

# Is Disinflation Good for Growth?

**Peter Blair Henry\***  
**pbhenry@stanford.edu**  
**October 2000**

## Abstract

When countries attempt to stabilize annual inflation rates greater than 40 percent, the domestic stock market appreciates by 24 percent on average. Therefore, the long-run growth benefit of reducing high inflation outweighs the short-run cost. In contrast, the average market response is economically weak and statistically insignificant if the pre-stabilization inflation rate is less than 40 percent. Hence, the net growth benefit of reducing moderate inflation is negligible. The first result seems more consistent with the rational expectations view of disinflation than with the traditional view. The second result appears more consistent with the traditional view than with rational expectations. Together, the results suggest that neither view sufficiently captures the real effects of disinflation across all ranges of initial inflation. The stock market responses also help predict the change in inflation and output in the following year. This additional result indicates that the stock market evidence for the 81 disinflation episodes studied here is not spurious.

---

\*Assistant Professor of Economics, Stanford Business School and Hoover National Fellow 2000-2001: Stanford, CA 94305-5015; (650) 723-0905. I would like to thank Steve Buser and Paul Romer for detailed comments on earlier drafts and many enlightening discussions. I also thank Dave Baron, Olivier Blanchard, Rudi Dornbusch, Andrew Karolyi, Tom Sargent, Andrei Shleifer, Ken Singleton, Jeremy Stein, René Stulz, Ewart Thomas, Romain Wacziarg, Ingrid Werner, and seminar participants at the Hoover Institution, London Business School, the MIT International Breakfast, Ohio State, and the Stanford Macro Lunch for helpful conversations. I am grateful to the Dice Center for Financial Economics at Ohio State University for providing a stimulating research environment during the Summer of 2000 and the Stanford Institute for Economic Policy Research (SIEPR) for financial support. Serkan Arslanap, Joanna Campbell, Begna Gebreyes, Chad Milner, Nora Richardson, and Laura Veldkamp provided stellar research assistance. Finally, I would like to thank Robert Solow for encouraging me to pursue the idea. All remaining errors are my own.

## **I. Introduction**

Traditional wisdom holds that efforts to reduce inflation will cause a fall in output in accordance with the Phillips Curve (Okun, 1978; Gordon, 1982ab; Fischer, 1986; Ball, 1994). In Phillips-Curve-based analyses of disinflation, the short-run cost of reducing inflation is measured as the sum of undiscounted output losses over some horizon (Blanchard, 1999; Hall and Taylor, 1997; Dornbusch and Fischer, 1998; Mankiw, 1997). This approach assumes that there are long-run output benefits of disinflation without making them explicit in a cost-benefit calculation. Therefore, these analyses do not directly address the issue of whether the long-run output benefits of disinflation outweigh the short-run output costs.

This paper uses the stock market to provide just such a cost-benefit analysis. The unanticipated change in a country's stock market index in response to the announcement of a disinflation program is used to measure the expected net output benefits of the program. The stock market is forward-looking, which means that a country's aggregate share price index reflects the present value of the expected future dividends of its publicly traded firms. Under the traditional view, there will be two offsetting effects of a disinflation program on the stock market. Contractionary measures taken to stabilize inflation also reduce the growth rate of output and dividends in the short run. However, the reduction in inflation may increase the growth rate of output and dividends in the long run (Fischer, 1993; Bruno and Easterly, 1998; Burton and Fischer, 1998; Fischer, Sahay, and Végh, 1999). Therefore, the unanticipated change in the stock market in response to the news of disinflation measures the expected net output benefit of the stabilization program to shareholders.

The average unanticipated stock market change associated with the 81 disinflation episodes studied here is estimated using the dummy variable regression framework employed by Ozler (1989), Rose (1985), and Stulz (2000ab). The results show that the expected net output benefits of disinflation depend on the level of initial inflation. When countries attempt to stabilize annual inflation exceeding 40 percent, the stock market appreciates by 24 percent on average. In contrast, if the pre-stabilization inflation rate is less than 40 percent, the market response is economically weak and statistically insignificant.<sup>1</sup> The same conclusion is also reached for stock market responses conditional on alternative classifications of high and moderate inflation. The stock market responds positively and significantly when a country attempts to stabilize high inflation, but there is no significant market response if the pre-stabilization inflation rate is moderate. The stock market response also helps predict the change in inflation and output in the following year. This additional result suggests that the stock market evidence is not spurious.

Under the traditional view of disinflation, the output cost of reducing inflation increases monotonically with the level of inflation. In contrast to the traditional approach, advocates of rational expectations argue that disinflation need not be costly if policy makers credibly commit to reducing inflation. Under this view, the initial level of inflation should be largely irrelevant. Sargent (1982) provides supporting evidence for the rational expectations view. He presents case studies of four countries that abruptly halted post-World War I hyperinflations at virtually no cost to output. More recent work finds that countries may even experience output booms while stabilizing high inflation

---

<sup>1</sup> The 40 percent threshold comes from Easterly (1996) and Bruno and Easterly (1998) who find that inflation rates greater than 40 percent have a negative effect on growth. Barro (1998) reports similar results.

(Végh, 1992). Calvo and Végh (1998) document seven episodes of expansionary stabilization of high inflation. Fischer, Sahay, and Végh (1999) document nine episodes. Easterly (1996) provides broader evidence against the traditional view of disinflation. He studies twenty-eight episodes of high inflation that were successfully stabilized and shows that output expanded on average. In contrast to the recent evidence that reducing high inflation is expansionary, Dornbusch and Fischer (1993) conclude that moderate inflation can be reduced to low inflation only at a substantial short-term cost to growth. This conclusion is based on their case study of four countries that successfully reduced moderate inflation to low inflation.

These previous papers suggest that disinflation is expansionary when starting from high levels of inflation, but contractionary when inflation is moderate. However, these studies focus exclusively on episodes where inflation was successfully reduced. Calvo and Végh (1998) argue that selection bias clouds the interpretation of studies that focus exclusively on episodes where inflation was successfully reduced, instead of all attempts at stabilizing inflation. To illustrate the theoretical content of Calvo and Végh's argument, imagine that a country experiencing high inflation implements a stabilization program. Now suppose that this country experiences a favorable output shock. The shock creates two measurement problems. First, it causes an output boom, which generates a spurious positive correlation between stabilization and output growth. Second, the boom generates a windfall in tax revenue, which reduces the government's need for inflationary finance and therefore raises the probability of a successful stabilization.

Figure 1 illustrates the empirical thrust of Calvo and Végh's (1998) selection bias

critique. The figure plots the average deviation of annual output growth from its sample mean for two subsets of the high inflation episodes to be studied in this paper: those that were successfully stabilized and those that were not. The graph for the successful cases suggests that stabilizing high inflation is expansionary, but it is also consistent with the view that stabilizations succeed because they coincide with favorable exogenous shocks. Indeed, the figure shows that unsuccessful stabilizations are associated with below average growth. However, the graph for the unsuccessful stabilizations is also consistent with multiple interpretations. Countries may experience recessions because (1) stabilization policy is contractionary; (2) growth may not improve because the government is not committed to stabilizing inflation; (3) attempts at stabilizing high inflation may fail because of adverse exogenous shocks. Thus, the general message of Figure 1 is that selective examination of *ex-post* realizations of GDP growth may not accurately measure the real effects of stabilization policy. In a world where economic agents are rational and forward-looking, one ideally wants an *ex-ante* measure of the effect the stabilization program is expected to have on short- and long-run growth.

This paper uses the stock market to provide just such an *ex-ante* measure. The stock market approach has three limitations. First, the stock market response captures the expected net benefits of stabilization to shareholders, not necessarily to the entire economy. Second, to the extent that stabilizations are anticipated, the measured unanticipated change in equity prices associated with a stabilization program will understate the expected impact of disinflation. Third, the stock market response may be muted if the market's assessment of the probability that the government will maintain the program is low; it may be difficult to distinguish empirically between the market

assessing a low probability that the program will be sustained and small net benefits conditional on being sustained.

Despite these limitations, the stock market approach has at least three distinct advantages. First, there is ample evidence that an unbiased assessment of the effects of public information releases is quickly incorporated into stock prices (Fama, 1976). In particular, stock prices in the subset of countries relevant for this paper respond to news of major economic policy reforms (Henry, 2000ab). Second, the stock market focuses the policy debate on the relevant issue of whether the output benefits of disinflation outweigh the costs. Third, the stock market evidence is useful for evaluating competing theories of disinflation.

For example, the stock market evidence for the high inflation episodes seems more consistent with the rational expectations view of disinflation than with the traditional view. On the other hand, the stock market evidence for the moderate inflation episodes appears more consistent with the traditional view than with rational expectations. Together, the results suggest that neither view sufficiently captures the real effects of disinflation across all ranges of initial inflation.

The paper proceeds as follows. Section II discusses the data. Section III provides theoretical motivation for the empirical analysis and presents descriptive findings. Section IV presents the empirical methodology and results. Section V discusses objections to and alternative interpretations of the results. Section VI presents the conclusions.

## **II. Data**

The implementation month and year of the 81 inflation stabilization programs are identified using two sources. The first source of event dates is Calvo and Végh (1998). They identify the best-known stabilizations that received a great deal of attention in the literature on inflation stabilization. The second source is the Annual Reports of the International Monetary Fund (IMF). These reports are used to construct a time series of months in which each of the 21 countries implemented a stabilization program through an official agreement with the IMF. For example, Argentina signed an IMF agreement in September of 1977. Thus September of 1977 is an implementation date for Argentina.

IMF programs typically call for current account stabilization in addition to inflation stabilization. The dual stabilization objectives of these programs do not introduce important biases into the dating procedure. The macroeconomic targets in IMF programs are generated by the IMF's Financial Programming Model, which is based on the monetary approach to the balance of payments (Agénor and Montiel, 1996). Under the monetary approach, balance of payments problems originate from an excess supply of money, with monetization of the government deficit typically seen as the proximate cause of the excess supply. The IMF requires that countries reduce both the fiscal deficit and the growth rate of the money supply in order to stabilize their current account. Thus, the prescription for stabilizing the current account is tantamount to a traditional disinflation program. In fact, the IMF has been intensely criticized in recent years for the uniformity of its policy prescriptions in all country agreements (Corden, 1998).

Including the recent IMF agreements in Mexico (1995), Asia (1997), Russia (1998), and Brazil (1999) would strengthen the central findings of this paper, because

these countries were experiencing moderate inflation and stock prices collapsed during the months leading up to their agreements with the IMF. Nevertheless, these episodes are excluded from the sample for two reasons. First, Dornbusch (1998) argues that the synopsis of stabilization outlined in the preceding paragraph does not provide an accurate description of these recent episodes. He argues that the recent episodes were not inflation crises *per se*, but financial crises; country balance sheets whose assets and liabilities were misaligned with respect to both maturity structure and currency denomination were the proximate cause. Second, as part of these recent agreements, the IMF has imposed major structural and institutional reforms in addition to insisting on its traditional short-run stabilization objectives (Feldstein, 1998).

High inflation episodes are defined as in Easterly (1996) and Bruno and Easterly (1998): 12-month inflation in excess of 40 percent during each of the 24 months leading up to and including the month in which the stabilization was implemented. Moderate inflation episodes are defined analogously: 12-month inflation between 10 and 40 percent during each of the 24 months leading up to and including the month in which the stabilization was implemented. This definition of moderate inflation corresponds closely to that of Dornbusch and Fischer (1993).

