International Monetary Fund).

_____ (1995), "Supply-Side of Disinflation Programs," *IMF Staff Papers*, 42: 158-83.

Sachs, Jeffrey (1996), "Economic Transition and the Exchange-Rate Regime," *American Economic Review*, 86: 147-52.

Uribe, Martin (1995), "Exchange-Rate-based Inflation Stabilization: The Initial Real Effects of Credible Plans," International Finance Discussion Papers no. 503, (Washington, DC: Board of Governors of the Federal Reserve System).

_____ (1996), "Comparing The Welfare Costs and the Initial Dynamics of Alternative Temporary Stabilization Policies," International Finance Discussion Papers no. 539, (Washington, DC: Board of Governors of the Federal Reserve System).

Vandaele, Walter (1983), *Applied Time Series and Box-Jenkins Models* (Orlando, Fla.: Academic Press).

Végh, Carlos A. (1992), "Stopping High Inflation: An Analytical Overview," *IMF Staff Papers*, 39 (September): 626-95.

Table 1
Inflation Stabilizations

Announcement of Plan[18]	Year of Peak Inflation Around Announcement of Plan
Exchange Rate-Based Stabilizations	
Argentina:	
1967 March	1966
1978 December	1976
1985 June	1985
1991 April	NA[19]
Brazil:	
1964 March	1964
1986 February	1985
Chile:	
1978 February	NA[20]
Israel:	
1985 July	1984
Mexico:	
1987 December	1987
Uruguay	
1968 June	1968
1978 October	1977
1991 January	1990
Monetary-Based Stabilizations	
Argentina:	
1989 December	1989
Bolivia:	
1985 October	1985
Brazil:	
1990 March	1990
Chile:	
1975 April	1974
Dominican Republic:	
1990 August	1990
Peru:	
1990 August	1990

[18]According to Reinhart and Végh (1994).

[19]Inflation began declining two years earlier after the monetary-based stabilization in 1989.

[20]Inflation began declining three years earlier after the monetary-based stabilization in 1975.

Table 2
Statistical Significance of Growth Patterns Before and After Stabilizations
(Pooled Cross-Sectional Data with Parks Correction for Autocorrelation)

	Aggregate GDP Growth		Aggregate GDP Growth	
Years from Stabilization	Monetary-Based	Exchange Rate-Based	Monetary-Based	Exchange Rate-Based
	Peak Inflation		Announcement	
-3	-1.505 (-0.88)	-0.549 (-0.41)	-3.054 (-1.81)	-3.495 (-2.68)
-2	-2.535 (-1.47)	1.612 (1.14)	-4.555 (-2.65)	-0.394 (-0.28)
-1	-7.183 (-4.17)	-2.078 (-1.44)	-6.440 (-3.77)	-3.598 (-2.54)
0	-7.383 (-4.07)	-2.540 (-1.76)	-9.297 (-5.42)	-1.072 (-0.79)
+1	-7.166 (-4.16)	1.015 (0.73)	-4.633 (-2.70)	3.059 (2.07)
+2	-2.902 (-1.66)	2.164 (1.46)	-0.964 (-0.55)	2.732 (1.77)
+3	2.209 (1.06)	1.199 (0.80)	1.976 (0.95)	-0.522 (-0.38)
Observations	186	186	186	186

Note: *t*-values are in parentheses. Fixed effects regressions were run for each type of stabilization.

Table 3
Statistical Significance of Growth Patterns Before and After Stabilizations
(Pooled Cross-Sectional Data with Parks Correction for Autocorrelation)

	Per Capita GDP Growth		Per Capita GDP Growth	
Years from Stabilization	Monetary-Based	Exchange Rate-Based	Monetary-Based	Exchange Rate-Based
	Peak Inflation		Announcement	
-3	-1.335 (-0.81)	0.880 (0.62)	-2.729 (-1.65)	-3.294 (-2.38)
-2	-2.648 (-1.57)	2.016 (1.34)	-4.847 (-2.89)	0.012 (0.01)
-1	-7.777 (-4.63)	-1.929 (-1.26)	-6.818 (-4.06)	-3.798 (-2.52)
0	-7.333 (-4.18)	-2.409 (-1.56)	-9.230 (-5.51)	-0.962 (-0.66)
+1	-7.015 (-4.37)	1.101 (0.74)	-4.916 (-2.93)	2.693 (1.71)
+2	-3.373 (-1.99)	2.481 (1.56)	-1.249 (-0.73)	3.056 (1.87)
+3	1.710 (0.87)	1.321 (0.84)	1.480 (0.75)	-0.445 (-0.30)
Observations	186	186	186	186

Note: *t*-values are in parentheses. Fixed effects regressions were run for each type of stabilization.

Table 4
Intervention Analysis of Growth Patterns Around Stabilizations
(Pooled Cross-Sectional Data with Fixed Effects)

Dependent Variable:	Per Capita GDP Growth					
	Peak Inflation	Announce-ment	Peak Inflation	Announce-ment	Peak Inflation	Announce-ment
$\hat{Y}_{t-1}$	0.238 (3.97)	0.250 (4.11)	0.206 (3.40)	0.223 (3.60)	0.182 (2.97)	0.199 (3.20)
$\hat{Y}_{t-2}$	-0.120 (-2.04)	-0.099 (-1.68)	-0.128 (-2.15)	-0.120 (-2.00)	-0.124 (-2.09)	-0.117 (-1.96)
ALLDUM	1.032 (0.63)	3.637 (2.21)	0.852 (0.52)	3.508 (2.14)	0.611 (0.38)	3.287 (2.02)
MBSDUM	-6.182 (-2.35)	-5.257 (-1.98)	-7.373 (-2.29)	-3.759 (-1.15)	-6.415 (-2.00)	-2.899 (-0.89)
INF_t			-0.088 (-2.49)	-0.073 (-2.08)	-0.084 (-2.41)	-0.070 (-2.00)
INF_{t-1}			0.035 (0.73)	-0.034 (-0.72)	-0.030 (-0.64)	-0.039 (-0.81)
$SRES_t$					-0.024 (-0.17)	-0.036 (-0.25)
$SRES_{t-1}$					0.288 (1.91)	0.308 (2.03)
Observations	292	292	292	292	286	286
$\overline{R}^2$	0.163	0.166	0.173	0.175	0.195	0.194
LM test for autocorrelation	0.471	0.745	0.458	1.521	0.747	0.122

Note: *t*-values are in parentheses. Fixed effects regressions were run for each type of stabilization. This LM test is distributed as a χ^2 with one degree of freedom. The critical value for the test at the 5 percent significance level is 3.84.

Table 5
Multinomial Logit Analysis:
Predicting Stabilizations by the Level of International Reserves
(Pooled Cross-Sectional Data with Fixed Effects)

Dependent variable	Independent variable	Coefficient	*t*-ratio	Significance level
$\ln(P_{ERB}/P_{MB})$	$SRES_Q$	1.549	2.888	0.004
$\ln(P_N/P_{MB})$		0.727	7.743	0.081
Observations	305			

P_N is the probability of no stabilization, P_{ERB} is the probability of an exchange rate-based stabilization, and P_{MB} is the probability of a monetary-based stabilization.

