Disinflation and the Stock Market: Third World Lessons for First World Monetary Policy

Anusha Chari and Peter Blair Henry[*]
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When policymakers implement a disinflation program directed at high inflation, the real dollar value of their country's stock market index experiences a cumulative abnormal 12-month return of 48 percent in anticipation of the event. In contrast, the average cumulative abnormal 12-month return associated with disinflations directed at moderate inflation is negative 18 percent. The 66-percentage point difference between cumulative abnormal returns, along with descriptive evidence and case studies, suggests that unlike the swift eradication of past high inflations documented by Sargent (1982), the US will not experience a quick, low-cost transition from moderate inflation to the Fed's two-percent target.

[*]Chari: University of North Carolina at Chapel Hill and NBER, achari@unc.edu. Henry: Hoover Institution and Freeman Spogli Institute, Stanford University; PhD Excellence Initiative, pbhenry@stanford.edu.

1. Introduction

With monetary policymakers having fallen behind the curve on their price stability mandate, there is much to learn from history about whether Federal Reserve officials can quickly, and at low cost to employment and output, reduce inflation to their stated target. There are two opposing schools of thought.

The first, call it the Sacrifice Ratio (SR) School, says that the journey back to stable prices will be painful and protracted, as it was during the Volcker disinflation of the late 1970s and early 1980s, because reducing inflation requires a short-run fall in output in accordance with the Phillips Curve (Ball 1994; Fischer 1986; Gordon 1982; Okun 1978).

An opposing school of thought consists of financial market participants who have been parsing Chair Powell's speeches since the 2022 Jackson Hole Economic Symposium in the hope of extracting signals about a future pause in interest rate hikes and a willingness to cut rates if necessary. This school holds that this time is different, claiming that the Powell Fed, unlike Volcker's, will be able to restore price stability in short order and at a modest cost to the economy. In seeking support for its claim, the This Time is Different (TTID) School might look for comfort in Sargent (1982), who documents that credible shifts in the monetary and fiscal policy regimes of Austria, Germany, Hungary, and Poland during episodes of hyperinflation in the aftermath of World War I: (a) rapidly stabilized these countries' price levels, and (b) inflicted little cost on their employment and output.

The trouble with the TTID view, however, is that: (1) there has been no change in US fiscal policy—the federal deficit as a percentage of GDP was 5.4 percent in 2022, will be 5.3 percent in 2023, and is forecast to climb, on average, through 2033 (Congressional Budget Office, 2023); and (2) even after raising the Federal Funds Rate at a record-setting pace, it is not

clear that monetary policymakers, having let the inflation genie out of the bottle in the first place, have met the Sargent (1982) standard of a credible regime shift. Furthermore, both the SR and TTID view suffer from a small sample problem. It is difficult to infer how long and how costly the current US disinflation path will be by comparing it with the only previous attempt in US history to actively engineer a disinflation on the order of magnitude of the one currently underway.

In contrast to the focus that both schools of thought place on the Volcker episode, this paper uses the historical experience of developing countries' attempts to actively engineer disinflation as a set of quasi-laboratory experiments to address the following question: will the Fed be able to achieve a rapid, low cost return to two-percent inflation? By exploiting the richness of the developing country data—81 disinflation programs: 56 directed at reducing "moderate" inflation, 25 directed at reducing "high", and spread across 21 developing countries between 1973 and 1994—the paper concludes that a soft landing by the Fed is unlikely. In the process of drawing that conclusion, the paper makes two contributions.

First, by assembling a dataset of 56 disinflation programs directed at reducing "moderate" inflation—defined, per Dornbusch and Fischer (1993) and Fischer (1993) as double-digit inflation of less than 40 percent—the paper provides more statistical power than the single Volcker episode. It is tempting to dismiss developing countries as too dissimilar to the US to provide a useful comparison, but the median level of peak inflation during the 56 developing country disinflation programs, 15 percent, was similar to peak inflation in: (a) the Volcker era (11 percent), and (b) the United Kingdom, United States, and European Union in 2022. The current bouts of inflation in advanced economies, and the earlier episodes of inflation in developing countries, have parallel origins: large, spending-driven fiscal deficits. Further

similarities include a context of foreign wars, oil-price spikes, and other shocks. Because the paper also assembles data on 25 disinflation programs directed at reducing "high" inflation—defined, in accordance with Easterly (1996) and Bruno and Easterly (1996), as inflation greater than 40 percent per year—it also provides more high-inflation episodes than Sargent's (1982) sample of four countries.

The second contribution is methodological. It uses stock market data from the 21 developing countries to provide a cost-benefit analysis of disinflation. It conducts this analysis because the central issue about disinflation is not how costly it is in the short run, but whether the costs of disinflation, if any, are outweighed by the longer-run benefits (Henry 2002). Policymakers presumably do not attempt to reduce inflation unless it is in the interest of the countries they serve to do so, but if the net present value of disinflation is positive there is no clear articulation of this point in the literature. For instance, the Sacrifice Ratio School measures the short-run cost of reducing inflation as the sum of undiscounted output losses over some horizon.[1] This approach assumes that there are long-run benefits to disinflation without making them explicit in a cost-benefit calculation. Sacrifice-ratio-based analyses, therefore, do not tell us whether the benefits of disinflation outweigh the costs.