Fourteen of the 81 attempted inflation stabilizations are Calvo and Végh (1998) episodes, 2 of which coincide with IMF agreements (Mexico 1977 and Argentina 1991). Thirteen of the 25 attempts at stabilizing high inflation have official IMF sponsorship, and 7 succeed in reducing high inflation to moderate inflation. Seventeen of the 25 episodes occur in Argentina and Brazil. All 56 of the attempts at stabilizing moderate inflation have official IMF sponsorship, and 5 succeeded in reducing moderate inflation



to low inflation. Table A1 in the appendix provides details about all of the inflation stabilization programs identified using both data sources.

The sample includes all countries that: (1) have publicly available stock market data and (2) have undertaken at least one inflation stabilization program (as defined in Section IIIB) at some point since their stock market data became readily available. The 21 countries that satisfy both criteria are: Argentina, Brazil, Chile, Egypt, India, Indonesia, Israel, Jamaica, Jordan, Kenya, Korea, Mexico, Nigeria, Pakistan, Peru, the Philippines, South Africa, Thailand, Turkey, Venezuela, and Zimbabwe. The principal source of stock market data is the International Finance Corporation's (IFC) Emerging Markets Data Base (EMDB). Stock price indices for individual countries are the dividend-inclusive, U.S. dollar-denominated *IFC Global Index*. For most countries, EMDB's coverage begins in December 1975, but for others coverage only begins in December 1984. For those countries for which the IFC does not provide stock market data, the analysis uses the share price index given in the IMF's International Financial Statistics (IFS). Each country's U.S. dollar-denominated stock price index is deflated by the U.S. consumer price index (CPI), which comes from the IFS. All of the data are monthly. The consumer price index for each country is also obtained from the IFS. Returns and inflation are calculated as the first difference of the natural logarithm of the real stock price and CPI, respectively. Section III provides the theoretical motivation for looking at stock market responses to these events and presents some descriptive findings.

### **III. Theoretical Motivation and Descriptive Findings**

Suppose that real output has been growing at a constant rate and that the

government unexpectedly implements an inflation stabilization program.<sup>2</sup> Let  $p$  be the market's assessment of the probability that the government will maintain the program. Assume that with the stabilization program in place, the rate of output growth will decline (Okun, 1978; Gordon, 1982a, 1982b; Fischer, 1986). Once inflation has been reduced, the stabilization program ends and output again grows at a constant rate that might be higher, lower, or equal to the pre-stabilization growth rate.

Let  $C$  denote capital's share in output times the present discounted value (PDV), at the time of the implementation, of the short-run output loss from reducing inflation. Thus,  $C$  is the output cost that shareholders would suffer as a result of reducing inflation. Similarly, let  $B$  denote capital's share in output times the PDV of the long-run output gain. Thus,  $B$  is the output benefit that would accrue to shareholders. With this terminology in place, it is clear that  $\Delta V$ , the change in the value of the stock market in response to the implementation is given by:

$$\Delta V = p(B - C) \tag{1}$$

Equation (1) illustrates the sense in which the stock market provides an observable, *ex-ante* metric of the expected net benefits of stabilization. It also highlights the three key fundamentals that the stock market capitalizes: short-run output losses, long-run output gains, and credibility of the program.

### **III.B. Descriptive Findings**

There are two key questions to be asked about the relationship between the stock market response and the level of inflation that the stabilization program is attempting to

---

<sup>2</sup> In practice, the market may anticipate the stabilization before it is implemented. The implications of market anticipation for the empirical analysis are discussed in Section IV.

reduce. First, does the magnitude of the stock market response increase or decrease as a function of the level of initial inflation? Second, what is the sign of the stock market response and does the sign depend on the level of inflation?

### **III.B.1. Is the Market Response an Increasing Function of Ex-Ante Inflation?**

Figure 2 provides a rough empirical answer to the first question: the net benefits of stabilization appear to be an increasing function of the level of *ex-ante* inflation. Month “0” is defined as the month in which a given stabilization program is implemented. The IFC records the value of a country’s stock market index at the end of the month. The data on stabilization events do not provide the day of the month on which programs are implemented. These facts imply that the implementation of a given stabilization program may occur after the day of the month on which the IFC recorded prices. In such cases, the change in the stock market index in month [0] may not reflect the news of the stabilization event. Accordingly, Figure 2 plots the unadjusted cumulative change in the real dollar value of the stock market index in months [0, +1] against the average 12-month inflation rate over the two years prior to implementation. Figure 2 suggests that the two-month stock price change is an increasing function of the ex-ante inflation rate. The higher the ex-ante inflation rate, the greater the stock price response when a stabilization program is implemented.

The positive linear relationship apparent in Figure 2 is given by the following regression equation (robust t-statistics in parentheses  $R^2=0.10$ ,  $N=81$ ):

$$\Delta \ln(\text{stockprice}_{[0,+1]}) = 3.73 + 0.076 * \text{inflation} \quad (2)$$

(1.4) (1.8)

The unconditional relationship is significant but the relationship is also noisy. There are a number of high inflation episodes for which the actual stock price change is close to zero. Explanations for these outliers are considered in Section IV.C.1

### **III.B.2. Is the Sign of the Response Uniform Across All Ranges of Ex-Ante Inflation?**

Figure 2 shows that, on average, the expected net benefits of stabilizing appear to be roughly zero near the origin, but are clearly positive at high levels of inflation. Table 1 investigates this feature of the data for three different groupings of the 81 stabilization episodes based on levels of average inflation prior to implementation. The first grouping corresponds to the Bruno and Easterly (1998) classification of high versus moderate inflation; the second simply divides the total sample into two groups of equal size: high inflation (40 cases) and moderate inflation (41 cases). The third comparison splits the sample into three groups of equal size: high inflation (27 cases), moderate inflation (27 cases), and low inflation (27 cases). The alternative classification schemes are useful for checking whether the results are sensitive to the Bruno and Easterly inflation classification. In particular, the two-way numerical split creates a superset of the Bruno and Easterly high inflation episodes that is not dominated by Argentina and Brazil. Seventeen of the 25 Bruno and Easterly high inflation episodes are in Argentina and Brazil.

The first three rows of Table 1 report summary statistics for the number of country episodes, the median inflation rate and the median stock price response for the high and moderate categories under each inflation classification scheme. The fourth row identifies the number of country episodes for which the stock price change over the two-

month-implementation window is less than the country-specific median two-month stock price change.

The last row of Table 1 reports the two-sided p-value of observing at most the corresponding number of stock price responses to stabilization below their country-specific median two-month percentage stock price change. The sign tests are significant at the one percent level for the high inflation episodes under all three inflation classification schemes. The sign tests are never significant for the moderate inflation episodes. These sign tests should be treated with caution, because they are based on raw returns. However, the consistency of the findings suggests that more careful measurements of the stock market response to stabilizing high versus moderate inflation may not be overly sensitive to any particular classification scheme. For brevity and comparability to previous work, the next section of the paper estimates the stock market response to stabilization conditional on inflation being high or moderate in the Easterly (1996) and Bruno and Easterly (1998) sense.

#### **IV. Methodology and Results**

The average stock market response to implementation of an inflation stabilization program is estimated using the dummy variable regression framework in Rose (1985). Under the assumption that markets are efficient, a country's stock market index will adjust to information about changes in expected future profits or discount rates. Measuring the response of share prices to inflation stabilization events enables us to infer whether the expected net benefits of stabilizing inflation are positive or negative.

Following Stulz (2000ab), the world capital asset pricing model is used to

measure the expected return on each country's stock market index. The abnormal return associated with a stabilization event is the residual from this model. This implies a stochastic return generating process for country  $i$  of the following form that is possibly affected by inflation stabilization events:

$$R_{it} = \alpha + \beta_i R_t^w + \gamma_1 HIGH_{it} + \gamma_2 MOD_{it} + \varepsilon_{it} \quad (3).$$

$R_{it}$  is the real return in dollars on country  $i$ 's stock market index in month  $t$ .  $R_t^w$  is the real return in dollars on the Morgan Stanley Capital Market Index (MSCI) world stock market index in month  $t$ .  $HIGH_{it}$  is a dummy variable that is equal to one in high-inflation-stabilization months  $[0, +1]$  in country  $i$ .  $MOD_{it}$  is a dummy variable that is equal to one in moderate-inflation-stabilization months  $[0, +1]$  in country  $i$ . The constant intercept term,  $\alpha$ , implicitly assumes perfect capital market integration. Alternative specifications that allow for country-specific intercepts are also examined and yield similar results.

The usual assumption that  $\varepsilon_{it}$  is a serially uncorrelated, random error term requires further discussion. Equation (3) is estimated using Feasible Generalized Least Squares (FGLS). An assumption of no serial correlation in stock returns could be justified on the grounds of rational expectations, but the estimation procedure will allow for the possibility of serial correlation. The estimation procedure also allows for heteroscedasticity across countries. However, with an unbalanced panel it is not possible to relax the assumption of no contemporaneous correlation of the error term across countries. Therefore, a number of indirect precautions are taken.

First, short estimation windows are used in all of the central results; the assumption that country abnormal returns are not contemporaneously correlated is

reasonable if event windows do not overlap in calendar time and overlaps occur less frequently with short windows. The *HIGH* and *MODERATE* stabilization dummies are on for two-month windows,  $[0, +1]$ . Estimates using one-month windows,  $[0]$ , are also provided. Second, the extent to which contemporaneous correlation is likely to be a problem with short windows was investigated. With two-month and one-month estimation windows, 29 of the 162 and 11 of the 81 event periods overlap, respectively. These numbers suggest that a small fraction of the abnormal returns from (3) will potentially be affected by contemporaneous correlation. Third, two of the alternative regression specifications to equation (3) will estimate abnormal returns relative to the IFC's emerging stock market index. Since all of the sample countries are emerging markets, the inclusion of a composite emerging market index as a right-hand-side variable will partially control for contemporaneously correlated disturbance terms in the spirit of Ozler (1989).<sup>3</sup> Including the emerging market index does not change the results.

Equation (3) constrains the coefficient on *HIGH* to be the same across all months. Thus, the parameter  $\gamma_1$  measures the average monthly stock market response to all attempted stabilizations of high inflation. Similarly,  $\gamma_2$  measures the average monthly response to all attempted stabilizations of moderate inflation. Since the dummy variable for the event window is two-months long, the total stock market response to each type of stabilization attempt is given by two times the parameter estimate. A different estimation technique would be to use a seemingly unrelated regression (SUR). This approach would have the advantage of providing a unique coefficient estimate for each country for each

---

<sup>3</sup> Ozler estimates a pooled cross-section time series dummy variable model to estimate the average effect of international debt restructuring on US bank stock returns. Bank abnormal returns are estimated relative to returns on the US stock market. She controls for contemporaneous correlation across banks by also including the return on a portfolio of banking industry securities on the right-hand side.

event. However, there are also several disadvantages to this approach. First, the low power of hypothesis tests in unconstrained systems severely weakens the ability of the event study methodology to detect the impact of the event (Rose, 1985). Second, SUR requires a balanced panel. Due to the limited time series availability of stock market data, creating a balanced panel would result in discarding almost half of the 81 stabilization events. Given data limitations, the pooled cross-section time series framework seems appropriate.

