



GETTING MONETARY POLICY BACK ON TRACK

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DISINFLATION AND THE STOCK MARKET

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

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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 1988; Gordon 1982; Okun 1978).

An opposing school of thought consists of financial market participants who have been parsing Federal Reserve chairman Jay 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 a Powell-led 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% in 2022, will be 5.3% 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 views suffer from a small sample problem. It is difficult to infer how long and costly the current US disinflation path will be by comparing it to 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 2% inflation? By exploiting the richness of the developing country data—eighty-one disinflation programs: fifty-six directed at reducing “moderate” inflation, twenty-five directed at reducing “high,” and spread across twenty-one developing countries between 1973 and 1994—our 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 fifty-six disinflation programs directed at reducing “moderate” inflation—defined by Dornbusch and Fischer (1993) and Fischer (1993) as double-digit inflation of less than 40%—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 fifty-six developing country disinflation programs, 15%, was similar to peak inflation in (a) the Volcker era (11%) 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 twenty-five disinflation programs directed at reducing “high” inflation—defined, by Easterly (1996) and Bruno and Easterly (1996), as inflation greater than 40% 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 twenty-one 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. However, if the net present value of disinflation is positive, there is no clear articulation of this point in the literature. For instance, the SR 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. SR-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 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 8.1 conveys the three central results. First, in real dollar terms, the average CAR associated with anticipated disinflation across the twenty-five high-inflation episodes is positive and large—44%. Second, the average CAR associated with anticipated disinflation across the fifty-six moderate-inflation episodes is negative and large—minus 24%. 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 in 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

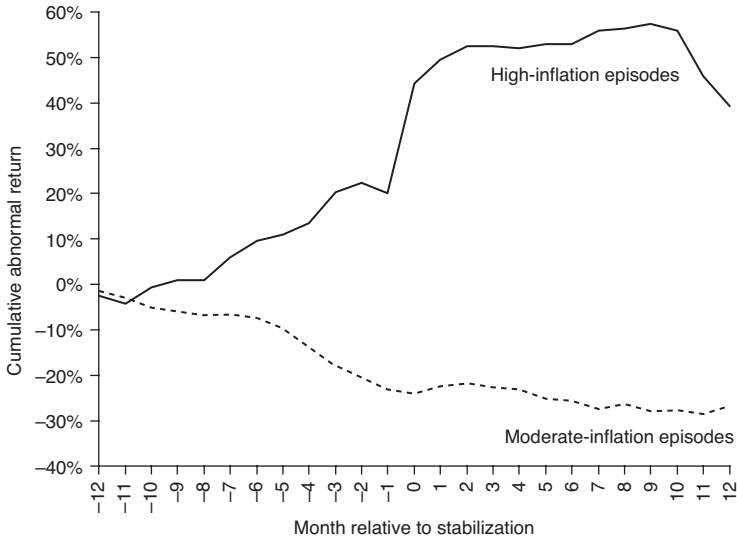


FIGURE 8.1. The stock market responds positively to disinflation programs directed at high inflation and negatively to those directed at moderate inflation. Source: Authors' calculations.

(b) also had a stock market, figure 8.1 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 8.1 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 the following section, the rest of this paper grapples with the relevance of figure 8.1 and the accompanying institutional details for the challenges currently facing the Fed.

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 twenty-one countries that satisfy both criteria are: Argentina, Brazil, Chile, Egypt, India, Indonesia, Israel, Jamaica, Jordan, Kenya, Mexico, Nigeria, Pakistan, Peru, the Philippines, South Africa, South Korea, Thailand, Turkey, Venezuela, and Zimbabwe.

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, US dollar-denominated IFC Global Indices. For most countries, EMDB's coverage began in December 1975. For others, coverage started in December 1984. For countries where the IFC does not provide stock market data, we use the stock price index given in the IMF's [International Monetary Fund] International Financial Statistics (IFS). Each country's US dollar-denominated stock price index is deflated by the US 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.

Disinflation Dates

We use two sources to identify the implementation month and year of each of the eighty-one disinflation programs. The first source is Calvo and Végh (1999). 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 1973–1994). We use these reports to construct a time series of the months in which each of the twenty-one 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, 423; Mussa and Savastano 2000, 101). Under the monetary approach, balance of payments problems stem from an excess supply of money, with the 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 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).

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 where twelve-month inflation was greater than 40% during each of the twenty-four months leading up to and including the month in which policymakers implemented the disinflation program. We define moderate-inflation episodes analogously: those with twelve-month inflation between 10 and 40% during each of the twenty-four months leading up to and including the month in which policymakers implemented disinflation.