In contrast to the exclusive previous emphasis on costs, by also accounting for the potential benefits, our stock market analysis of disinflation highlights the fundamental issue of net present value. A country's aggregate share price index is the present value of the expected future profits of its publicly traded firms. Changes in stock prices, therefore, reflect revised expectations about future corporate profits and the discount rate at which those profits are capitalized. Contractionary measures taken to reduce inflation may raise discount rates and

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[1]See, for example, Blanchard (1999), p. 368; Dornbusch and Fischer (1987), p. 528; Mankiw (1997), p. 352.

reduce profits in the short run. But the reduction in inflation may increase future profits because reducing inflation: (a) raises productivity, and (b) may also reduce discount rates (e.g., equity risk premia) by reducing the variance of expected future profits. The percentage change in the stock market in response to the announcement of a disinflation program removes the temporal dimension of the analysis by collapsing the entire expected future stream of disinflation costs and benefits into a single summary statistic: the present value of the expected net benefits of the program.

Using standard event-study regressions (e.g., MacKinlay 1997), we estimate the average cumulative abnormal return (CAR), measured in real US dollars, associated with attempted disinflations of high versus moderate inflation. Figure 1 conveys the three central results. First, in real dollar terms, the average CAR associated with anticipated disinflation across the 25 high inflation episodes is positive and large—44 percent. Second, the average CAR associated with anticipated disinflation across the 56 moderate inflation episodes is negative and large—minus 24 percent. Third, the 68-percentage-point difference between the two sets of CARS is statistically as well as economically significant. The three central results persist after controlling for external and domestic factors, and regardless of whether the left-hand-side variable in the regressions is real dollar returns or real local currency returns. Bluntly stated: on average, the stock market views reducing high inflation as a positive net present value event while it regards attempts to reduce moderate inflation as destroying value.

Constructed using data on all of the developing countries between 1973 and 1994 that: (a) had a disinflation program and (b) also have a stock market, Figure 1 does not capture the universe of developing-country disinflations, but it comes close, and therefore suggests that reducing high inflation is, in general, a very different proposition than reducing moderate

inflation. Said differently, Figure 1 signals that we cannot easily extrapolate lessons from high-inflation episodes—where inflation was rapidly reduced at little apparent cost—to moderate inflation scenarios. Starting with a description of the data in Section 2, the rest of the paper grapples with the relevance of Figure 1, and the accompanying institutional details, for the challenges currently facing the Fed.

2. Data and Descriptive Findings

Data construction involves two steps—sample selection and assembly of the raw data, namely: stock prices, dates of disinflation programs, and classification of the level of inflation at the time each program was implemented. The sample includes all countries that (1) have publicly available stock market data and (2) have undertaken at least one disinflation 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.

A. Stock Markets

The principal source of stock prices 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 Indices. For most countries, EMDB's coverage begins in December 1975, but for others coverage begins in December 1984. For those countries for which the IFC does not provide stock market data, we use the stock 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 data are monthly. The consumer price index for each country also comes from the IFS. Returns and inflation are calculated as the first difference of the natural logarithm of the real stock price and CPI.

B. Disinflation Dates

We use two sources to identify the implementation month and year of each of the 81 disinflation programs. The first source is Calvo and Végh (1998). They identify the best-known programs in the literature on inflation stabilization. The second source is the Annual Reports of the International Monetary Fund (IMF). We use these reports to construct a time series of the months in which each of the 21 countries effectively announced their intention to stabilize inflation (i.e., engineer a disinflation) by signing an official agreement with the IMF.

IMF programs typically call for current account stabilization in addition to disinflation. The dual 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, p.423; Mussa and Savastano 1999, p. 101). Under the monetary approach, balance of payments problems stem from an excess supply of money, with monetization of the government deficit 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 to stabilize their current accounts. The prescription for stabilizing the current account is, therefore, tantamount to a traditional disinflation program.

Including the IMF programs of Mexico in 1995, the Asian Crisis in 1997, Russia in 1998, and Brazil in 1999, would strengthen the central findings, because stock prices collapsed during

the months leading up to the signing of the relevant agreements, all of which were implemented during moderate inflation. Nevertheless, we exclude these episodes from the sample for two reasons. First, the synopsis of IMF-sponsored disinflation programs outlined in the preceding paragraph does not provide an accurate description of the Mexican, Asian, Russian, and Brazilian episodes. These IMF agreements were not triggered by inflation crises *per se*, but rather financial crises, the proximate cause of which was country balance sheets whose assets and liabilities were misaligned with respect to both maturity structure and currency denomination (Dornbusch 1999). Second, as part of these agreements, the IMF imposed major structural and institutional reforms in addition to insisting on its traditional short-run stabilization objectives (Feldstein 1998).

C. Inflation Classification

Turning to the classification of inflation episodes, as in Bruno and Easterly (1998) and Easterly (1996), we define high-inflation episodes as those in which 12-month inflation was greater than 40 percent during each of the 24 months leading up to and including the month in which policymakers implemented the disinflation program. We define moderate inflation episodes analogously: those with 12-month inflation between 10 and 40 percent during each of the 24 months leading up to and including the month in which policymakers implemented disinflation.

The online data appendix provides extended information about the 81 disinflation programs. Here is a summary. Fourteen of the 81 programs correspond to the beginning of Calvo and Végh (1998) disinflation episodes. Two of the fourteen Calvo and Végh episodes coincided with IMF agreements: Mexico in 1977 and Argentina in 1991. All 56 attempts at reducing

moderate inflation had IMF sponsorship. Thirteen of the 25 attempts at reducing high inflation had official IMF sponsorship. Chile is the only country in the sample that successfully stabilized both high inflation and then, a decade later, moderate inflation. Jamaica had the most IMF agreements, 11. Finally, seventeen of the 25 high inflation episodes occur in Argentina and Brazil.