#### **IV.A. Stock Market Reactions to Attempted Stabilizations of High Versus Moderate Inflation**

In order to isolate the effects of stabilization, Panel A of Table 2 presents estimates of *HIGH* and *MODERATE*. The first row presents estimates from the benchmark specification given by equation (3). Heteroscedastic-consistent standard errors are reported in parentheses. The estimated coefficient on *HIGH* is 0.121 and is significant at the one-percent level. This means that the stock market increases by an average of 12.1 percent per month in real dollar terms when governments attempt to stabilize high inflation. Therefore, the total stock market increase associated with the *HIGH* implementation window is 24.2 percent in real dollar terms. The estimated coefficient on *MODERATE* is 0.001 and is not statistically significant. Therefore, the stock market response to stabilizing moderate inflation is not significantly different from 0. The column labeled “P-Value of *HIGH* > *MODERATE*” shows that the p-value for a test that the coefficient on *HIGH* equals the coefficient on *MODERATE* is 0.01. Therefore, the coefficient on *HIGH* is significantly larger than the coefficient on *MODERATE*.



Table 2 also presents estimates of *HIGH* and *MODERATE* using alternative specifications. Row 2 presents estimates that use real US stock returns,  $R_t^{US}$ , in place of  $R_t^W$  in equation (3). Row 3 presents estimates that use the real dollar return on the IFC Emerging Market index,  $R_t^{LDC}$ , in place of  $R_t^W$ . Row 4 presents estimates that use all three sets of returns simultaneously. As an alternative to the market model in equation (3), Row 5 presents estimates based on simple mean-adjusted abnormal returns:

$$R_{it} = \alpha + \gamma_1 HIGH_{it} + \gamma_2 MODERATE_{it} + \varepsilon_{it} \quad (4).$$

As a final specification, Row 6 presents estimates using a statistical model in which mean-returns may differ across countries by allowing for country-specific intercept terms:

$$R_{it} = \alpha_i + \gamma_1 HIGH_{it} + \gamma_2 MODERATE_{it} + \varepsilon_{it} \quad (5).$$

Letting the intercept terms vary across countries allows for the possibility that average expected returns may differ across countries due to imperfect capital integration.

The central result is the same under all six specifications. The stock market responds positively and significantly to attempts at stabilizing high inflation, with the average effect ranging from 11.3 to 12.2 percent per month. Thus, the total effect is between 22.6 and 24.4 percent. The response to stabilizing moderate inflation is small and never significant. The estimate of *HIGH* is always significantly larger than the estimate of *MODERATE*. Panel B of Table 2 also presents estimates based on month [0] only. These estimates closely match the month [0, +1] estimates. In some cases, the month [0] estimate is smaller than the month [0, +1] estimate, which suggests that not all of price change is captured in month [0].

As a final robustness check, the analysis explores whether the results are sensitive

to whether real returns are measured in dollars or local currency units. The potential problem is that in high-inflation countries, the rate of depreciation of the nominal exchange rate may not keep pace with inflation. If inflation exceeds the rate of nominal depreciation, then the currency is appreciating in real terms, which means that the real dollar value of the stock market may become artificially inflated. In order to see whether the results in Table 2 are driven by real appreciation of the local currency *vis-à-vis* the dollar, all of the regressions were re-estimated using real local currency returns instead of real dollar returns as the left-hand-side variable. The results were virtually identical to the estimates that use dollar-denominated returns.

#### **IV.A.1. Are the Differences Between HIGH and MODERATE Driven by Market Anticipation?**

The estimates in Table 2 may understate the stock market response if the market anticipates stabilizations. In particular, suppose that news of future stabilization attempts are announced or leaked to the public. Countries with high inflation also have a long history of failures. Thus, the market may be less prone to believe announcements by these governments. If this is the case, the stock market may increase in anticipation of stabilizing moderate inflation. Under this scenario we would incorrectly infer that there are significant differences in the market response to attempted stabilizations of high and moderate inflation.

To explore this possibility, equation (3) is used to estimate abnormal returns and cumulative abnormal returns for the 12 months prior and the 12 months following attempted stabilizations of high and moderate inflation. Two important caveats are in order here. First, in the span of a 24-month window there is a lot that could be going on

and the estimates do not control for this. Second, with long estimation windows, the problem of overlapping event windows is likely to be more severe and the standard errors are therefore more subject to problems stemming from cross-country correlation in the error term. Keeping these limitations in mind, the numbers may be useful in providing a crude sense of whether the market anticipates stabilizations. Table 3 presents the results. There is no substantial run-up in prices preceding attempted stabilizations of high inflation. The cumulative abnormal return from month  $-12$  to  $-1$  is close to 0. In the case of moderate inflation, the market experiences a cumulative fall of about 16 percent. This fall in prices is consistent with the view that stabilization of moderate inflation is a negative net present value event for shareholders and the market anticipates these events. This fact reinforces the differences between HIGH and MODERATE evident in Table 2

#### **IV.A.2. Are the HIGH Results Exclusively an Exchange-Rate-Based Stabilization Phenomena?**

There is an extensive literature on inflation stabilization in developing countries, which demonstrates that countries that have stabilized inflation by fixing the nominal exchange rate have experienced output booms (Végh, 1992; Calvo and Végh, 1998; Fischer, Sahay and Végh, 1999). All of these exchange-rate-based stabilization (ERBS) episodes were implemented in high-inflation regimes. Therefore, this subsection investigates whether the positive and significant stock market response to the attempted stabilization of high inflation reported in Table 2 is unique to ERBS, or is a more general outcome associated with stabilizing high inflation.

In order to address this issue, the 25 attempts at stabilizing high inflation are split into two groups: those that were exchange-rate-based and those that were not. A total of

8 of these 25 episodes are identified as exchange-rate-based stabilizations by Calvo and Végh (1998) and Fischer *et al.* (1999). After separating these two kinds of stabilizations the following panel regression is estimated:

$$R_{it} = \alpha + \beta_i R_t^W + \gamma_1 NONERBS_{it} + \gamma_2 ERBS_{it} + \varepsilon_{it} \quad (6).$$

*NONERBS* is a dummy variable that equals 1 in months [0, +1] of all non-exchange-rate-based attempts at stabilizing high inflation. *ERBS* is a dummy variable that equals 1 in months [0, +1] of all exchange-rate-based attempts at stabilizing high inflation.

Panel A of Table 4 shows that the estimated coefficients on *ERBS* range from 10.5 to 15.2 percent per month, and all are significant at the one percent level. These estimates are consistent with the finding that exchange-rate-based-stabilizations are associated with output booms (Végh, 1992; Calvo and Végh, 1998; Fischer Sahay and Végh, 1999). The point estimates of the coefficient on *NONERBS* range from 10.2 to 12.1 percent per month and are also significant at the one-percent level. The column labeled “P-Value of *ERBS*>*NONERBS*” shows that the p-value for an F-test that the coefficient on *ERBS* is significantly different from the coefficient on *NONERBS* is not significant for any specification in Table 4. Therefore, the point estimates of *ERBS* are statistically indistinguishable from those for *NONERBS*. This fact, taken together with the evidence in Table 2, suggests that the stock market responds more favorably to the stabilization of high inflation than it does to the stabilization of moderate inflation, regardless of whether the stabilization program is exchange-rate-based or not. Thus, the stock market evidence also supports Easterly’s (1996) finding that output booms are not limited to exchange-rate-based stabilizations of high inflation.

## IV.B. Does the Stock Market Get it Right?

This subsection of the paper asks whether the stock market rationally forecasts stabilization outcomes. The analysis employs three crude approaches. The first approach examines if controlling for previous failed stabilizations strengthens the positive relationship between the stock market response and the ex-ante inflation rate. The second approach asks whether the stock market response helps predict the ex-post change in inflation. The third approach explores whether the unexpected change in the stock market helps predicts ex-post GDP growth.

### IV.B.1. Stock Market Responses and Ex-Ante Inflation Rates Revisited

If the stock market is rational, then it may place a lower probability of success on stabilization programs that follow on the heels of failed attempts. Equation (1) suggests that a lower probability of success will decrease the stock market response to news of stabilization. Therefore, a low probability of success may explain why the stock price change is close to zero for a number of high-inflation episodes in Figure 2. This discussion suggests that the relationship between the stock market response and ex-ante inflation after controlling for past failures should be stronger than the unconditional relationship documented in Section III.B. Two approaches are taken.

First, equation (2) is re-estimated. This time the inflation rate is interacted with a variable called *PREVFAIL*. *PREVFAIL* is equal to one if there was a failed stabilization in the previous 24 months (robust t-statistics in parentheses  $R^2 = 0.22$ ,  $N=81$ ):

$$\Delta \ln(\text{stockprice}_{[0,+1]}) = 2.21 + 0.203 * \text{inflation} - 0.158(\text{inflation} * \text{prevfail}) \quad (8)$$

(0.9) (3.6) (-2.6)

The conditional relationship between the stock market change and the average pre-stabilization inflation rate is stronger than the unconditional one. Relative to equation (2) the coefficient on *INFLATION* is higher, the robust t-statistic is larger, and the R-squared is bigger. The interactive term, *INFLATION\*PREVFAIL* also has the expected negative sign and is significant.

As a second pass at the data, Figure 3 plots the implementation window stock price change versus the average 12-month inflation rate for only those episodes that were not preceded by a failed stabilization in the previous 24 months. There are 41 such episodes. Figure 3 and equation (9) below exhibit a tighter positive linear relationship between the stock price change and inflation than Figure 2 and equation (2), which do not control for past failures. The trend line in Figure 3 is given by the following equation (robust t-statistics in parentheses  $R^2=0.48$ ,  $N=41$ ):

$$\Delta \ln(\text{stockprice}_{[0,+1]}) = -2.51 + 0.237 * \text{inflation} \quad (9)$$

(-0.9) (4.7)

The outlier in the upper right hand corner of Figure 3 is Peru. In 1989 and 1990 the average inflation rate in Peru was 344 percent and real GDP fell by 12.3 and 5.5 percent, respectively. In August of 1990 Alberto Fujimori was inaugurated as the new prime minister and implemented a sweeping stabilization program, which came to be known as “Fujishock.” The stock market increased by 100 percent in real dollar terms between August and September. In 1991 inflation fell to 44 percent and real GDP grew by 6.7 percent. The positive linear relationship in Figure 3 remains significant if Peru is removed.

#### **IV.B.2. Do the Stock Market Responses Predict Ex-Post Changes in Inflation?**

To the extent that the stock market response predicts the expected net benefit that will accrue to shareholders as a result of stabilizing inflation, it should also have some predictive power for the ex-post change in inflation. Specifically, the ex-ante stock price response should be negatively associated with the ex-post change in inflation. Figure 4 examines whether the data support this prediction. The variable on the y-axis is the change in inflation: the average 12-month inflation rate in the year after stabilization minus the 12-month inflation rate in the two years prior to stabilization. The variable on the x-axis is the unexpected stock price change (as measured by the cumulative abnormal return for months [0,+1]). The trendline in Figure 4 is given by the following equation (robust t-statistics in parentheses  $R^2=0.05$ ,  $N=81$ ):

$$\Delta inflation = -6.60 - 0.546 * \Delta \ln(stockprice_{[0,+1]}) \quad (10)$$

(-1.2) (-2.2)

The stock price response to stabilization seems to have some unconditional predictive power for what will happen to inflation in the following year.

#### **IV.B.3. Do the Stock Market Responses Predict Future GDP Growth?**

To the extent that the stock market response to stabilization capitalizes the expected net output benefits, then there should be a positive relationship between the ex-ante stock price change and GDP growth outcomes following the stabilization. The unexpected stock market change should reflect the “news” about future GDP growth. If the sample mean is taken as a measure of the expected future growth rate, then the deviation of GDP growth from its country-specific sample mean is a metric of the news

in GDP growth.