Chart 1

Exchange Rate Based Stabilizations

Real GDP Growth

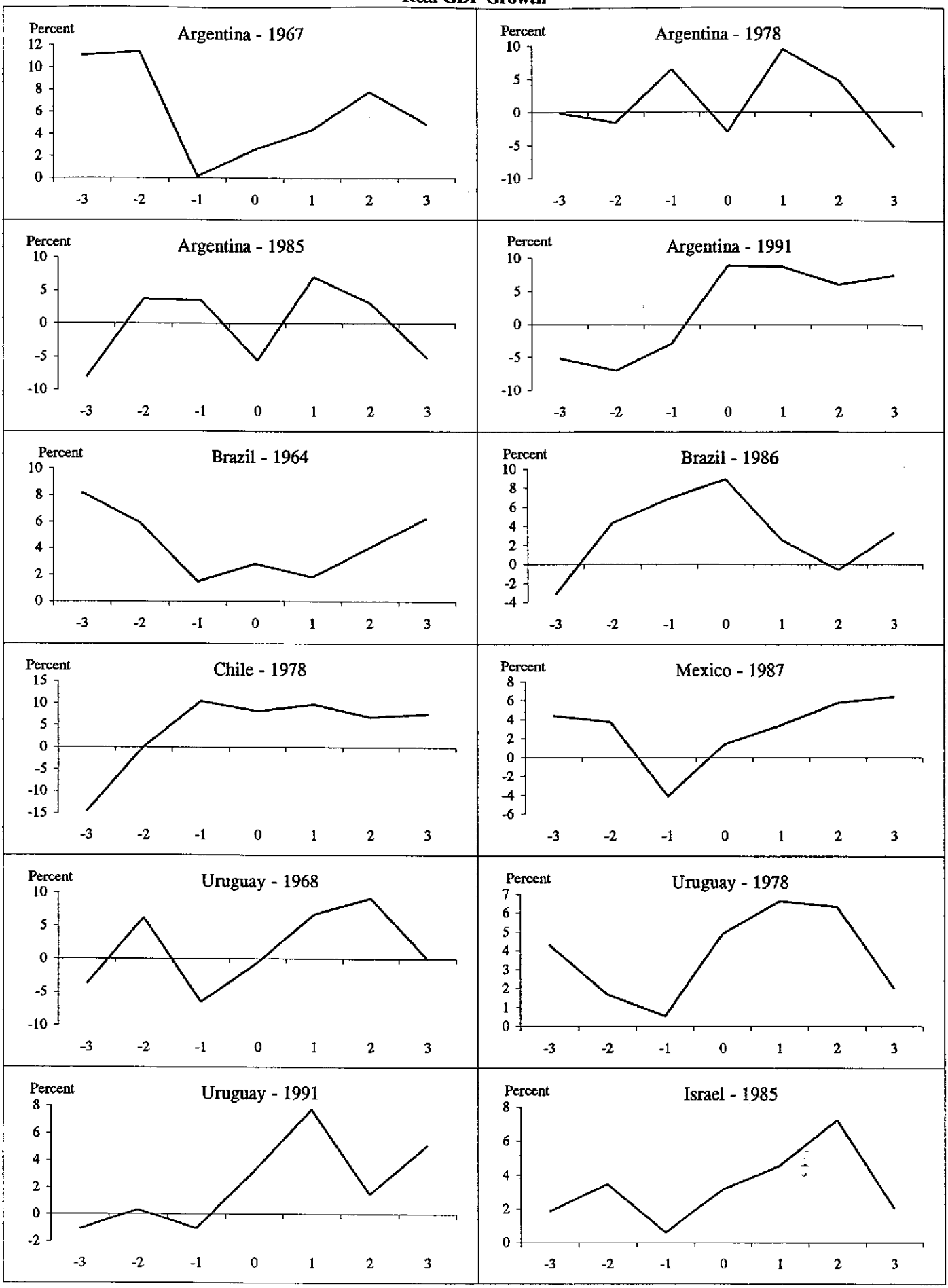


Chart 2

Monetary Based Stabilization

Real GDP Growth

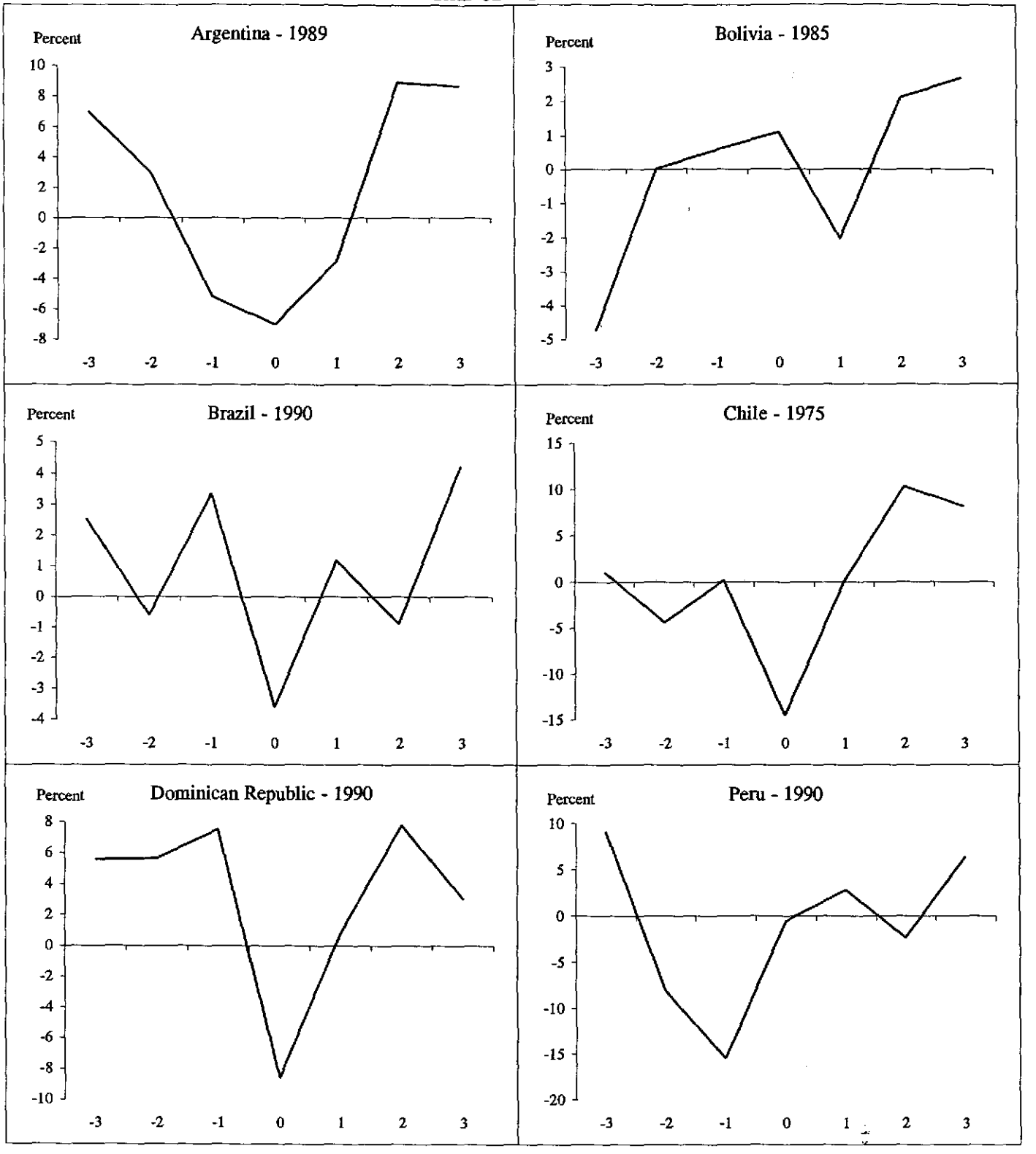


Chart 3a

(Stabilization date = Announcement date)