Given the outsized presence of Argentina and Brazil, it is natural to ask whether Figure 1 is sensitive to the classification of "high" inflation as that which is 40 percent or greater. Table 1 investigates by comparing stock price responses to disinflation under two alternative classifications. The first alternative divides the 81 episodes into two groups of roughly equal size by descending order of inflation at the time the disinflation program was initiated: high inflation (40 cases) and moderate inflation (41 cases); this two-way split is particularly useful because it creates a superset of the high inflation episodes that is not dominated by Argentina and Brazil. The second alternative divides the episodes into three groups of equal size: high inflation (27 cases), moderate inflation (27 cases), and low inflation (27 cases).

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. In keeping with the spirit of presenting raw data in the previous two rows of the table, the third row presents information on raw, unadjusted stock returns instead of abnormal returns. Accordingly, instead of reporting information on cumulative returns over the twelve-month pre-disinflation window of [-12, 0], where the discrepancy between cumulative returns and cumulative abnormal returns might be large, the table reports cumulative returns over the two-month window, [-1, 0].

The last row of Table 1 reports the two-sided p-value of observing, at most, the

corresponding number of cumulative two-month returns below their country-specific, median cumulative two-month returns. Under all three inflation classification schemes, the sign tests are significant at the one percent level for the high-inflation episodes, but they are never significant for the moderate-inflation episodes. The consistency of the sign tests across the three classification schemes suggests that the differential responses of the stock market to programs directed at reducing high versus moderate inflation indicated by Figure 1 are not overly sensitive to the classification of high inflation as that exceeding 40 percent.

D. Descriptive Differences and Case Studies

Turning from issues of classification sensitivity back to broader themes of the disinflation episodes themselves, one fact leaps out from the data: countries that attempt to reduce moderate inflation to low inflation (single digits) rarely succeed. Of the 56 stabilization programs directed at reducing moderate inflation between 1973 and 1994, only 5 worked.

At first blush, the rate at which governments successfully stabilized high inflations, 8 of 25, also appears low. But this low rate of success is driven almost entirely by the 17 attempts in Argentina and Brazil, 15 of which failed. Of the six countries outside Argentina and Brazil that tried to stabilize high inflation, only Mexico and Peru needed more than one attempt—two each—to do so. In other words, beyond Latin America, all of the countries in the sample that attempted to stabilize high inflation, succeeded on their first try.

In short, countries have found it harder to reduce inflation from moderate to low than they have to reduce it from high to moderate. The reality that, even with official IMF sponsorship and financing, countries succeeded in reducing moderate inflation to single-digits less than ten percent of the time, casts doubt on the view that the Fed will be able to engineer a

quick return to its two percent inflation target.

Indeed, Figure 2 tells a sobering story in this regard. The figure plots annualized monthly inflation during successful stabilizations of high inflation (solid line, left-hand-side) and successful stabilizations of moderate inflation (dashed line, right-hand-side scale). The graph indicates that high inflation comes down more quickly than moderate inflation. On average, high inflation falls from 120 to 20 percent—well within the Dornbusch and Fischer (1993) moderate inflation range—in 15 months. In contrast, it takes 36 months to reduce moderate inflation to the low-inflation threshold of 10 percent. The reality that high inflation falls to one-sixth its pre-stabilization level in 15 months, whereas moderate inflation takes three years to recede by half, strongly suggests that moderate inflation is more persistent.

Moderate inflation may be more persistent than high inflation for structural reasons, but it is also possible that moderate inflation only appears to be more stubborn because governments facing high inflation implement cold turkey strategies, whereas those facing moderate inflation take a gradualist approach. Chile's experience, for example, reveals that the journey from moderate to low inflation can take years.

Following a decade of little progress toward achieving stable prices, in September 1990—with annual inflation in excess of 20 percent—the country's central bank announced that it would adopt an official target for annual inflation and tighten monetary policy as necessary to achieve it. The first target, set for the period of December 1990 to December 1991, was 15 to 20 percent, with the central bank reducing the annual target by 1.5 percentage points each year from 1991 to 2001. By publicly articulating an explicit goal, and putting its credibility at stake, Chile's central bank was able to reduce inflation to 8.2 percent by 1995, and kept it in the single digits through 2021.

Moving beyond Chile to the broader developing world, did the longer period of time with which it took to reduce moderate inflation in comparison to high inflation have attendant consequences for output? Figure 3 addresses the question by plotting, in disinflation time, the average annual growth rate of real GDP for the 8 episodes in which countries successfully reduced high inflation to moderate—Argentina, Brazil, Chile (1978), Israel, Jamaica, Mexico, Peru, and Turkey—versus the 5 episodes in which countries successfully reduced moderate inflation to low: Chile (1990), Egypt, Indonesia, Kenya, and South Korea. The time path of real GDP growth during the two types of disinflation episodes differ in three important ways.

First, during disinflation from moderate to low levels of inflation, there are output losses. On impact, between years -1 and 0, the only country in which growth does not decline is Kenya, and the average growth rate of GDP across the five countries falls by 2 percentage points. Looking over the entire disinflation horizon, the average growth rate of GDP during the post-disinflation period, years 1 to 3, is 5.5 percent, or 1.4 percentage points lower than the 6.9 percent growth rate of GDP in the pre-disinflation period, years -3 to -1.

Second, during disinflation from high to moderate levels of inflation, there are output gains. On impact, between years -1 and 0, growth increases in five of the eight countries, and their average growth rate of GDP rises by 3.7 percentage points. Turning to the entire disinflation horizon, the average growth rate of GDP during the post-disinflation period, years 1 to 3, is 4.5 percent, or 4.6 percentage points higher than the negative 0.1 percent growth rate of GDP in the pre-disinflation period, years -3 to -1.