Figure 5 compares the average deviation of real GDP growth in years [0, +3] with the average deviation over the pre-stabilization period (years [-3, -1]), for all episodes of attempted stabilizations of high inflation. Region B, the area above the average pre-stabilization deviation, is substantially larger than Region A, the area below. Figure 6 compares the average deviation in stabilization years [0, +3] with the average deviation over the pre-stabilization period, for all episodes of attempted stabilizations of moderate inflation. In this figure, Region B is not substantially larger than Region A. Overall, the comparisons appear at least roughly consistent with the discounted evidence provided by the stock market (Table 2).

Figure 7 plots the GDP news measure versus the unexpected stock price change. The graph suggests that the stock market has predictive power. The corresponding regression confirms the statistical significance of the apparent relationship (robust t-statistics in parentheses  $R^2=0.09$ ,  $N=81$ ):

$$GDPDEVIATION = -0.42 + 0.0476 * \Delta \ln(stockprice) \quad (11)$$

(-1.0) (2.9).

Equation (11) indicates that, on average, an unexpected stock price increase of 100 predicts GDP growth in the following year that is 4.76 percentage points above its sample mean. This equation should not be given a causal interpretation. It does not say that the unexpected stock market change causes growth.

## V. Alternative Explanations and Interpretations

There are some lessons we can learn from these data. For example, the results



demonstrate that the expected net benefits of disinflation are an increasing function of the initial level of inflation. However, there are other issues, which cannot be disentangled on the basis of these data alone. This section of the paper highlights some of these questions without resolving them.

For example, the 24 percent jump in real equity prices in anticipation of reducing high inflation seems at odds with the traditional view that disinflation is costly in the short run. However, it is possible that stabilizing high inflation is costly in the short run, but these costs are swamped by the long-run benefits. Therefore, the high inflation results could be consistent with the traditional view. Analogously, the negligible stock price response in anticipation of stabilizing moderate inflation appears more consistent with the traditional view than with rational expectations. However, it is possible that stabilizing moderate inflation is costless in the short run, but also generates minimal long-run growth benefits (Barro, 1998). Hence, the moderate inflation results could be consistent with rational expectations.

The data show that the expected net benefits of stabilizing high inflation exceed those of moderate inflation. It would be useful to know whether this result is driven primarily by a difference in net benefits, conditional on success, or differing probabilities of success. The current evidence is silent on this issue. The observed differences in the stock market responses for cases of high versus moderate inflation may also be driven by exogenous factors for which the current analysis does not control. For example, stabilizing high inflation might signal broader future macroeconomic reforms as suggested by Bruno and Easterly (1996), whereas stabilizing moderate inflation might not. In such cases, the stock market may respond more favorably at the time of the

stabilization of high inflation, even if there are no substantial differences in the real effects of stabilizing high versus moderate inflation per se. Using short event windows reduces the chance of contamination from confounding major events that are unrelated to stabilization. However, even a short window does not entirely eliminate the concern. The evidence relating the stock market response to ex-post inflation and growth outcomes is also subject to a similar critique.

The potential for reverse causality also merits discussion. If strong economic performance drives policy-makers to initiate disinflation programs, then the estimated stock market response to attempts at stabilizing high inflation may be upward biased. The pre-stabilization-window evidence (Table 3) and the data on GDP growth (Figures 5 and 6) do not suggest reverse causality, but the possibility cannot be dismissed.

Virtually all of the moderate inflation episodes are identified using IMF agreements. Section II of the paper provides evidence in support of the view that IMF programs are tantamount to traditional disinflation programs. If inflation reduction is not a major objective of an IMF program, then the stock market results for the cases of moderate inflation suggest that an IMF program is of marginal net benefit to the economy when inflation reduction is not the major objective.

Finally, broader social welfare implications of the stock market results are also limited by the fact that this measure of the net benefits of stabilization is limited to the perspective of shareholders only. For example, stabilizing moderate inflation may generate private benefits for non-shareholders, even if it is of little consequence to shareholders. There may also be public benefits from reducing moderate inflation that are not captured in the stock market response. Conversely, whereas shareholders benefit

from stabilizing high inflation, the results do not necessarily imply that non-shareholders are also better off. For example, if stabilization increases capital's share in GDP, then labor may not benefit from the increase in net present value of expected future output.

## **VI. Conclusion**

The traditional view of disinflation predicts that efforts to reduce inflation will cause a fall in output in accordance with the Phillips-curve. Under this approach, the social cost of disinflation is taken to be the sum of undiscounted output losses over some horizon. Therefore, for a given sacrifice ratio, the total social cost of disinflation increases monotonically with the initial level of inflation. In contrast to the traditional approach, advocates of rational expectations argue that disinflation need not be costly if policy makers are truly committed to reducing inflation. Under this view, the initial level of inflation should be largely irrelevant.

This paper uses the stock market to compare the present discounted value of the output gains of disinflation with the present discounted value of the output losses. The evidence suggests three key results. First, the expected net benefits of stabilizing high inflation are large--the stock market increases by 24 percent in real dollar terms--and reliably significant. Second, the expected net benefits of stabilizing moderate inflation are economically weak and statistically insignificant. Third, the stock market response to attempted stabilizations is a reliable, though admittedly noisy, predictor of future inflation and future growth in output. These additional findings indicate that the difference in stock market responses for high and moderate inflation is not spurious.

The stock market evidence for high inflation seems more consistent with the

rational expectations view of disinflation than with the traditional view. The moderate inflation results appear more consistent with the traditional view than with rational expectations. Together, the results suggest that neither view sufficiently captures the real effects of disinflation across all ranges of initial inflation. Future research may yet provide a unified view over the entire empirical landscape.

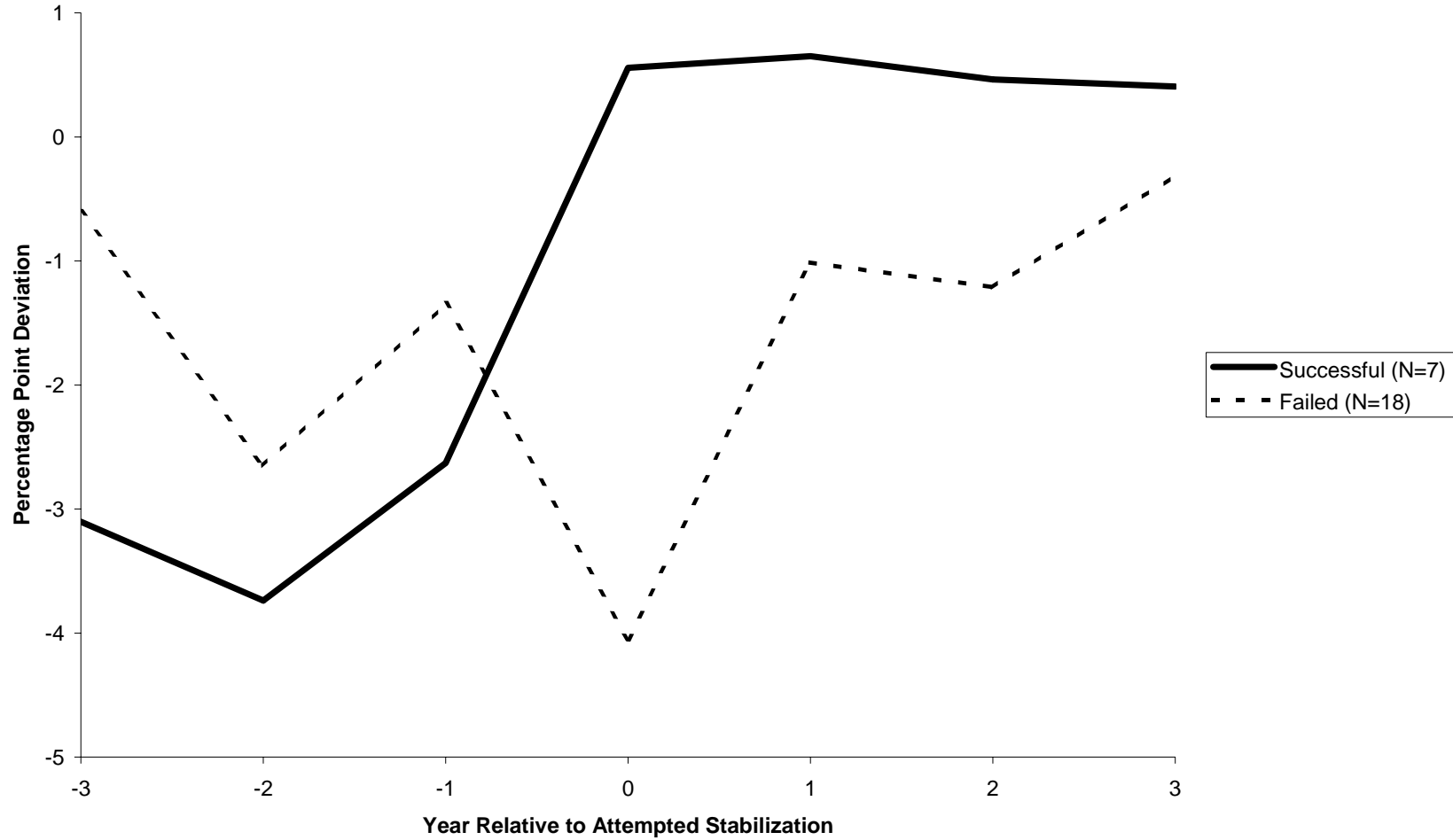
## References

- Agénor, Pierre-Richard and Peter Montiel (1996) *Development Macroeconomics*, Princeton: Princeton University Press.
- Ball, Laurence (1994). “What Determines the Sacrifice Ratio?” in *Monetary Policy*, ed. By N. G. Mankiw, Chicago: University of Chicago Press.
- Barro, Robert J. (1998). “Determinants of Economic Growth: Implications of the Global Evidence for Chile” Mimeo Harvard University.
- Blanchard, Olivier Jean (1999). *Macroeconomics*, Upper Saddle River, NJ: Prentice Hall.
- Bruno, Michael, and William Easterly (1998). “Inflation Crises and Long Run Growth” *Journal of Monetary Economics*, Vol. 41, No. 1, 3-26.
- Bruno, Michael and William Easterly (1996). “Inflation’s Children: Tales of Crises that Beget Reforms” *American Economic Review*, Vol. 86, No. 2, 213-217.
- Burton, David and Stanley Fischer (1998) “Ending Moderate Inflation” in Cottarelli and Szpáry eds. *Moderate Inflation: The Experience of Transition Economies*, International Monetary Fund.
- Calvo, Guillermo and Carlos Végh (1998). “Inflation Stabilization and Balance of Payments Crises in Developing Countries” *Handbook of Macroeconomics*, forthcoming
- Corden, W. Max, (1998). “The Asian Crisis: Are the IMF Prescriptions Right” Working Paper, Johns Hopkins University
- Dornbusch, Rudiger (1998). “After Asia: New Directions for The International Financial System” Mimeo MIT
- Dornbusch, Rudiger (1998). “Containing High Inflation” Mimeo MIT.
- Dornbusch, Rudiger, and Stanley Fischer (1993). “Moderate Inflation” *The World Bank Economic Review*, Vol. 7, No. 1, 1-44.
- Dornbusch, Rudiger and Stanley Fischer (1998). *Macroeconomics*, New York, New York: McGraw Hill.
- Easterly, William, (1996). “When is Stabilization Expansionary?” *Economic Policy*, 22: 67-107.
- Fama, Eugene F., (1976). *Foundations of Finance*, New York: Basic Books.