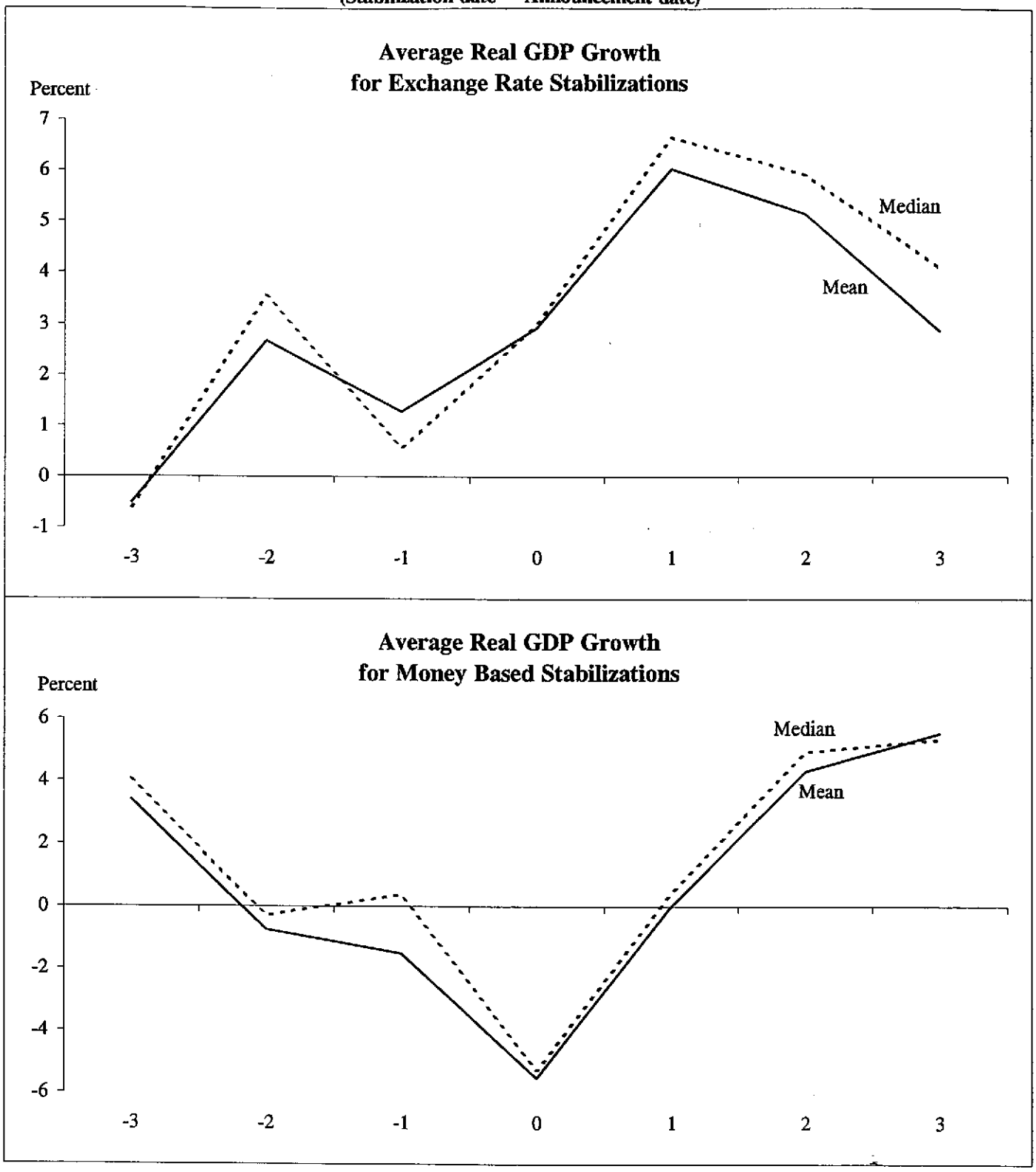
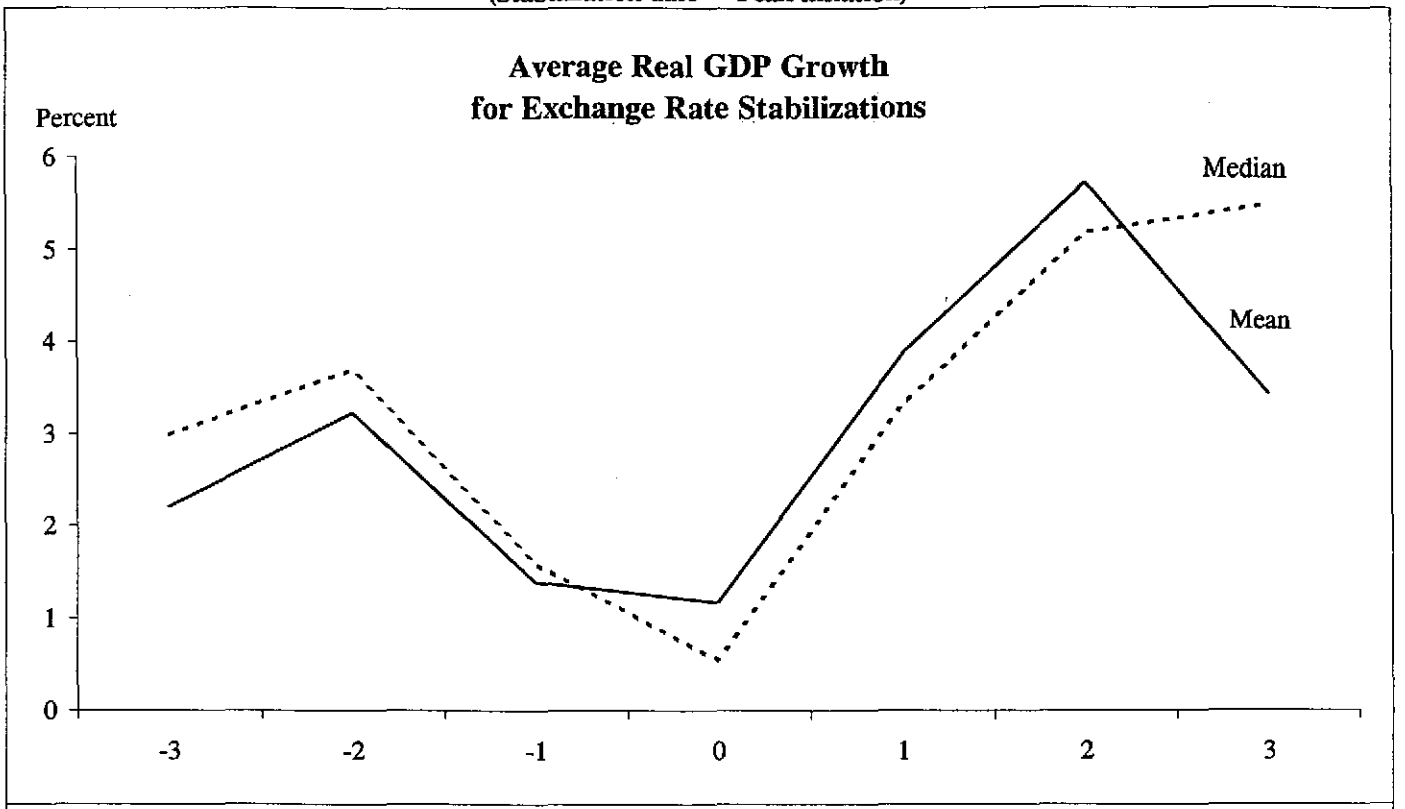