Third, the change in output associated with disinflation from high levels of inflation is 6.0 percentage points (4.6 minus negative 1.4) larger than the change in output associated with disinflation from moderate to low levels of inflation.

The output losses associated with successful disinflations of moderate inflation in developing countries documented here are consistent with the advanced country experiences of Ireland and Spain chronicled by Dornbusch and Fischer (1993). Ireland's disinflation began in 1982 and unemployment rose from 9.5 percent to more than 17 percent between the early 1980s and 1987. Spanish authorities initiated their disinflation in 1977, and "Spanish disinflation, like the Irish, involved a long, hard slog" (Dornbusch and Fischer 1993), with the Spanish unemployment rate rising by almost 10 percentage points before inflation declined to single digits in 1985. Dornbusch and Fischer (1993) conclude: "…the countries that successfully disinflated to low inflation—…Ireland and Spain—did so at a significant cost to output."

The experiences of Ireland and Spain, taken together with the five developing country episodes, paint a picture of output and employment during successful disinflations from moderate to low levels of inflation that is very different than the behavior of output and employment during successful disinflations from high levels of inflation. Nevertheless, defining a disinflation program by its outcome, namely a successful reduction of the inflation rate, may deliver biased estimates of the true effect of disinflation on growth (Calvo and Vegh 1998). In a world where people are rational and forward-looking, one ideally wants an *ex-ante* measure of the effect they expect that the program will have on short- and long-run growth. The stock market view of disinflation, to which we now return, provides—with important limitations—just such an *ex-ante* measure. It allows us to use the power of all 81 episodes to determine the expected impact of all disinflations, not just those which succeeded.

3. Regression Estimates

We analyze the difference in stock market reactions to disinflations depicted in Figure 1

by running regressions of real dollar stock returns on control variables and two sets of disinflation dummies—one for the high inflation episodes and another for the moderate inflation episodes. Before proceeding to the results, there are four important caveats.

First, the variance of stock returns is not constant across countries, so we correct all standard errors for heteroscedasticity. Second, although there are 3,595 observations of monthly stock returns, common shocks can affect all 21 countries, so the observations may not be independent; we control for common shocks by using proxies for the world business cycle. Third, in addition to controlling for common world shocks, we also control for non-disinflation-related country-specific economic reforms. Fourth, all estimations include country-specific dummy variables.

A. Benchmark Specifications

Keeping the four caveats in mind, the following panel regression provides a benchmark specification for evaluating the magnitude and statistical significance of the cumulative abnormal 12-month change in the stock market in anticipation of disinflation:

$$R_{it} = \alpha_i + \gamma_1 HIGH_{it} + \gamma_2 MOD_{it} + \varepsilon_{it} \tag{1}$$

The α_i in equation (1) are country-specific dummies. $HIGH_{it}$ is a dummy variable for disinflation programs implemented during high inflation. $HIGH_{it}$ takes on the value 1 for country i in each of the months from –12 to 0, where 0 is the month in which the disinflation program is implemented.

Given market efficiency, the country's aggregate share price index will change only in response to new information. Specifically, when the market first learns that the government will implement a disinflation program at Time 0, prices will jump up or down in reaction to the news.

Because there can be no anticipated jumps in asset prices, absent any additional new information, the share price index will continue drifting in the same direction as the initial jump, until Time 0, when the market reaches its new equilibrium price. After Time 0, there will be no more changes in the aggregate share price index. Because I do not have precise information on when governments first announced (vs. implemented) the disinflations, I use a twelve-month, pre-implementation window to reflect the likelihood that market participants learned that the disinflation programs would be put in place before they were actually implemented.

The coefficient on $HIGH_{it}$, γ_1, measures the average monthly abnormal return in months –12 through 0 across all countries that implemented disinflation programs during high inflation. Multiplying γ_1 by 12 gives the average CAR attributable to the anticipated disinflation of high inflation. Similarly, γ_2, the coefficient on MOD_{it}, measures the average monthly abnormal return during the 12-month window preceding disinflation programs that were implemented during moderate inflation.[2] Multiplying γ_2 by 12 gives the average CAR attributable to the anticipated disinflation of moderate inflation. Similarly, $12*(\gamma_1 - \gamma_2)$ gives the average difference between the stock market response to the disinflation of high versus moderate inflation.

Table 2 presents the results. The entry in row 1 of Column (1a) indicates that for the benchmark regression the coefficient on *HIGH* is 0.04, meaning that the average CAR for high inflation episodes is 48 percent. The entry in row 2 of Column (1a) indicates that the coefficient on *MOD* is –0.015, so that the average CAR for moderate inflation episodes is negative 18

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[2] We also estimated the regressions using a market-adjusted regression specification, that is, regression (1) with world stock returns as right hand-side variables. The results are virtually identical, so we present the more parsimonious mean-adjusted specification.

percent. Since $\gamma_1 - \gamma_2 = 0.055$, the average difference between the high and moderate CARs is 66 percentage points. The third row of Table I is labeled "*HIGH>MOD*?" A "YES" in this row means that an *F*-test rejects the restriction $\gamma_1 = \gamma_2$, indicating that the point estimate of γ_1 is significantly larger than the point estimate of γ_2. Thus, the entry in row 3 of Column (1a) indicates that the cumulative 66 percentage point differential between the two stock market responses is statistically significant.