- Feldstein, Martin, (1998). "Refocusing the IMF," *Foreign Affairs*.
- Fischer, Stanley (1986). "Exchange Rate versus Money Targets in Disinflation" in his *Indexing, Inflation, and Economic Policy*, Cambridge, MA: MIT Press 247-62.
- Fischer, Stanley (1993). "The Role of Macroeconomic Factors in Growth," *Journal of Monetary Economics*, 32: 482-512.
- Fischer, Stanley, Ratna Sahay and Carlos Vegh (1999). "Modern Hyper and High Inflations," Mimeo, International Monetary Fund and UCLA.
- Gordon, Robert J. (1982a). "Why Stopping Inflation May be Costly: Evidence From Fourteen Historical Episodes," in R.E. Hall, ed. *Inflation: Causes and Effects*. Chicago: University of Chicago Press, 11-40.
- Gordon, Robert J. (1982b). "The Output Cost of Disinflation in Traditional and Vector Autoregressive Models" *Brookings Papers on Economic Activity*, 1: 205-45.
- Hall, Robert and John B. Taylor (1997). *Macroeconomics*, New York, NY: Norton and Company.
- Henry, Peter B. (2000a). "Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices" *Journal of Finance* 55: 529-64.
- Henry, Peter B. (2000b) "Do Stock Market Liberalizations Cause Investment Booms?" *Journal of Financial Economics*, 58: 301-34.
- Little, I.M.D., Richard N. Cooper, W. Max Corden, and Sarath Rajapatirana (1993). *Boom, Crisis, and Adjustment: The Macroeconomic Experience of Developing Countries*, Oxford University Press, Oxford.
- Mankiw, N. Gregory (1997). *Macroeconomics*, New York, New York: Worth.
- Okun, Arthur M. (1978). "Efficient Disinflationary Policies," *American Economic Review*, 68: 348-352.
- Ozler, Sule, 1989, On the relationship between reschedulings and bank value, *American Economic Review* 12, 1117-31.
- Rose, Nancy (1985). "The Incidence of Regulatory Rents in the Motor Carrier Industry" *Rand Journal of Economics* 16: 299-318.
- Sargent, Thomas (1982). "The Ends of Four Big Inflations" " in R.E. Hall, ed. *Inflation: Causes and Effects*. Chicago: University of Chicago Press, 41-97.
- Stulz, René M. and Bong-Chan Kho (2000a), Banks, the IMF, and the Asian Crisis

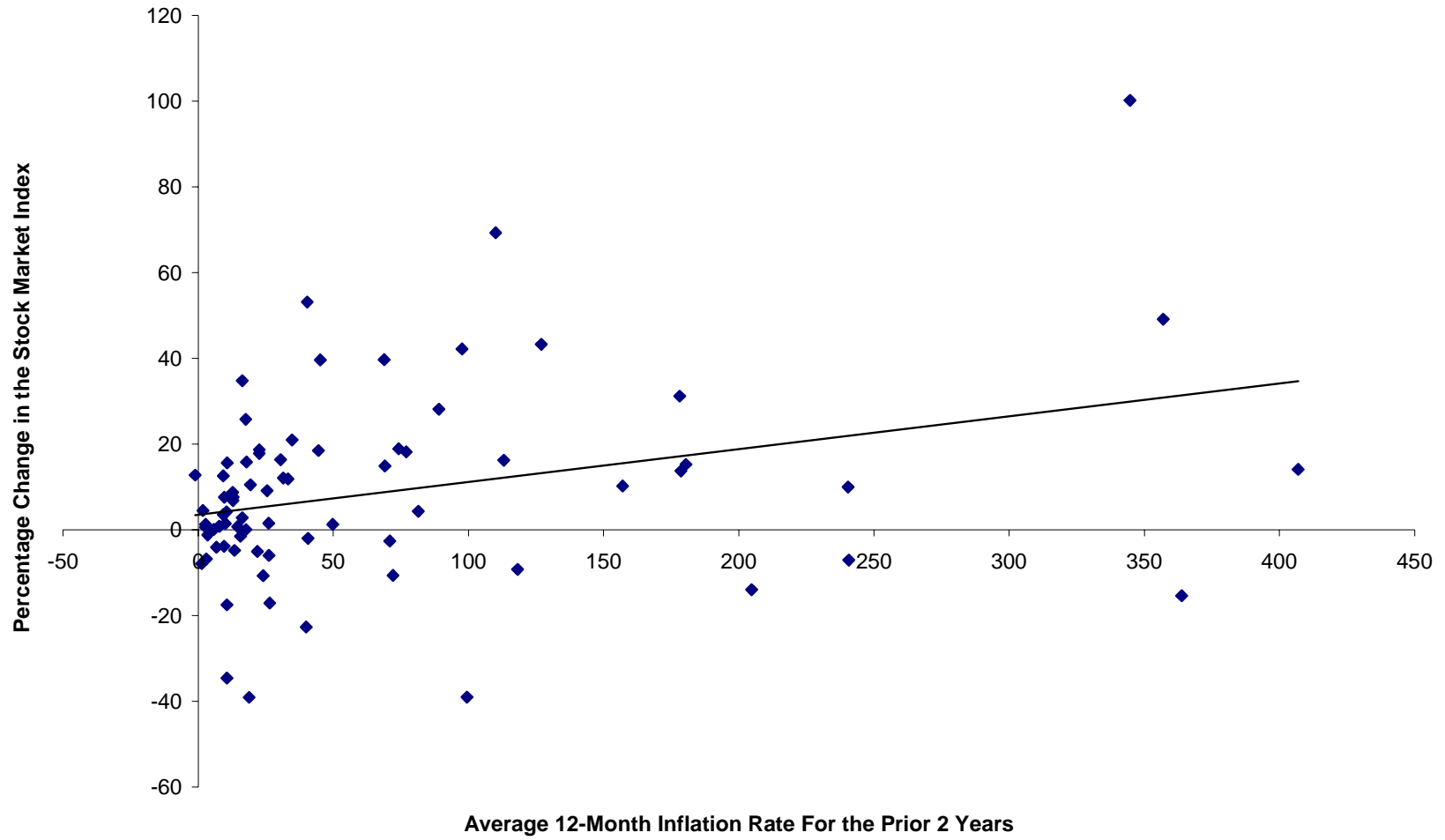
- Working paper, Dice Center for Financial Economics, The Ohio State University.
- Stulz, René M., Bong-Chan Kho, and Dong Lee (2000b), "U.S. Banks, Crises, and Bailouts: From Mexico to LTCM" *American Economic Review*, forthcoming.
- Stulz, René M. (1999a). "International Portfolio Flows and Security Markets" in Martin Feldstein, ed. *International Capital Flows*. Chicago: University of Chicago Press.
- Stulz, René M. (1999b). "Globalization, Corporate Finance, and the Cost of Capital" *Journal of Applied Corporate Finance*, 12: 8-25.
- Végh, Carlos A. (1992) "Stopping High Inflation: An analytical overview" *IMF Staff Papers*, 39: 626-695.

**Figure 1. Average Deviation of Real GDP Growth From Country-Specific Sample Mean Around Attempted Stabilizations of High Inflation Episodes**