Chart 3b

(Stabilization date = Peak inflation)



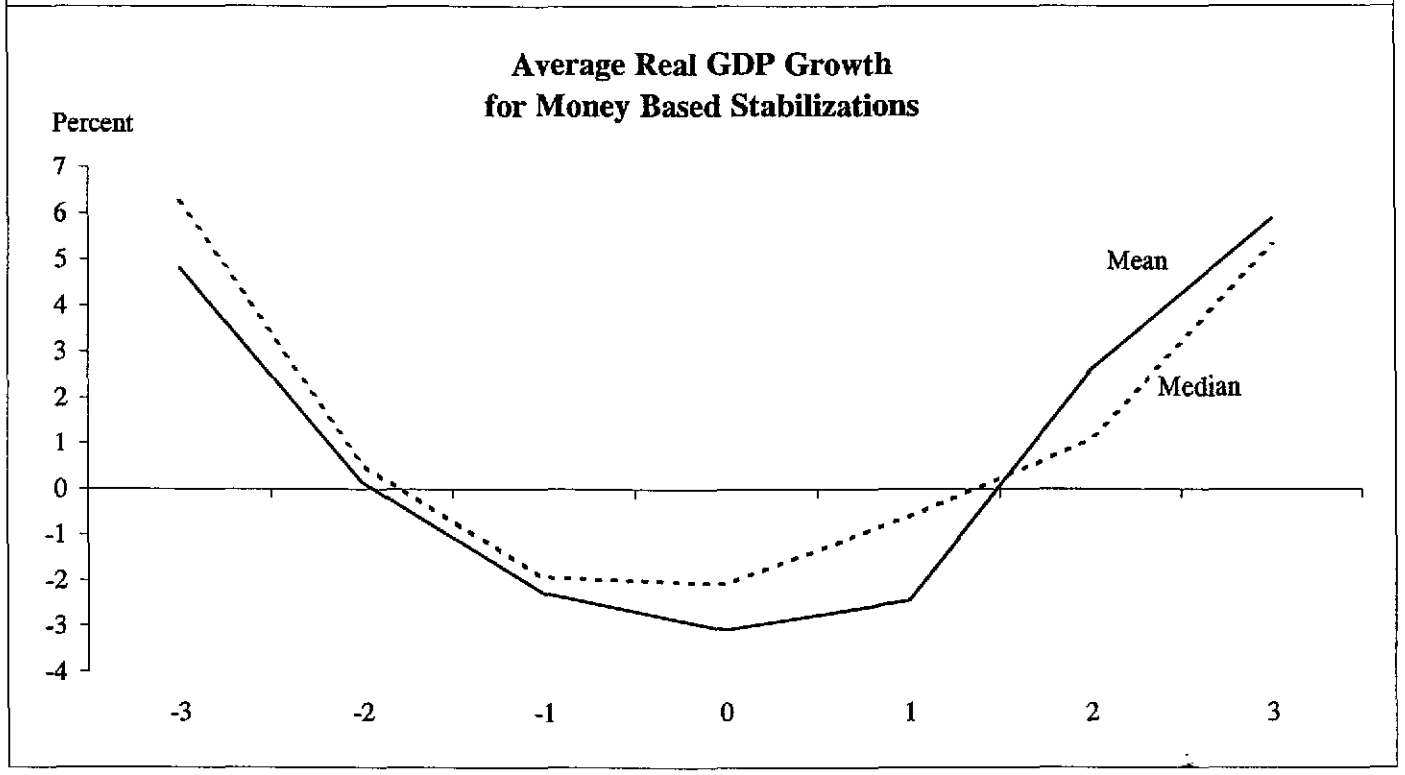


Chart 4

Exchange Rate Based Stabilizations

Inflation, Money Base Growth, and Devaluation