To control for external factors, we follow Calvo and Vegh (1998) and Fischer, Sahay, and Vegh (2002) by adding the growth rate of OECD industrial production and the level of real LIBOR as right-hand-side variables in the benchmark specification. The results reported in Column (2a) of Table 2 indicate that after controlling for external factors, the coefficients on *HIGH* and *MOD* are largely unchanged, and the difference between the coefficient on *HIGH* and *MOD* is still 0.055 and statistically significant.

Next, we extend the Fischer *et. al* set of right-hand-side variables by controlling directly for a host of domestic economic policy changes that often coincided with attempted disinflations. Using the policy events in Henry (2000), we construct five dummy variables to control for the effect of the following changes: stock market liberalization, trade liberalization, privatization, debt rescheduling, and national elections. These variables, denoted *SML*, *Trade*, *Priv*, *Debt*, and *Election*, control directly for the possibility that the stock market may increase more in anticipation of reducing high inflation because disinflations of high inflation are accompanied by other country-specific policy changes that also have a positive effect on stock prices.

We construct the non-disinflation-related reform variables in an entirely analogous fashion to the disinflation dummies. For example, Argentina liberalized its stock market in November of 1989. Thus, November of 1989 is Month 0 for this particular stock market

liberalization, and the variable *SML* takes on the value 1 in each of the twelve months from November of 1988 to November of 1989. Again, note that the dummy variable for each of these country-specific economic reforms is "on" only when these reforms coincide with a disinflation program. Thus, the correct interpretation of the reform coefficients is that of an average monthly effect on the stock market conditional on there also being a disinflation program underway. The results reported in Column (3a) of Table 2 indicate that after controlling for contemporaneous domestic policy changes as well as external economic fundamentals, the coefficients on *HIGH* and *MOD* are, again, largely unchanged. The difference between the coefficients on *HIGH* and *MOD* increases slightly to 0.059 and remains statistically significant. The general lack of significant coefficients on the non-disinflation reform variables may indicate that news of other reforms is of minor importance during periods of disinflation (Dornbusch 1992).

Finally, in addition to controlling for external and domestic factors, we also perform a parallel set of regressions using real local currency returns. We do this because 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. To see if this is the case, we re-estimate regressions (1a) through (3a) using real local currency returns instead of real dollar returns as the left-hand-side variable. The results, displayed in Columns (1b) through (3b) are almost identical to the previous regressions in which the left-hand-side variable is real US dollars.

B. Interpretation

The estimates in Table 2 confirm three central facts: (1) the net present value of reducing

high inflation is positive; (2) the net present value of reducing moderate inflation is negative; and (3) both economically and statistically, the net present value of reducing high inflation is significantly larger than the net present value of reducing moderate inflation.

The second fact begs a question. If the expected net present value of reducing moderate inflation is negative, why do countries do it? One reason is that the alternative is worse. Moderate inflation tends to rise (Ha, Kose, and Ohnsorge 2019; IMF 2001). Rising moderate inflation runs the risk of becoming high inflation, and high inflation: (a) has negative consequences for productive activity; and (b) rapidly erodes the purchasing power of people who cannot protect their incomes against inflation.

The caution required to interpret the negative stock market reaction to disinflation programs directed at moderate inflation highlights certain limitations of the stock market analysis. First, stock price responses measure the change in real wealth, not utility gains *per se*, and a shock that drives down stock market valuation may actually increase utility. For example, an increase in expected future productivity can decrease stock market value if the attendant rise in discount rates outstrips the valuation impact of greater expected future dividends (Lucas 1978). Nevertheless, welfare improves.

More generally, the stock market is not the economy, and a cost-benefit analysis of current and expected future gains to shareholders, is not the same thing as a cost-benefit analysis of current and expected future output. The observation, for instance, that shareholders benefit from eliminating high inflation does not necessarily imply that non-shareholders (i.e., the majority of workers) are also better off. If eliminating high inflation increases capital's share in GDP, then stock prices may rise with no change (or even a fall) in expected future output. As we have seen, eradicating high inflation is associated with aggregate output gains and does not

appear to be zero sum, but the reality that disinflation may have distributive consequences has important implications for moderate inflation scenarios.

For example, if stabilizing moderate inflation increases labor's share in GDP, then the incomes of workers may rise even though stock prices fall. In this case, shareholders, and owners of capital more broadly, might prefer to live with moderate inflation than endure the devaluation of assets required to bring about low inflation, while wage earners (i.e., labor) would prefer disinflation. This potential for distributive conflict under moderate inflation scenarios may provide important clues as to why attempts to reduce moderate inflation so often fail. Resolving these issues is beyond the scope of the paper, but the distributive conflict that flows from the initiation of disinflation programs directed at moderate inflation may explain why financial market participants in the US are so eager for the Fed to pause rate hikes, even as the wider US population wants much lower inflation.

C. Beyond the Stock Market

Turning from the stock market and the Fed, back to inflation itself, something remarkable occurred during the 1990s. The set of nations classified by the IMF as emerging market and developing economies (EMDEs), saw their average annual inflation rates decline from 89.4 percent in 1994 to 8.5 percent in 2000, and average inflation for these countries remained in the single digits until 2022. Per the discussion about the 1990s emerging market financial crises and IMF programs in Section 2A, we cannot identify, with confidence, discrete dates after 1994 on which EMDEs initiated proper disinflation programs. We do not attempt, therefore, to replicate our stock market analysis for the post-1994 data. The post-1994 decline in inflation is nevertheless relevant for two reasons.