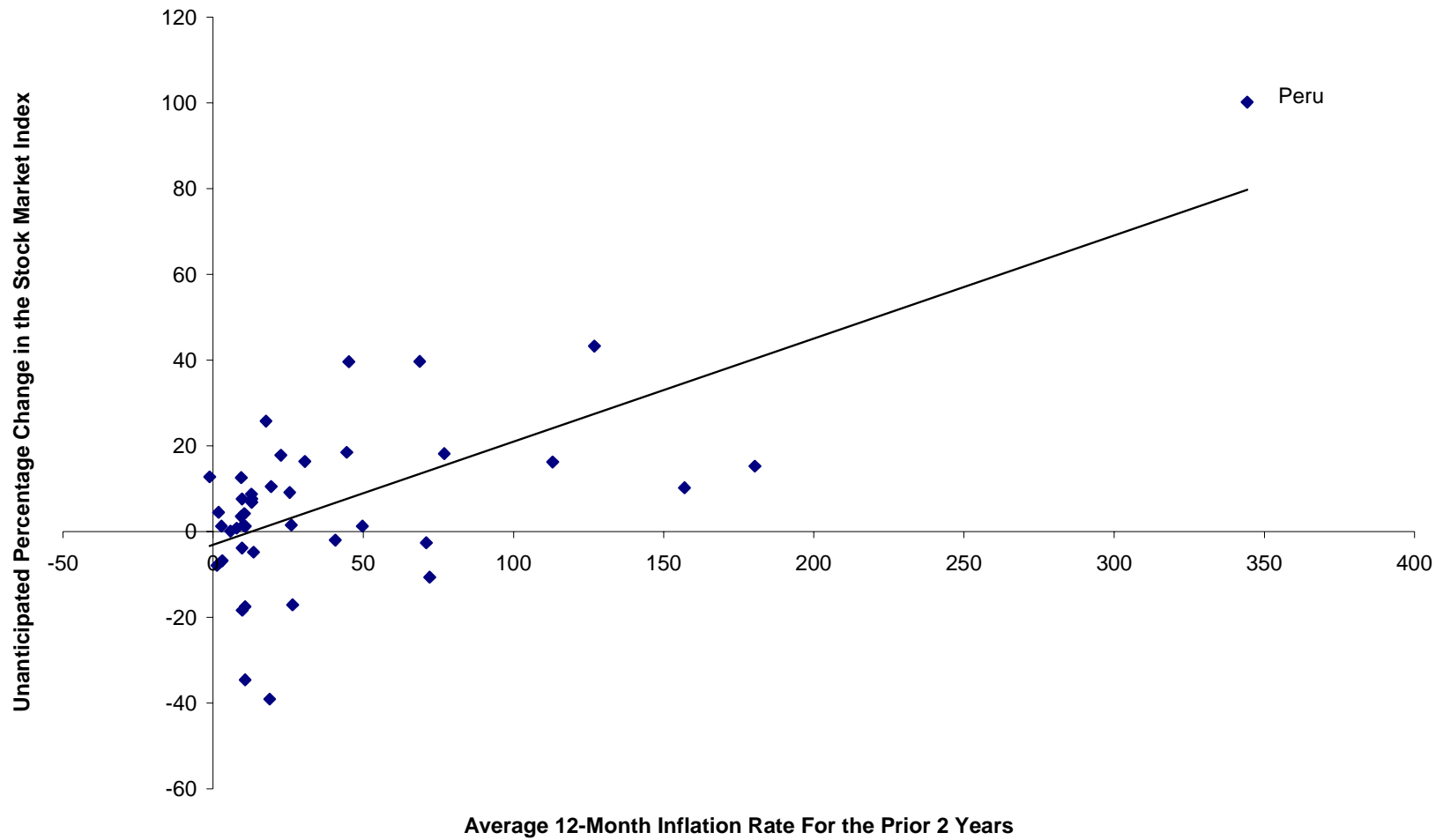




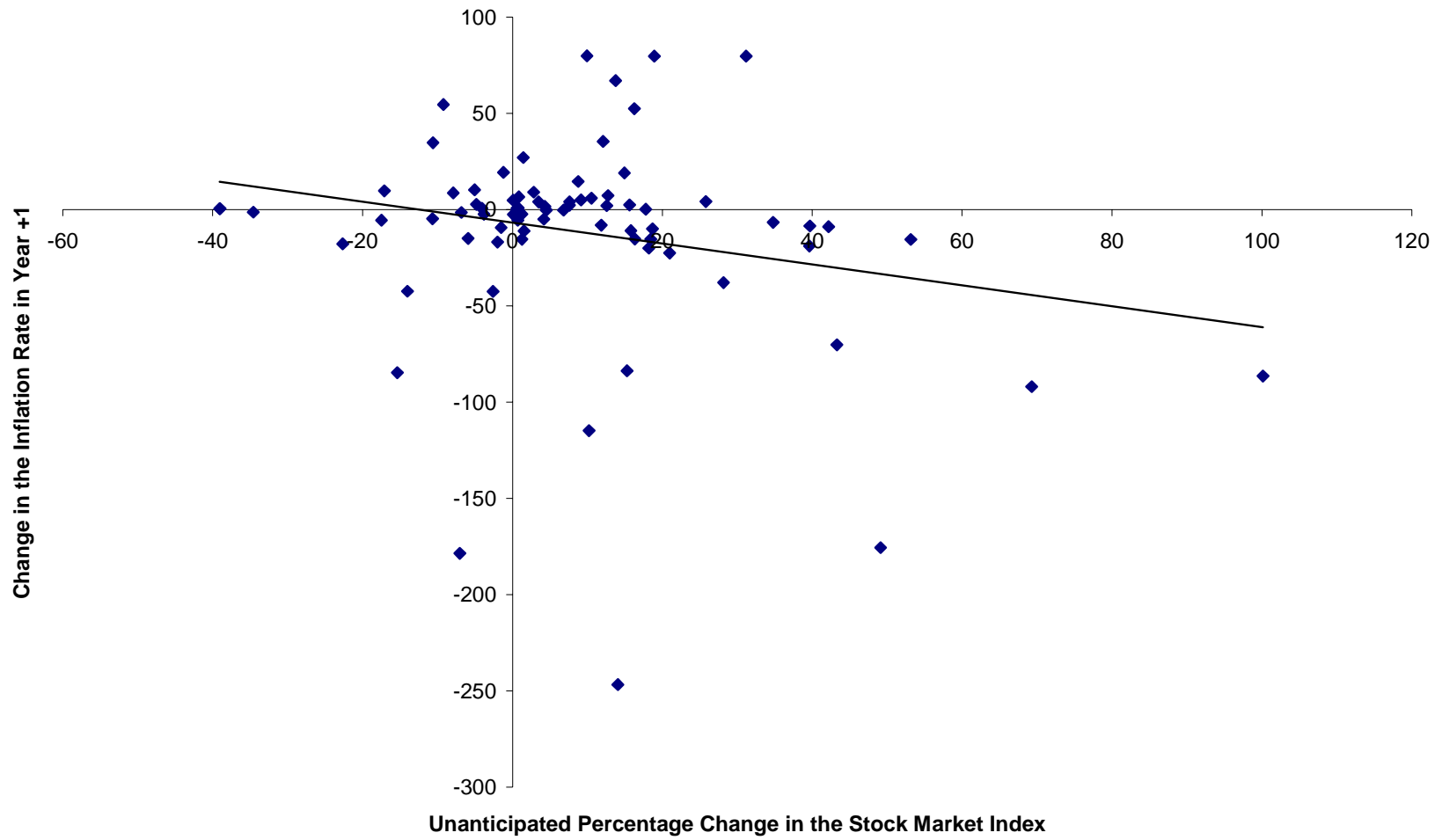
**Figure 2. The Stock Market Response to Implementation of a Stabilization Program as a Function of the Pre-Stabilization Level of Inflation**



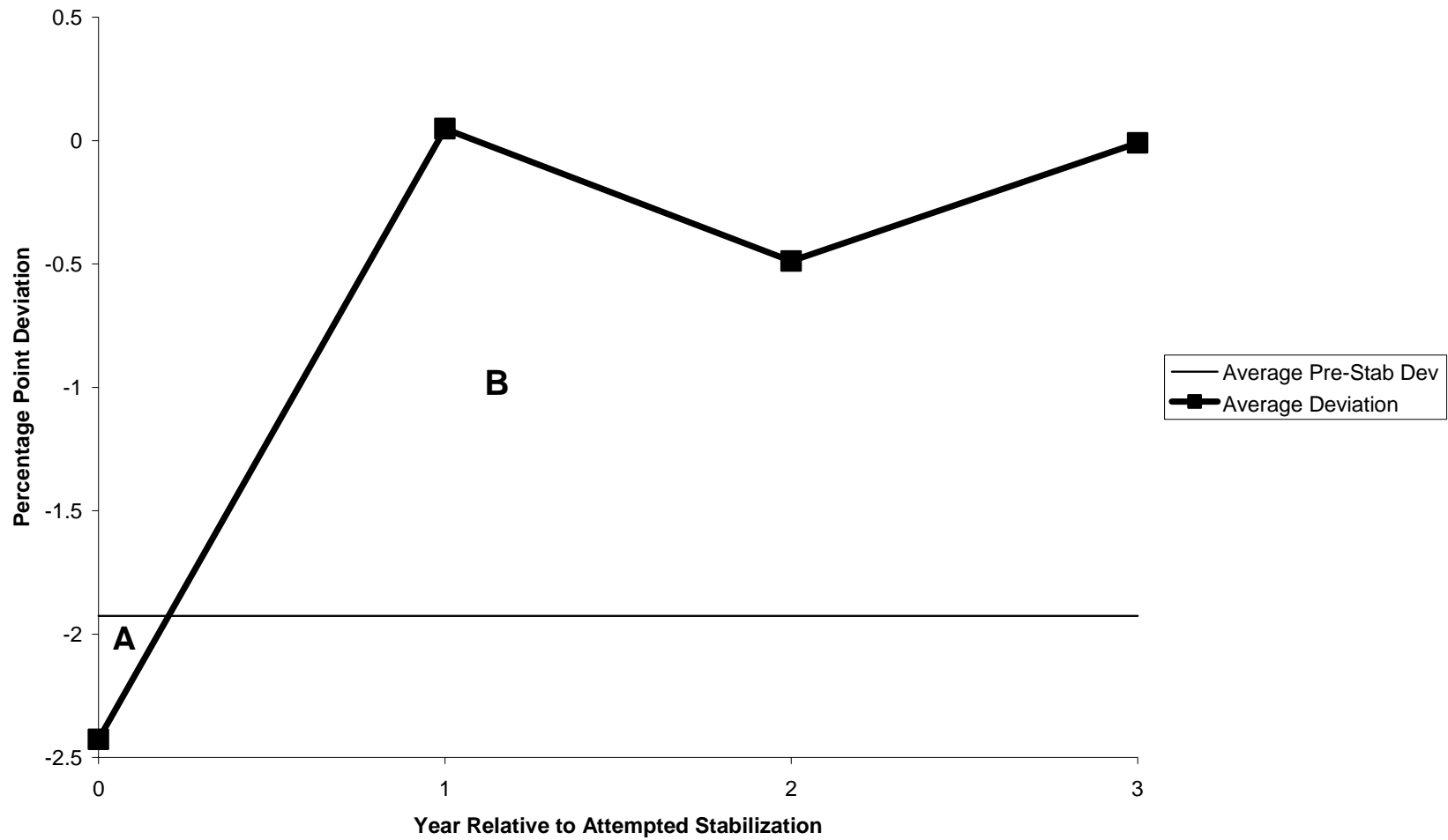
**Figure 3. The Stock Market Response to Implementation of a Stabilization Program as a Function of the Pre-Stabilization Level of Inflation: No Failed Programs in Previous 24 months**



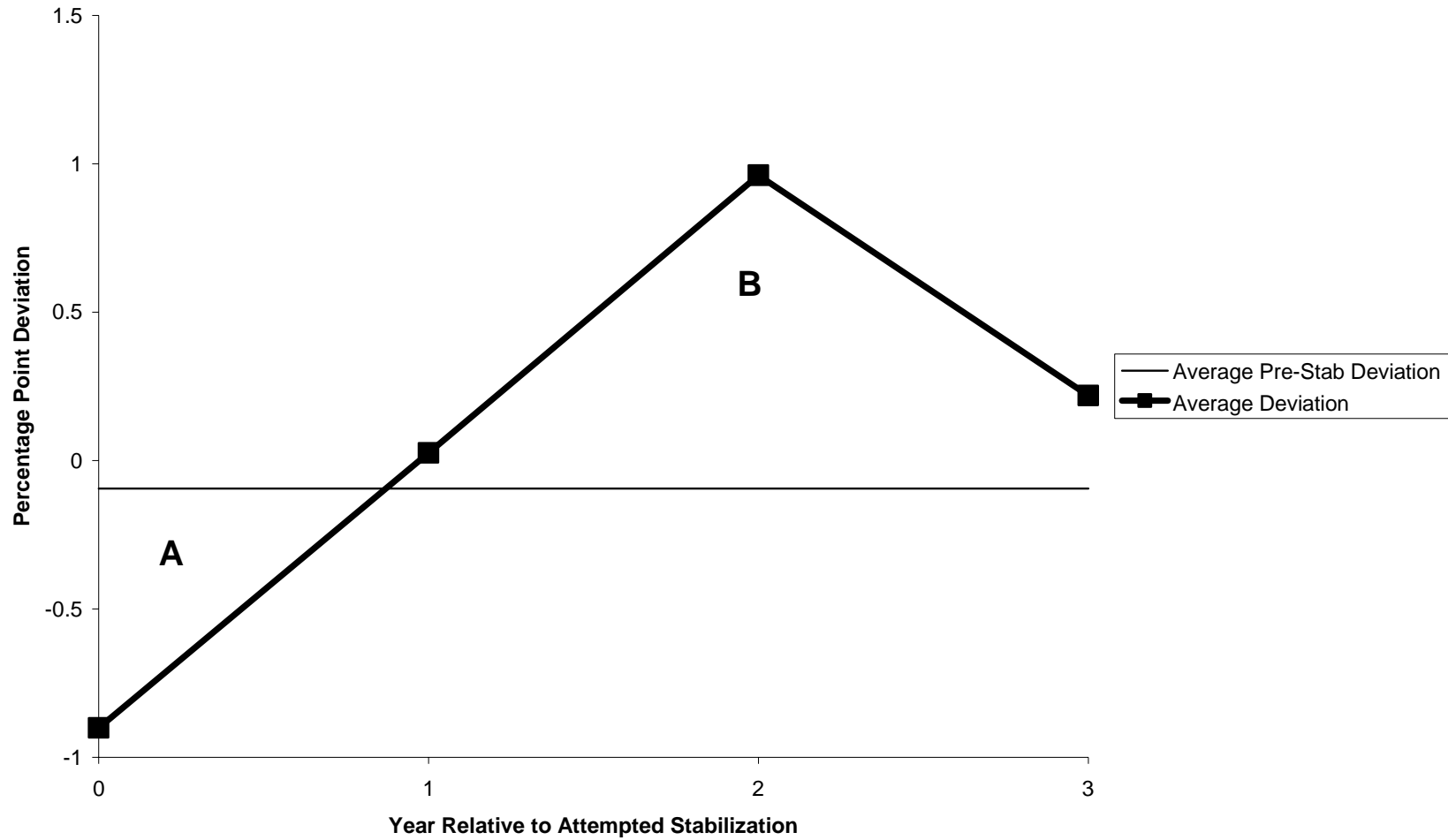
**Figure 4. Change In the Inflation Rate in Year +1 as a Function of the Stock Market Response to Implementation of a Stabilization Program in Year 0**