The online data appendix provides extended information about the eighty-one disinflation programs. Here is a summary. Fourteen of the eighty-one programs correspond to the beginning of Calvo and Végh (1999) disinflation episodes. Two of the fourteen Calvo and Végh episodes coincided with IMF agreements: Mexico in 1977 and Argentina in 1991. All fifty-six attempts at reducing moderate inflation had IMF sponsorship. Thirteen of the twenty-five 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, eleven. Finally, seventeen of the twenty-five high-inflation episodes occurred in Argentina and Brazil.

Given the outsized presence of Argentina and Brazil, it is natural to ask whether figure 8.1 is sensitive to the classification of “high” inflation defined as 40% or greater. Table 8.1 compares stock price responses to disinflation under two alternative classifications. The first alternative divides the eighty-one episodes into two groups of roughly equal size by descending order of inflation when the

TABLE 8.1. The median stock price response to disinflations directed at high inflation exceeds the median stock price response to disinflations directed at moderate inflation.

	Bruno and 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
<i>P</i> -value	0.01	0.25	0.01	0.5	0.01	0.12	0.65

Source: Henry (2000).

disinflation program was initiated: high inflation (forty cases) and moderate inflation (forty-one cases). This two-way split is particularly useful, because it creates a superset of the high-inflation episodes not dominated by Argentina and Brazil. The second alternative divides the episodes into three groups of equal size: high inflation (twenty-seven cases), moderate inflation (twenty-seven cases), and low inflation (twenty-seven cases).

Table 8.1 divides the eighty-one stabilization episodes into three groups based on levels of average inflation prior to announcement. 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 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.

The first three rows of table 8.1 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 8.1 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 1% 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 8.1 are not overly sensitive to the classification of high inflation as that exceeding 40%.

Descriptive Differences and Case Studies

Turning from issues of classification sensitivity back to broader themes of the disinflation episodes, one fact leaps out from the data: countries that attempt to reduce moderate inflation to low

inflation (single digits) rarely succeed. Of the fifty-six stabilization programs directed at reducing moderate inflation between 1973 and 1994, only five worked.

At first blush, the rate at which governments successfully stabilized high inflations, eight of twenty-five, also appears low. But this low success rate is driven almost entirely by the seventeen attempts in Argentina and Brazil, fifteen 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 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 10% of the time casts doubt on the view that the Fed will be able to engineer a quick return to its 2% inflation target.

Indeed, figure 8.2 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 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%—well within the Dornbusch and Fischer (1993) moderate-inflation range—in fifteen months. In contrast, it takes thirty-six months to reduce moderate inflation to the low-inflation threshold of 10%. The reality that high inflation falls to one-sixth its prestabilization level in fifteen 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. It is also possible that moderate inflation

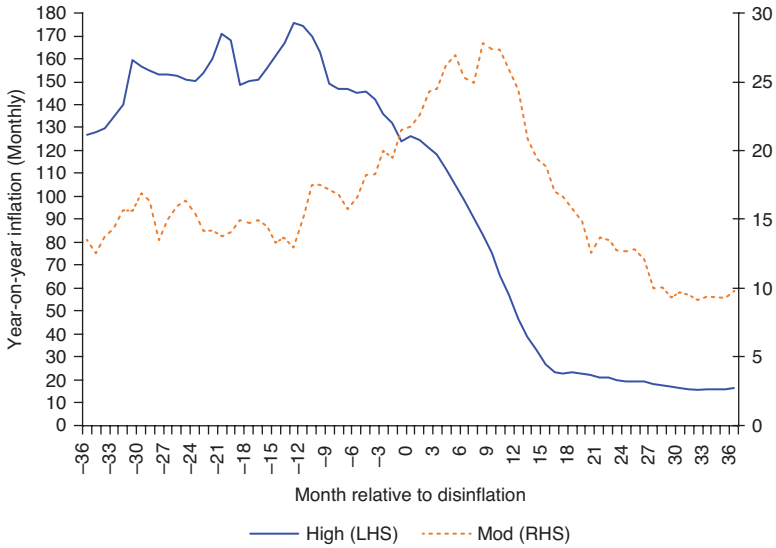


FIGURE 8.2. During successful disinflations, the transition from high to moderate inflation is swifter than the transition from moderate to low inflation.

Source: Authors' calculations.

only appears 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%—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%, 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 reduced inflation to 8.2% by 1995 and kept it in the single digits through 2021.