First, the speed with which inflation fell is consistent with the evidence in Section 2D that demonstrates, quite apart from the numerical levels themselves, high and moderate inflation are very different phenomena. Average inflation fell quickly from high in 1994 to moderate (39.2 percent) in 1995, whereas it takes an additional five years to decline from moderate to low. The persistence of moderate inflation for the universe of EMDEs is consistent with the sluggish speed of disinflation in the subset of five countries in the pre-1994 sample that successfully reduced inflation from moderate to low levels.

Second, and shifting the focus once again from short-run questions about speed and cost to the fundamental issue of whether the long-run benefits of disinflation outweigh the costs, the following points are worth noting about the world after 1994. For the universe of EMDEs that successfully reduced inflation from high to moderate, the average growth rate of GDP in the ten-year post-disinflation period was 2.6 percentage points higher—4.2 percent versus 1.6 percent—than it was in the previous ten-year period (Chari, Henry, and Reyes 2021). For the universe of EMDES that eventually reduced inflation from moderate to low, the average growth rate of GDP in the ten-year post-disinflation period was 1.47 percentage points higher—5.52 percent versus 4.05 percent—than it was in the previous ten-year period (Chari, Henry, and Reyes 2021). These numbers are subject to the caveat in Section 2D about evaluating disinflation programs on the basis of ex-post growth, and the point applies with special force because of the litany of non-disinflation-related reforms undertaken by EMDEs in the 1990s (Chari and Henry 2014). Nevertheless, US lawmakers would do well to take notice of these developing country facts.

4. Conclusion

U.S. inflation has declined from its 40-year high in 2022. Yet it remains above the Fed's two-

percent target, and throughout the current disinflation, U.S. financial markets have been ignoring a simple reality. There is no historical precedent for a painless return from moderate to low inflation.

Chairman Volcker's war against double-digit inflation in the late 1970s and early 1980s was not unusual. In fact, it was the norm—part of a wider, recurring phenomenon, at a time when "Third World" nations struggled to reduce inflation. Of the 56 developing countries that tried to reduce inflation from levels similar to that where the US began its current journey, only five succeeded, and it took them an average of three years to reduce inflation to single digits.

It is possible that developing countries struggled with disinflation, not because moderate inflation is structurally different than high inflation, but because developing country policymakers lacked the credibility of their advanced economy counterparts. As emphasized by Sargent (1982) and Cochrane (2022), however, the joint commitment of fiscal and monetary policy to price stability is a key determinant of credibility, and the collapse of UK Gilt prices in October 2022 bore distinct similarities to past emerging-market fiscal crises. And while US Treasuries have yet to be subjected to deep skepticism about the federal government's commitment to the debt, with American monetary policy having gone astray, it is not obvious the Fed possesses the credibility required for a swift return to two percent inflation.

Whether in advanced economies or the developing world, no team of policymakers has ever executed an immaculate reduction of inflation from moderate to low akin to what we have seen in the vanquishing of high inflations past. Ironically, the stock market, which in the US has been yearning for signs that interest rates will not remain higher for longer, actually provides the strongest evidence that a quick return to the Fed's target is highly unlikely. Policymakers—and financial markets—ignore this lesson at their own peril.