**Figure 5. Average Deviation of Real GDP Growth From Country-Specific Sample Mean: All Attempted Stabilizations of High Inflation**



**Figure 6. Average Deviation of Real GDP Growth From Country-Specific Sample Mean: All Attempted Stabilizations of Moderate Inflation**



**Figure 7. GDP Growth "News" in Year +1 as a Function of the Stock Market Response to Implementation of a Stabilization Program**

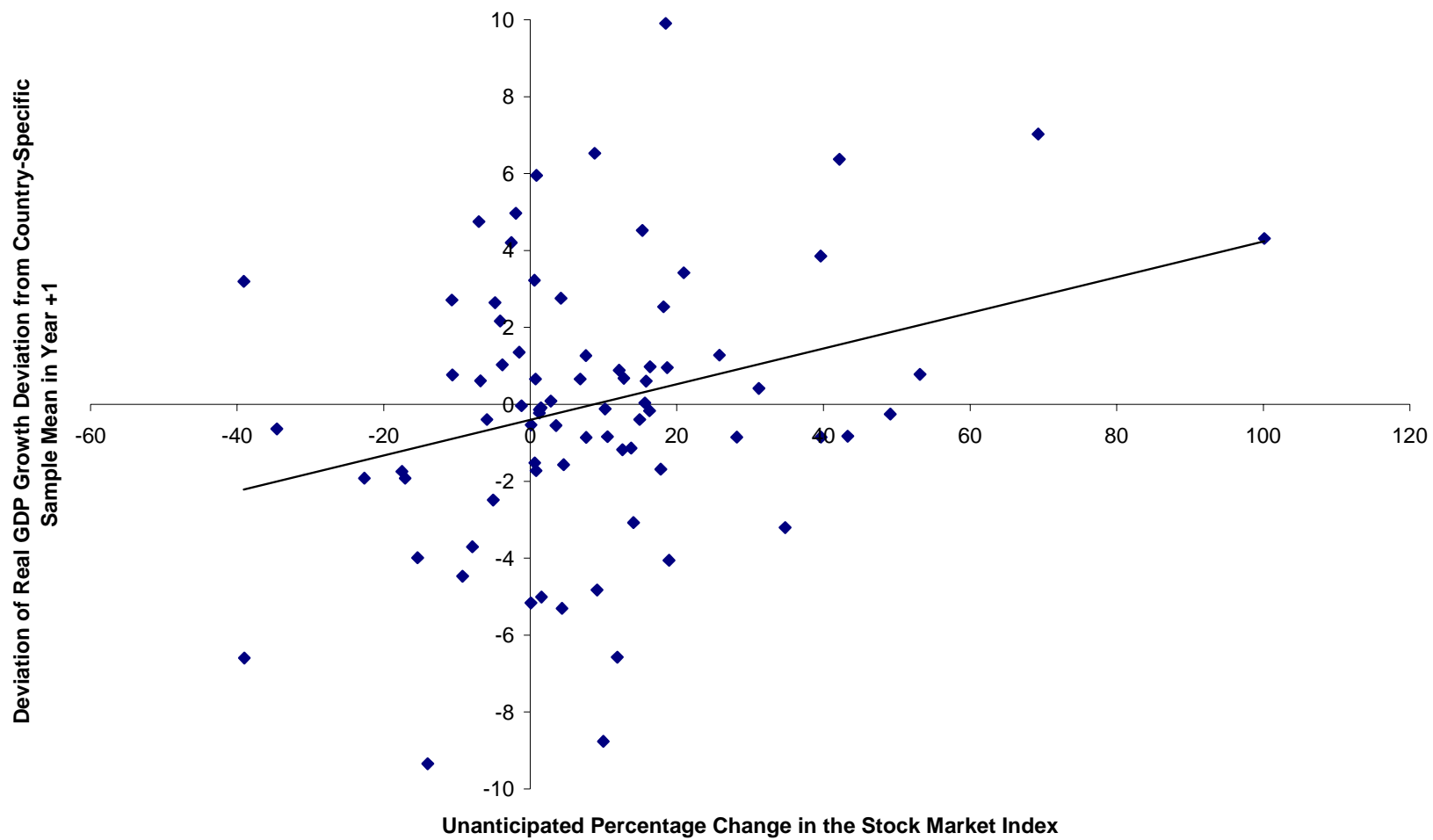


Table 1. Differences Between Median Stock Price Reactions to Attempted Stabilizations of High Versus Moderate Inflation Under Three Different Classifications of High and Moderate Inflation

	<u>Bruno Easterly Classification</u>		<u>Two-Way Numerical Split</u>		<u>Three-Way Numerical Split</u>		
	High	Moderate	High	Moderate	High	Moderate	Low
Number of Episodes	25	56	40	41	27	27	27
Median Inflation	118	15	77	11	116	26	10
Median Stock Price Change	16	1	14	1	15	11	1
Number Negative	6	25	11	20	7	10	14
P-Value	0.01	0.25	0.01	0.5	0.01	0.12	0.65

Notes: Table 1 divides the 81 stabilization episodes into three groups based on levels of average inflation prior to implementation. The first grouping corresponds to the Bruno Easterly (1998) classification of high versus moderate inflation; the second simply divides the total sample into two groups of equal size: high and moderate inflation. The third comparison splits the sample into three groups of equal size: high, moderate, and low inflation. The first three rows provide summary statistics for each grouping: the number of episodes, the median inflation rate and the median stock price response for the high and moderate categories under each inflation classification scheme. The fourth row reports the number of episodes for which the stock price change over the two-month-implementation window is less than the median (country-specific) two-month stock price change. The last row reports the two-sided p-value of observing at most the corresponding number of stock price responses to stabilization below the median (country-specific) two-month percentage change in the stock price.

Table 2. Differences Between Average Stock Market Reactions to Attempted Stabilizations of High Versus Moderate Inflation Under the Bruno Easterly Classification of High and Moderate Inflation

	Panel A: Month [0, +1] Estimates			Panel B: Month [0] Estimates		
	HIGH	MODERATE	P-Value of HIGH> MODERATE	HIGH	MODERATE	P-Value of HIGH> MODERATE
World	0.121*** (0.023)	0.001 (0.01)	0.00	0.126*** (0.032)	-0.004 (0.012)	0.00
U.S.	0.119*** (0.023)	0.001 (0.01)	0.00	0.121*** (0.032)	-0.006 (0.012)	0.00
LDC	0.113*** (0.026)	0.005 (0.012)	0.00	0.081** (0.037)	0.008 (0.02)	0.08
All	0.114*** (0.026)	0.006 (0.012)	0.00	0.080** (0.037)	0.006 (0.02)	0.07
Constant-Mean	0.122*** (0.023)	0.001 (0.01)	0.00	0.124*** (0.032)	-0.003 (0.01)	0.00
Country-Mean	0.122*** (0.001)	0.001 (0.01)	0.00	0.122*** (0.033)	-0.003 (0.01)	0.00

Notes: The left-hand-side variable is real, dollar-denominated stock returns. The estimation procedure is feasible generalized least squares. Heteroscedastic-consistent standard errors are given in parentheses. The column labeled Month [0,+1] presents estimates of HIGH and MODERATE using the two-month announcement window described in the text. The column labeled Month [0] presents estimates of HIGH and MODERATE using the one-month announcement window described in the text. The first row presents estimates of HIGH and MODERATE from the benchmark specification using a World stock return index. Row 2 presents estimates of HIGH and MODERATE from a specification that uses U.S. stock returns in place of a World stock return index in equation (3). Row 3 presents estimates that use the IFC Emerging Market index. Row 4 presents estimates that use all three sets of returns simultaneously. Row 5 presents estimates of HIGH and MODERATE based on simple mean-adjusted abnormal returns. Row 6 presents estimates using a statistical model, which allows for country-specific intercept terms. The column labeled P-Value of HIGH>MODERATE: shows the p-value for a test that the coefficient on HIGH is significantly larger than the coefficient on MODERATE. The symbols \*\*\*, \*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent confidence levels, respectively.



Table 3. Does the Stock Market Anticipate Attempted Stabilizations? Abnormal Returns and Cumulative Abnormal Returns Associated With the 12-Month Window Preceding Attempted Stabilizations of High Versus Moderate Inflation Under the Bruno and Easterly Classification of High and Moderate Inflation

Month Relative to Stabilization	Panel A: World-Return Model				Panel B: Constant-Mean-Return Model			
	High Inflation		Moderate Inflation		High Inflation		Moderate Inflation	
	AR	CAR	AR	CAR	AR	CAR	AR	CAR
-12	-.036	-.036	-.008	-.008	-.038	-.038	-.010	-.010
-11	-.033	-.069	-.018	-.026	-.033	-.070	-.016	-.026
-10	-.053	-.122	-.012	-.038	-.050	-.121	-.014	-.040
-9	.007	-.116	-.010	-.048	.002	-.119	-.012	-.052
-8	-.005	-.121	-.007	-.054	-.003	-.122	-.007	-.058
-7	.027	-.094	.011	-.043	.028	-.094	.012	-.047
-6	.042	-.052	-.020	-.063	.043	-.051	-.019	-.065
-5	.035	-.018	-.023	-.086	.037	-.014	-.024	-.090
-4	-.005	-.022	-.030	-.116	-.004	-.018	-.030	-.120
-3	.057	.035	-.026	-.142	.060	.041	-.026	-.146
-2	-.028	.006	-.008	-.150	-.025	.016	-.007	-.153
-1	-.030	-.023	-.014	-.163	-.032	-.016	-.013	-.166
0	.088	.064	-.008	-.172	.085	.069	-.007	-.173
1	.126	.190	.011	-.161	.127	.196	.011	-.162
2	.048	.238	.014	-.147	.050	.246	.015	-.147
3	-.027	.210	-.003	-.150	-.028	.218	-.002	-.149

Table 4. Differences Between Average Stock Market Reactions to Exchange-Rate-Based (ERBS) Versus Non-Exchange-Rate Based Stabilizations (NONERBS) of High Inflation

	Panel A: Month [0, +1] Estimates			Panel B: Month [0] Estimates		
	Exchange-Rate-Based Stabilization	Non Exchange-Rate-Based Stabilization	P-Value of <i>ERBS&gt;NON ERBS</i>	Exchange-Rate-Based Stabilization	Non Exchange-Rate-Based Stabilization	P-Value of <i>ERBS&gt;NON ERBS</i>
World	0.152*** (0.037)	0.102*** (0.029)	0.28	0.154*** (0.052)	0.109*** (0.041)	0.49
U.S.	0.148*** (0.037)	0.100*** (0.029)	0.31	0.146*** (0.052)	0.106*** (0.041)	0.55
LDC	0.105*** (0.04)	0.121*** (0.034)	0.77	0.039 (0.055)	0.113** (0.049)	0.308
All	0.122*** (0.034)	0.105*** (0.04)	0.75	0.035 (0.055)	0.116** (0.049)	0.27
Constant-Mean	0.152*** (0.037)	0.102*** (0.029)	0.29	0.151*** (0.052)	0.108*** (0.041)	0.52
Country-Mean	0.150*** (0.037)	0.103*** (0.029)	0.32	0.149*** (0.052)	0.106*** (0.042)	0.52

Notes: The left-hand-side variable is real, dollar-denominated stock returns. The estimation procedure is feasible generalized least squares. Heteroscedastic-consistent standard errors are given in parentheses. The column labeled Month [0,+1] presents estimates of the stock market response to exchange-rate-based and non-exchange-rate-based stabilizations of high inflation using the two-month announcement window described in the text. The column labeled Month [0] presents estimates of ERBS and NONERBS using the one-month announcement window described in the text. The first row presents estimates using the benchmark specification using a World stock return index. Row 2 presents estimates of ERBS and NONERBS from a specification that uses U.S. stock returns in place of the World stock return index in equation (6). Row 3 presents estimates of ERBS and NONERBS from a specification that uses the IFC Emerging Market index. Row 4 presents estimates of ERBS and NONERBS from a specification that uses all three sets of returns simultaneously. Row 5 presents estimates based on simple mean-adjusted abnormal returns. Row 6 presents estimates using a statistical model, which allows for country-specific intercept terms. The column labeled P-Value of ERBS>NONERBS shows the p-value for a test that the stock market response to exchange-rate-based stabilizations of high inflation is significantly different from the stock market response to non-exchange-rate-based stabilizations of high inflation. The symbols \*\*\*, \*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent confidence levels, respectively.