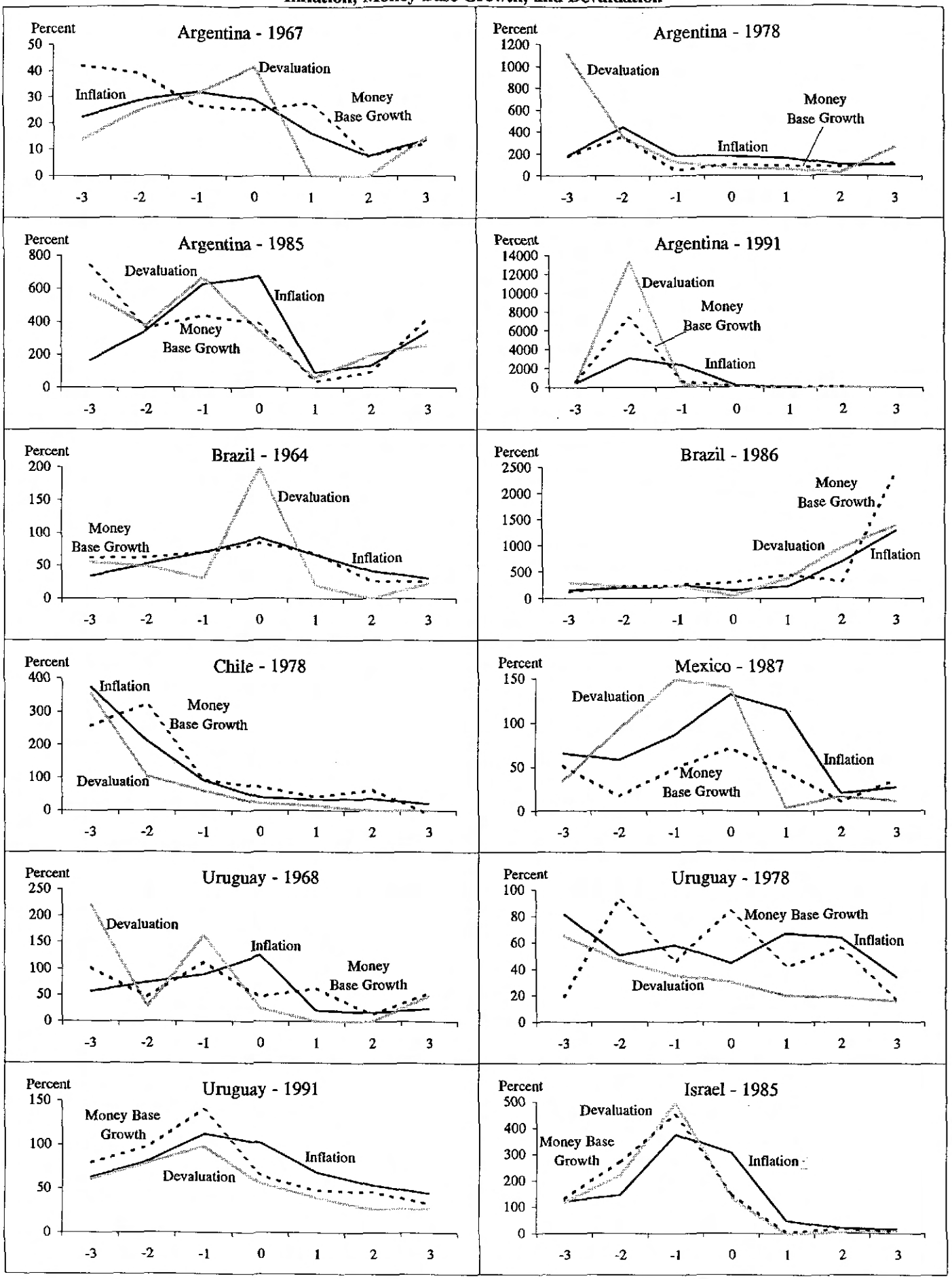


Chart 5

Monetary Based Stabilization

Inflation, Money Base Growth, and Devaluation

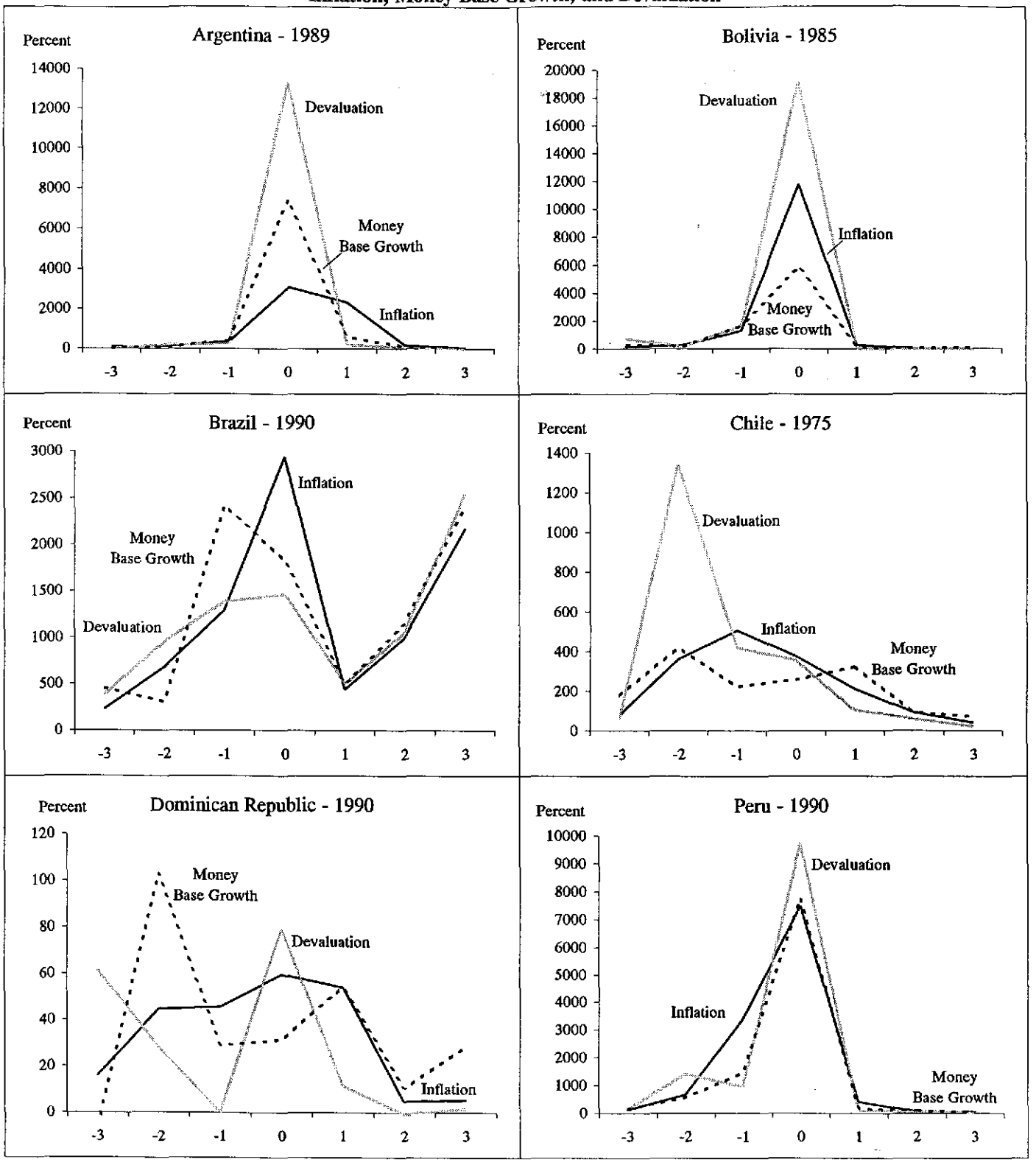


Chart 6