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Figure 1. The stock market responds positively to disinflation programs directed at high inflation, negatively to those directed at moderate inflation.
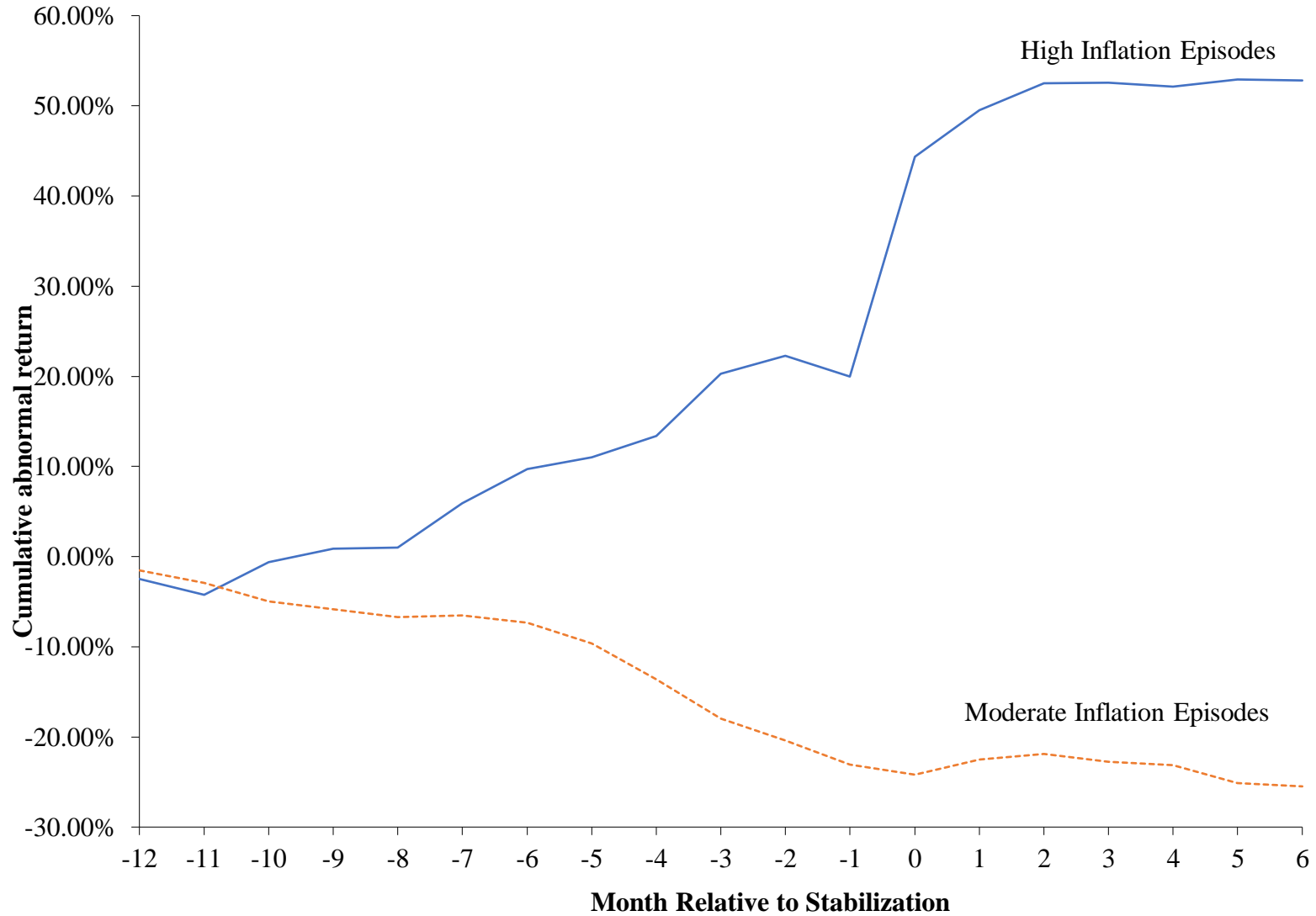
Figure 2. During successful disinflations, the tranition from high inflation to moderate inflation is swifter than the transition from moderate to low.
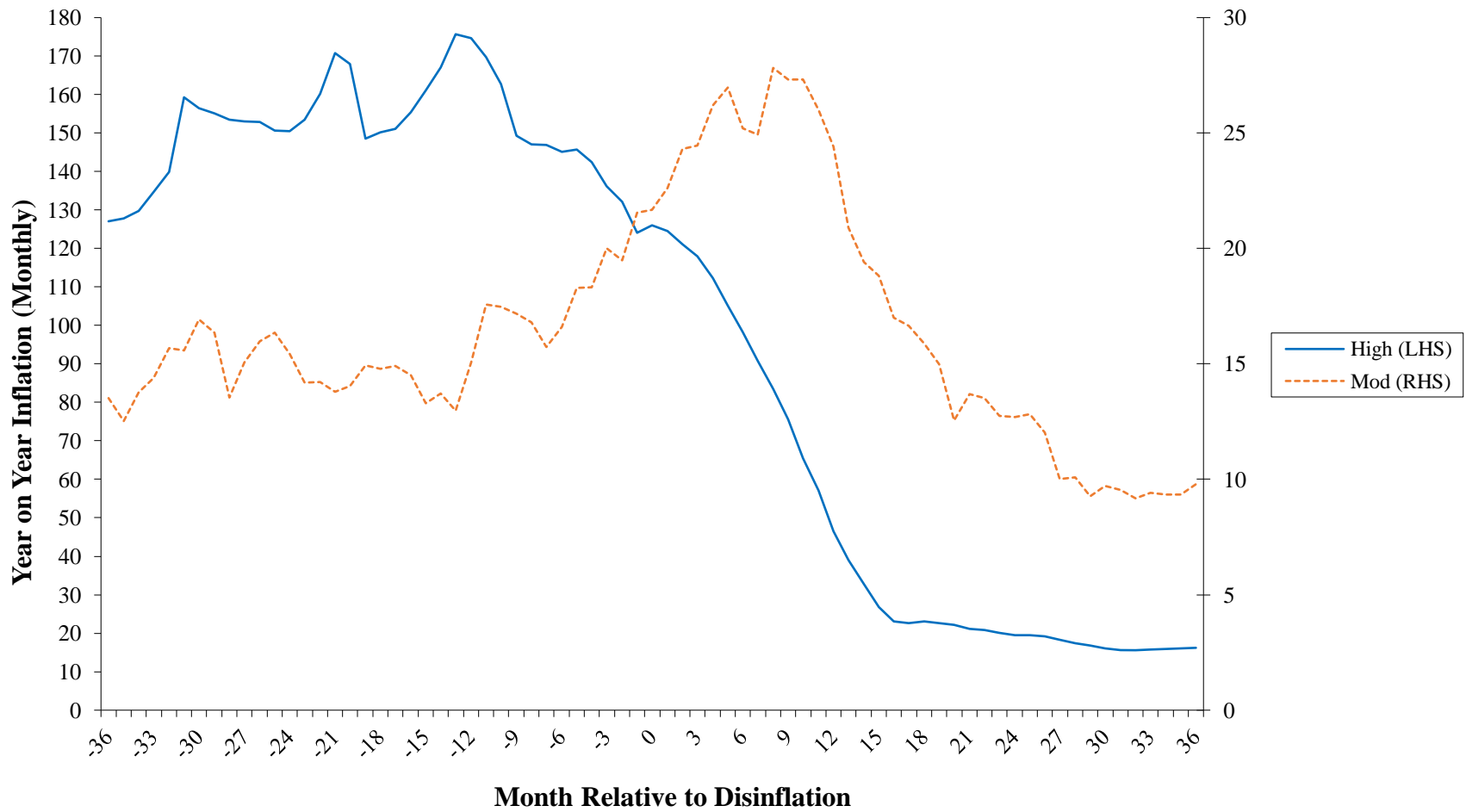
Figure 3. Growth slows during successful disinflations from moderate inflation to low inflation, but rises during disinflations from high to moderate.
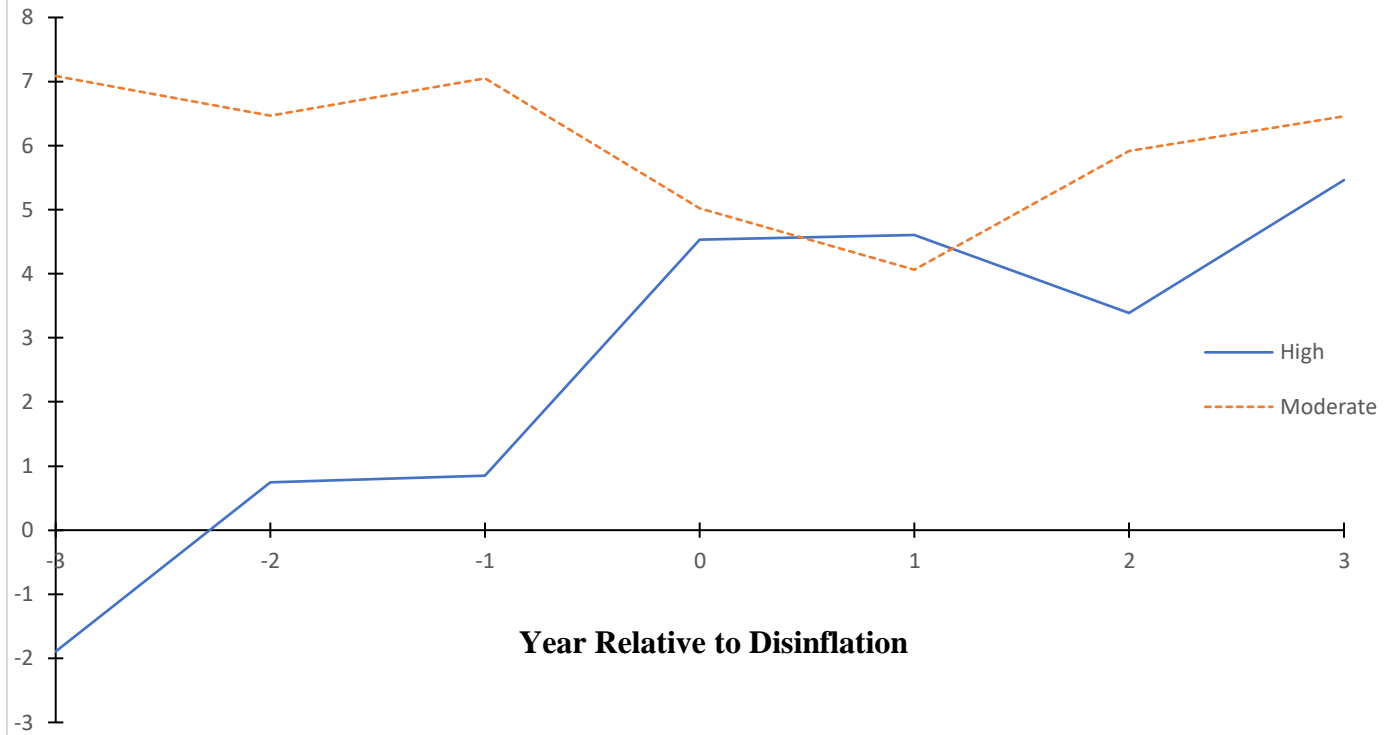
Year Relative to Disinflation