## Appendix

Each panel of Table A1 corresponds to a given country. Column 1 identifies the country to which each panel applies. Column 2 enumerates the month and year of all the stabilization programs that were implemented in each of the countries during the sample period (the period for which stock market data are available for each country). Columns 3 and 4 provide information on how the stabilization dates in Column 2 were identified. A “Yes” in a given row of column 3 indicates that the stabilization date in the corresponding row of Column 1 is a Calvo and Végh (1998) episodic stabilization program. A “Yes” in a given row of column 4 indicates that an agreement was signed with the IMF. The type of IMF agreement is given in parentheses. SB denotes a Stand-By agreement and EFF denotes an Extended Fund Facility agreement.<sup>4</sup>

Column 5 provides information on the nature of the inflation regime that existed at the time the stabilization program was initiated. A “Yes” in Column 5 indicates that the country was experiencing high inflation. A “Yes” in Column 6 indicates that there was a stabilization program in the previous 24 months. A “Yes” in Column 7 indicates that there was a stabilization program in the subsequent 24 months. A “Yes” in Column 8 indicates that the stabilization program was *ex-post* successful. In keeping with the spirit of the Bruno and Easterly (1995) definition of high inflation, a stabilization program implemented in the midst of high inflation is defined as *ex-post* successful if

---

<sup>4</sup> Stand-By (SB) arrangements typically cover periods of one to two years and focus on macroeconomic policies--such as fiscal, monetary, and exchange rate policies--aimed at overcoming balance of payments difficulties. Most programs supported by stand-by arrangements also include some policies to address structural or supply-side weakness, although because of the short duration of these arrangements, this focus is not as strong as in extended arrangements. Under the Extended Fund Facility (EFF), the IMF supports medium-term programs through extended arrangements that generally run for three or four years and are aimed at overcoming balance of payments difficulties stemming from macroeconomic and structural problems.

(prior to the implementation of another stabilization program) annualized monthly inflation falls below 40 percent and remains below 40 percent for two or more years. In accordance with Dornbusch and Fischer (1993) and Burton and Fischer (1998), a stabilization program implemented in the midst of moderate inflation is defined as *ex-post* successful if annualized monthly inflation falls below 10 percent and remains below 10 percent for two or more years. A “Yes” in Column 9 indicates that the stabilization program was exchange-rate-based according to Calvo and Vegh (1998) and Fischer et al. (1999).

The databases *Lexis/Nexis Research Software Version 4.06* and the *Dow Jones Interactive Publications Library* were searched in an attempt to find announcement dates corresponding to the implementation dates listed in Table A1. For most stabilization programs no announcement dates were available. In other cases, the “announcement” corresponds to informal agreements between the country and the IMF in advance of the official signing (i.e., implementation date) of the stabilization program, which begs the question of when the market first learned of the negotiations leading to the informal agreement. Thus, the search reinforces Easterly’s (1996) point that announcement dates uncovered using public news sources are likely to be poor proxies for the date at which information about the stabilization first reaches market participants. In the absence of reliable data on announcement dates, this study focuses on implementation dates. This approach may bias against finding any effect of stabilization if stabilizations are anticipated.

Table A1. Inflation Stabilization Programs in Emerging Economies with Stock Markets

Country	Date of Stabilization Program	Episodic	IMF Agreement?	High Inflation Crisis?	Stabilization in the Previous 24 Months?	Stabilization in the Following 24 Months?	Stabilization Ex-Post Successful?	Exchange Rate Based?
<b>Panel A: Argentina</b>								
	Aug 1976		Yes (SB)	Yes		Yes		
	Sept 1977		Yes (SB)	Yes	Yes	Yes		
	Dec 1978	Yes (Tablita)		Yes	Yes			Yes
	Jun 1983		Yes (SB)	Yes		Yes		
	Dec 1984		Yes (SB)	Yes	Yes	Yes		
	Jun 1985	Yes (Austral)		Yes	Yes			Yes
	Jul 1987		Yes (SB)	Yes	Yes			
	Nov 1989	Yes (Bonex)		Yes	Yes	Yes		
	Jul 1991	Yes (Convertibility)	Yes (SB)	Yes	Yes		Yes	Yes
	Mar 1992		Yes (EFF)		Yes			
<b>Panel B: Brazil</b>								
	Mar 1983		Yes (SB)	Yes				
	Feb 1986	Yes (Cruzado)		Yes		Yes		Yes
	Jul 1987	Yes (Bresser)		Yes	Yes	Yes		
	Aug 1988		Yes (SB)	Yes	Yes	Yes		
	Jan 1989	Yes (Summer)		Yes	Yes	Yes		
	Apr 1990	Yes (Collor)		Yes	Yes	Yes		
	Jan 1992		Yes (SB)	Yes	Yes			
	Mar 1994	Yes (Real)		Yes	Yes		Yes	Yes

Table A1--Continued

<b>Country</b>	<b>Date of Stabilization Program</b>	<b>Episodic</b>	<b>IMF Agreement?</b>	<b>High Inflation Crisis?</b>	<b>Stabilization in the Previous 24 Months?</b>	<b>Stabilization in the Following 24 Months?</b>	<b>Stabilization Ex-Post Successful?</b>	<b>Exchange Rate Based?</b>
<b>Panel C: Chile</b>								
	Feb 1978	Yes (Tablita)		Yes			Yes	Yes
	Jan 1983		Yes (SB)					
	Aug 1985		Yes (EFF)					
	Nov 1989		Yes (SB)				Yes	
<b>Panel D: Egypt</b>								
	May 1991		Yes (SB)				Yes	
<b>Panel E: India</b>								
	Nov 1981		Yes (EFF)					
	Jan 1991		Yes (SB)			Yes		
	Oct 1991		Yes (SB)		Yes			
<b>Panel F: Indonesia</b>								
	May 1973		Yes (SB)				Yes	
<b>Panel G: Israel</b>								
	Jul 1985	Yes		Yes			Yes	Yes

Table A1--Continued

Country	Date of Stabilization Program	Episodic	IMF Agreement?	High Inflation Crisis?	Stabilization in the Previous 24 Months?	Stabilization in the Following 24 Months?	Stabilization Ex-Post Successful?	Exchange Rate Based?
<b>Panel H: Jamaica</b>								
	Aug 1977		Yes (SB)			Yes		
	Jun 1978		Yes (EFF)		Yes	Yes		
	Jun 1979		Yes (EFF)		Yes	Yes		
	Apr 1981		Yes (EFF)		Yes			
	Jun 1984		Yes (SB)		Yes	Yes		
	Jul 1985		Yes (SB)		Yes	Yes		
	Mar 1987		Yes (SB)		Yes	Yes		
	Sept 1988		Yes (SB)		Yes	Yes		
	Mar 1990		Yes (SB)		Yes	Yes		
	Jun 1991		Yes (SB)		Yes	Yes		
	Dec 1992		Yes (SB)	Yes	Yes		Yes	
<b>Panel I: Jordan</b>								
	Jul 1989		Yes (SB)					
	Feb 1992		Yes (SB)					
	May 1994		Yes (EFF)					
<b>Panel J: Kenya</b>								
	May 1993		Yes				Yes	

Table A1--Continued

Country	Date of Stabilization Program	Episodic	IMF Agreement?	High Inflation Crisis?	Stabilization in the Previous 24 Months?	Stabilization in the Following 24 Months?	Stabilization Ex-Post Successful?	Exchange Rate Based?
<b>Panel K: Korea</b>								
	May 1977		Yes (SB)					
	Mar 1980		Yes (SB)			Yes	Yes	
	Feb 1981		Yes (SB)		Yes			
	Jul 1983		Yes (SB)			Yes		
	Jul 1985		Yes (SB)		Yes			
<b>Panel L: Mexico</b>								
	Jan 1977	Yes	Yes (EFF)		Yes			
	Jan 1983		Yes (EFF)					
	Nov 1986		Yes (SB)	Yes		Yes		
	Dec 1987	Yes (Pacto)		Yes	Yes	Yes	Yes	Yes
	May 1989		Yes (EFF)					
<b>Panel M: Nigeria</b>								
	Jan 1987		Yes (SB)					
	Feb 1989		Yes (SB)			Yes		
	Jan 1991		Yes (SB)		Yes			



Table A1--Continued

Country	Date of Stabilization Program	Episodic	IMF Agreement?	High Inflation Crisis?	Stabilization in the Previous 24 Months?	Stabilization in the Following 24 Months?	Stabilization Ex-Post Successful?	Exchange Rate Based?
<b>Panel N: Pakistan</b>								
	Mar 1977		Yes (SB)					
	Nov 1980		Yes (EFF)			Yes		
	Dec 1981		Yes (EFF)		Yes			
	Dec 1988		Yes (SB)					
	Sept 1993		Yes (SB)			Yes		
	Feb 1994		Yes (EFF)		Yes			
<b>Panel O: Peru</b>								
	Aug 1990	Yes		Yes				
	Mar 1993		Yes (EFF)	Yes			Yes	
<b>Panel P: Philippines</b>								
	Oct 1986		Yes (SB)					
	May 1989		Yes (EFF)			Yes		
	Feb 1991		Yes (SB)		Yes			
	Jun 1994		Yes (EFF)					
<b>Panel Q: S. Africa:</b>								
	Jan 1976		Yes (SB)			Yes		
	Aug 1976		Yes (SB)		Yes			
	Nov 1982		Yes (SB)					

Table A1--Continued

Country	Date of Stabilization Program	Episodic	IMF Agreement?	High Inflation Crisis?	Stabilization in the Previous 24 Months?	Stabilization in the Following 24 Months?	Stabilization Ex-Post Successful?	Exchange Rate Based?
<b>Panel R: Thailand</b>								
	Jul 1978		Yes (SB)					
	Jun 1981		Yes (SB)			Yes		
	Nov 1982		Yes (SB)		Yes			
	Jun 1985		Yes (SB)					
<b>Panel S: Turkey</b>								
	Jul 1994		Yes (SB)	Yes				
<b>Panel T: Venezuela</b>								
	Jun 1989		Yes (EFF)					
<b>Panel U: Zimbabwe</b>								
	Apr 1981		Yes (SB)			Yes		
	Mar 1983		Yes (SB)		Yes			
	Jan 1992		Yes (EFF)			Yes		
	Sept 1992		Yes (EFF)		Yes			
Total Number	81	14	69	25	42	47	12	8