International Reserves as a Share of GDP

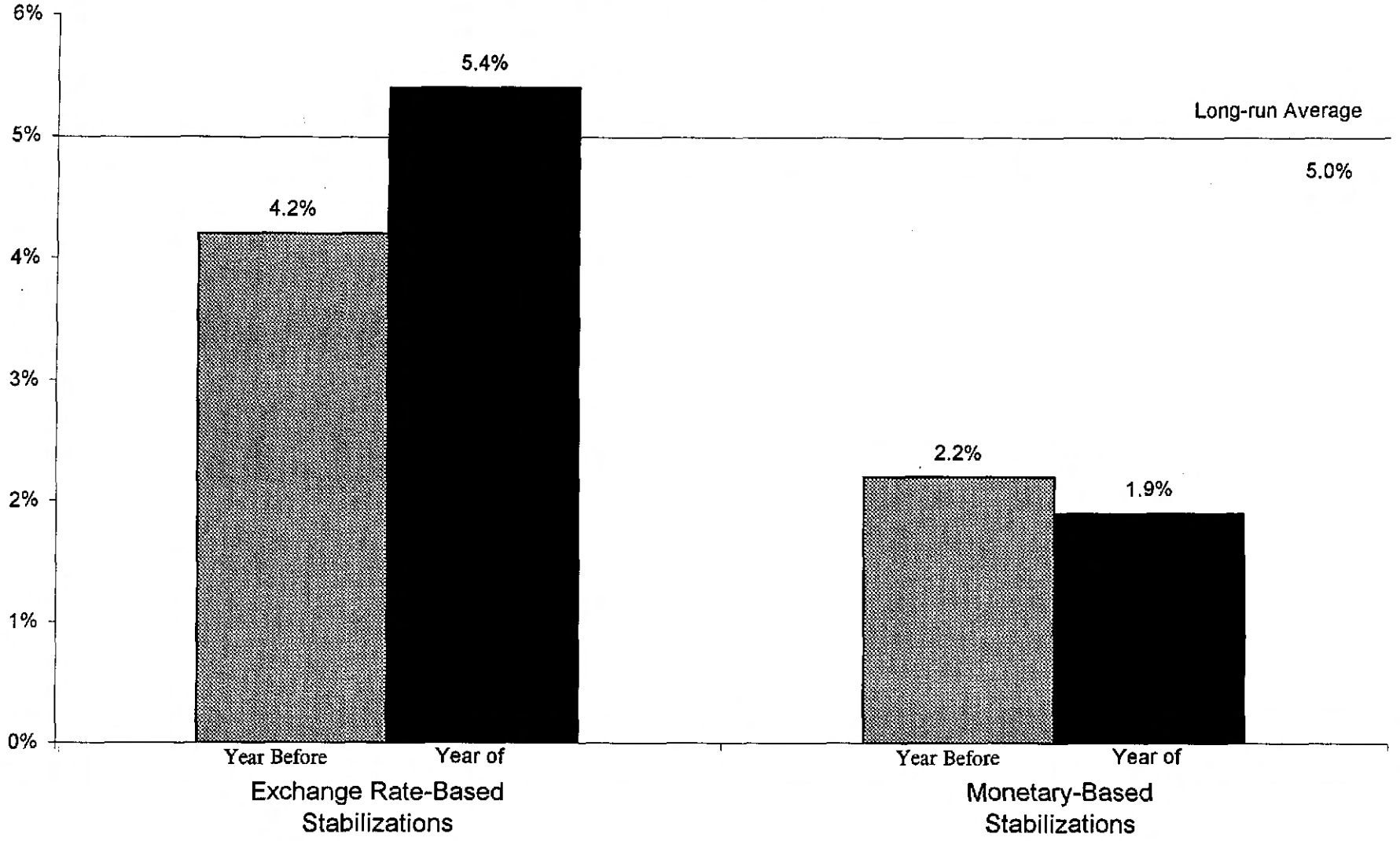
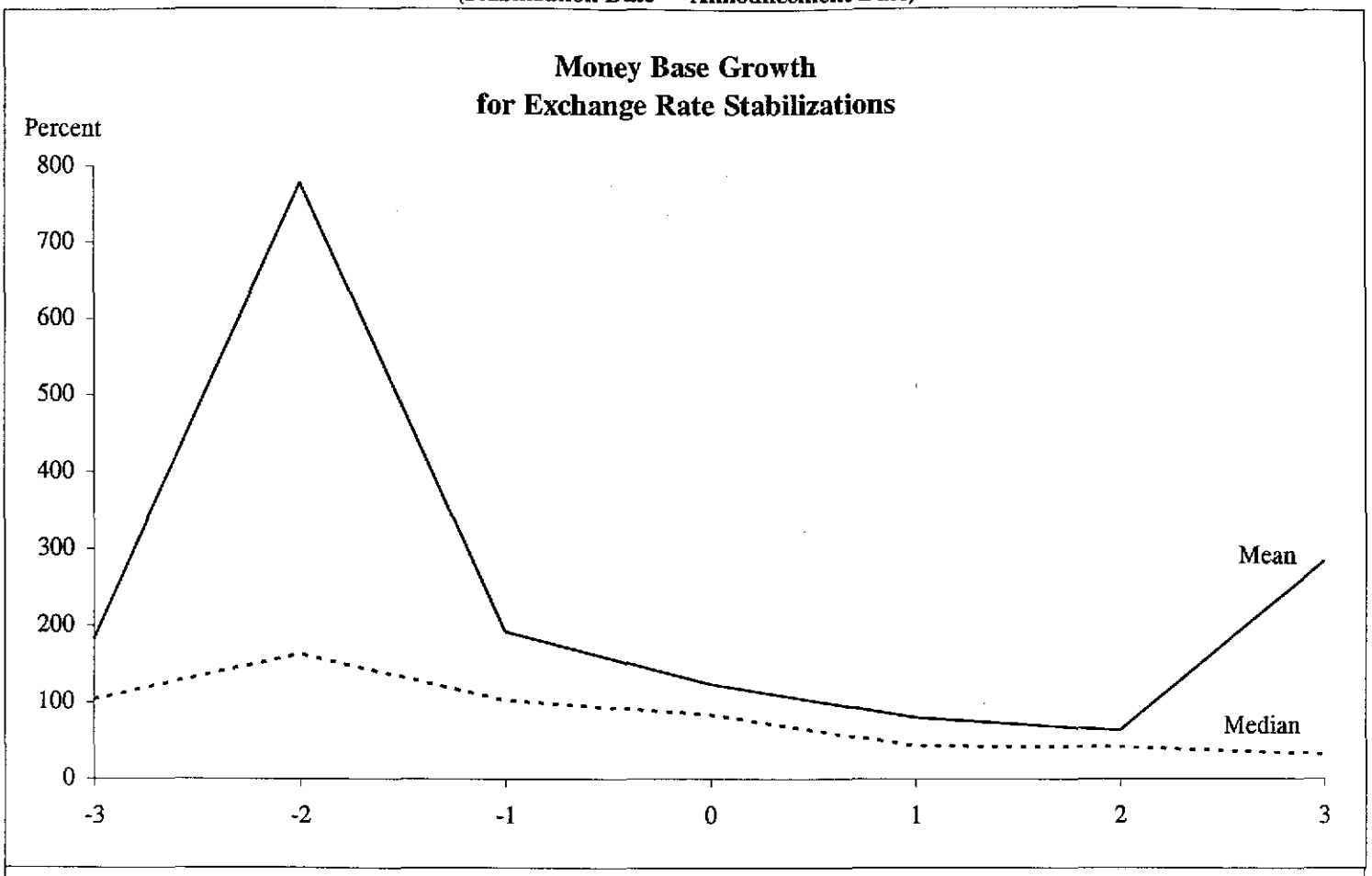


Chart 7a

(Stabilization Date = Announcement Date)