Table 1. The median stock price response to disinflations directed at high inflation exceeds the median stock price response to disinflations directed at moderate inflation.

	Bruno Easterly Classification		Two-Way Numerical Split		Three-Way Numerical Split		
	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

Table I divides the 81 stabilization episodes into three groups based on levels of average inflation prior to announcement. 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-announcement 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. The stock market responds positively to disinflations directed at high Inflation and negatively to disinflations directed at moderate inflation.

	Panel A: Real Dollar Returns			Panel B: Real Local Currency Returns		
	(1a)	(2a)	(3a)	(1b)	(2b)	(3b)
HIGH	0.040***	0.040***	0.042***	0.040***	0.040***	0.040***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
MOD	-0.015***	-0.015***	-0.017***	-0.010**	-0.010**	-0.011***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
HIGH>MOD?	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
OECD		-0.022	-0.022		-0.044*	-0.044*
		(0.026)	(0.026)		(0.024)	(0.024)
LIBOR		-0.002***	-0.002***		-0.000	-0.001
		(0.008)	(0.008)		(0.001)	(0.001)
SML			0.039			0.031
			(0.026)			(0.027)
TRADE			-0.014			-0.015
			(0.024)			(0.024)
PRIV			-0.039			-0.030
			(0.047)			(0.046)
DEBT			0.000			0.008
			(0.011)			(0.010)
ELECTION			0.035*			0.029
			(0.021)			(0.021)

The table presents estimates of the average stock market response to the stabilization of high versus moderate inflation. The left-hand-side variable is real monthly stock returns. The estimation procedure is Ordinary Least Squares (OLS). Heteroskedastic consistent standard errors are reported in parentheses. The number of observations is 3595. All regressions include a constant and 20 country-specific dummies (not shown). Levels of statistical significance are indicated by asterisks: *** 1percent; ** 5 percent; * 10 percent. HIGH is a dummy variable that takes on the value 1 in each of the 12 months leading up and including the month in which a stabilization program directed at reducing high inflation is implemented. MOD is a dummy variable that takes on the value 1 in each of the 12 months leading up and including the month in which a stabilization program directed at reducing moderate inflation is implemented.