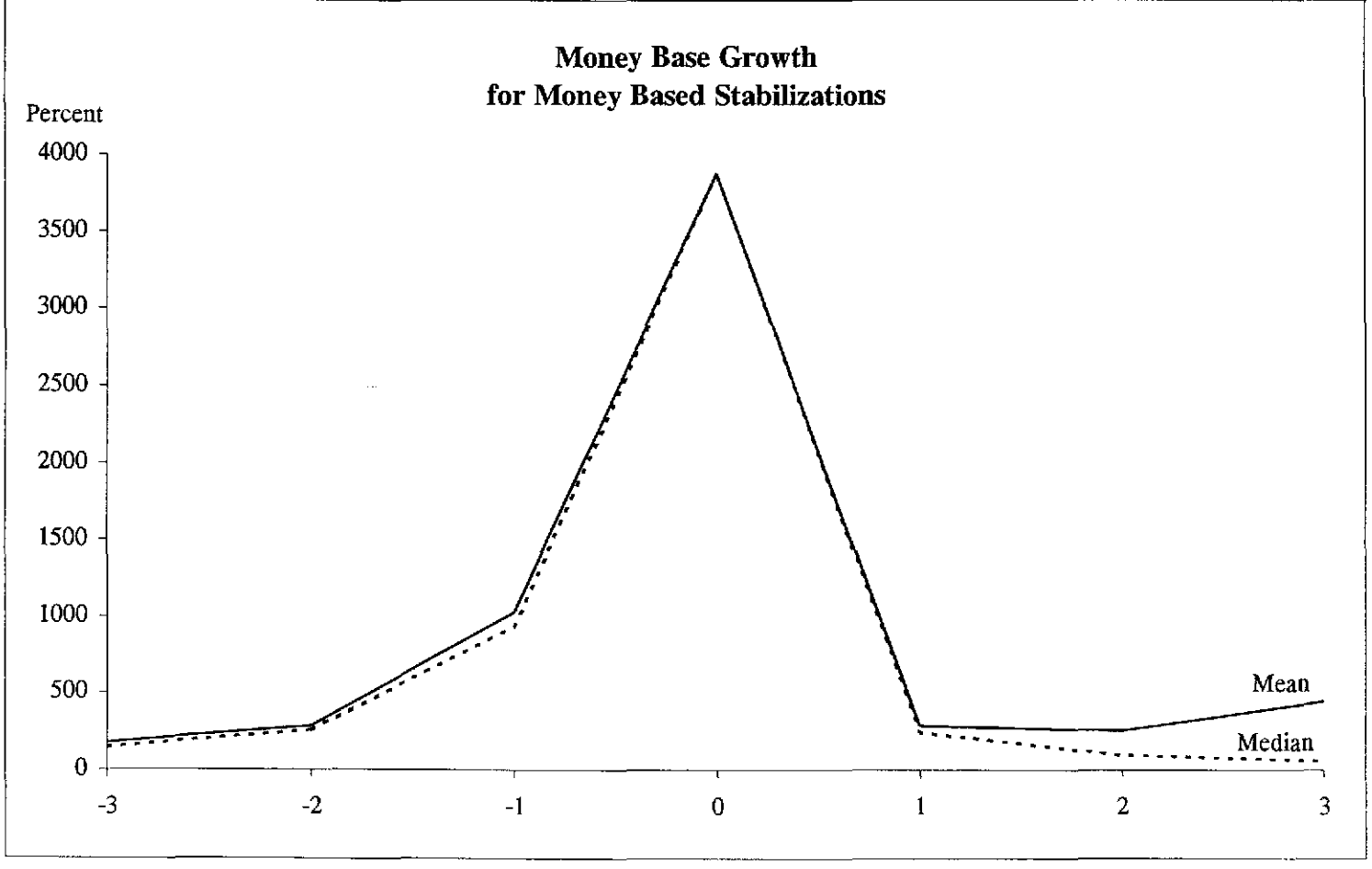
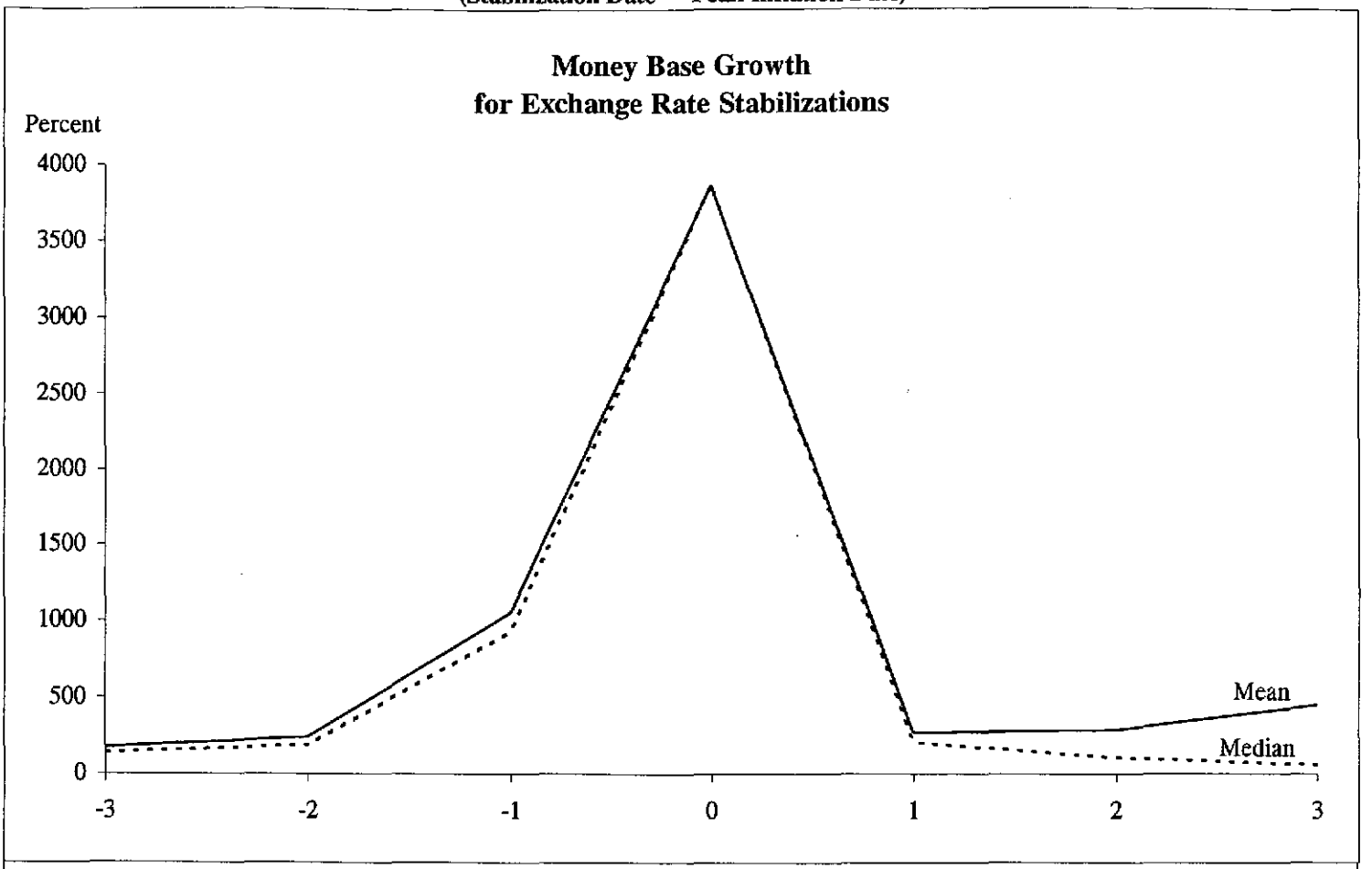


Chart 7b

(Stabilization Date = Peak Inflation Date)



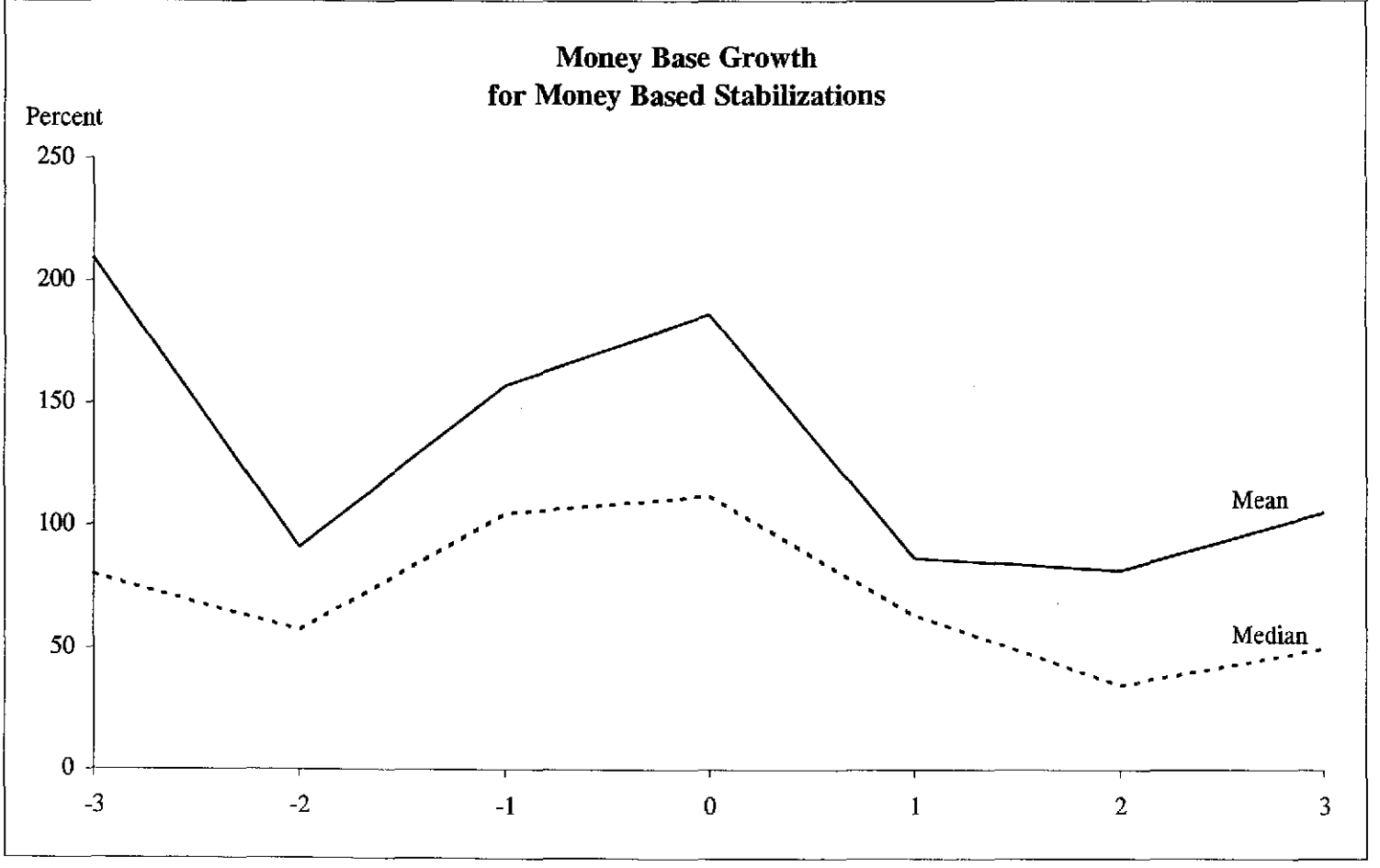
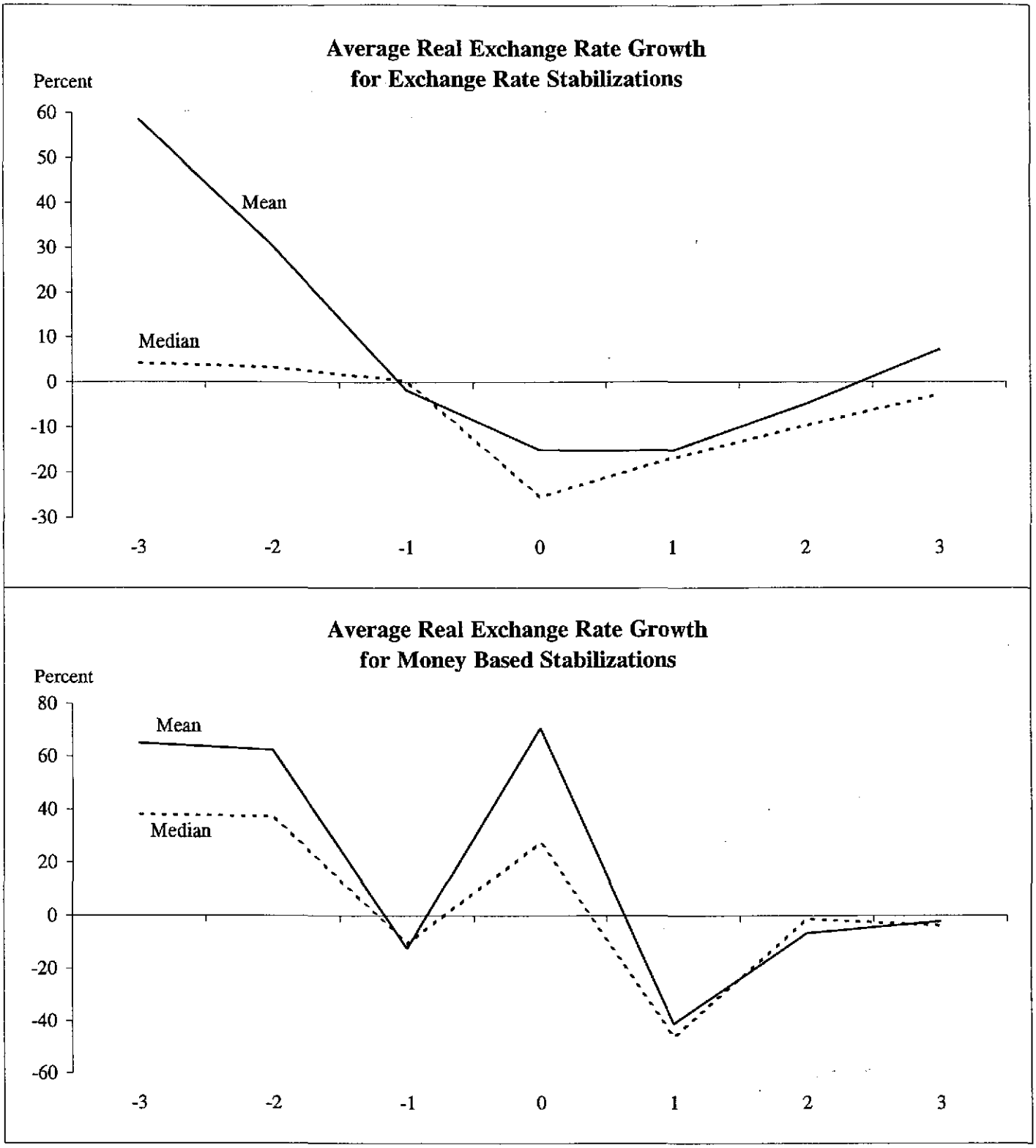


Chart 8


Average Real Exchange Rate Growth
for Exchange Rate Stabilizations
Percent
60
50
40
30
20
10
0
-10
-20
-30
Mean
Median
-3
-2
-1
0
1
2
3
Average Real Exchange Rate Growth
for Money Based Stabilizations
Percent
80
60
40
20
0
-20
-40
-60
Mean
Median
-3
-2
-1
0
1
2
3

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