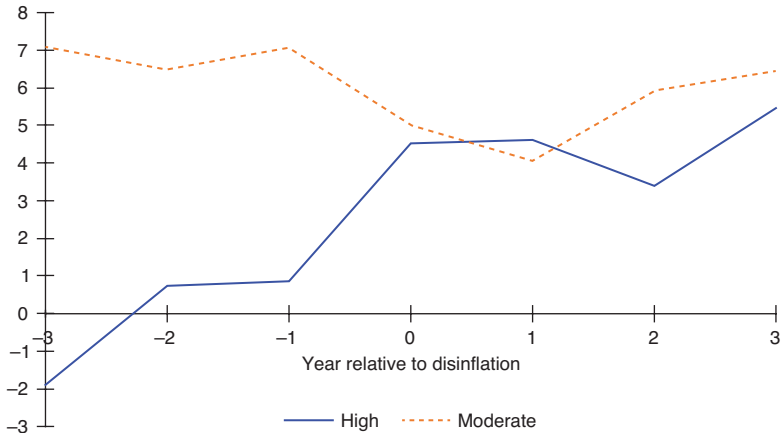


FIGURE 8.3. Growth slows during successful disinflations from moderate inflation to low inflation but rises during disinflations from high to moderate inflation. Source: Authors' calculations.

Moving beyond Chile to the broader developing world, did the longer period of time it took to reduce moderate inflation compared to high inflation have attendant consequences for output? Figure 8.3 addresses the question by plotting, in disinflation time, the average annual growth rate of real GDP for the eight episodes in which countries successfully reduced high inflation to moderate—Argentina, Brazil, Chile (1978), Israel, Jamaica, Mexico, Peru, and Turkey—versus the five 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 differs 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%, or 1.4 percentage points lower than the 6.9% growth rate of GDP in the pre-disinflation period, years -3 to -1.

Second, there are output gains during disinflation from high- to moderate-inflation levels. On impact, between years -1 and 0, growth increases in five of the eight countries, and their average GDP growth rate 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%, or 4.6 percentage points higher than the negative 0.1% 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% to more than 17% 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 from 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 Végh 1999). 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 eighty-one episodes to determine the expected impact of all disinflations, not just those that succeeded.

Regression Estimates

We analyze the difference in stock market reactions to disinflations depicted in figure 8.1 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 twenty-one 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.

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 twelve-month change in the stock market in anticipation of disinflation:

$$R_{it} = \alpha_i + \gamma_1 HIGH_{it} + \gamma_2 MOD_{it} + \varepsilon_{it} \quad (1)$$

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 during 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 we do not have precise information on when governments first announced (vs. implemented) the disinflations, we 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 twelve 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 twelve-month window preceding disinflation programs that were implemented during moderate inflation.² Multiplying γ_2 by twelve 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 8.2 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%. The entry in row 2 of column (1a) indicates that the coefficient on *MOD* is -0.015 , so the average CAR for moderate-inflation episodes is negative 18%. 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 8.2 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 Végh (1999) and Fischer, Sahay, and Végh (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 8.2 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. (2002) 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

TABLE 8.2. 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)
<i>HIGH</i>	0.040*** (0.016)	0.040*** (0.016)	0.042*** (0.016)	0.040*** (0.016)	0.040*** (0.016)	0.040*** (0.016)
<i>MOD</i>	-0.015*** (0.005)	-0.015*** (0.005)	-0.017*** (0.005)	-0.010** (0.004)	-0.010** (0.004)	-0.011*** (0.004)
<i>HIGH>MOD?</i>	Yes***	Yes***	Yes***	Yes***	Yes***	Yes***
<i>OECD</i>		-0.022 (0.026)	-0.022 (0.026)		-0.044* (0.024)	-0.044* (0.024)
<i>LIBOR</i>		-0.002*** (0.008)	-0.002*** (0.008)		-0.000 (0.001)	-0.001 (0.001)
<i>SML</i>			0.039 (0.026)			0.031 (0.027)
<i>TRADE</i>			-0.014 (0.024)			-0.015 (0.024)
<i>PRIV</i>			-0.039 (0.047)			-0.030 (0.046)
<i>DEBT</i>			0.000 (0.011)			0.008 (0.010)
<i>ELECTION</i>			0.035* (0.021)			0.029 (0.021)

Notes: 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 3,595. All regressions include a constant and twenty country-specific dummies (not shown). Levels of statistical significance are indicated by asterisks: *** 1%; ** 5%; * 10%. *HIGH* is a dummy variable that takes on the value 1 in each of the twelve months leading up to and including the month 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 twelve months leading up to and including the month a stabilization program directed at reducing moderate inflation is implemented.

Source: Authors' calculations.

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 1989. Thus, November 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 1988 to November 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 8.2 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.

Interpretation

The estimates in table 8.2 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 raises the question, why do countries do it if the expected net present value of reducing moderate inflation is negative? One reason is that the alternative is worse. Moderate inflation tends to rise (Ha, Kose, and Ohnsorge 2019). 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 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 nonshareholders (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. It 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, workers' income 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.

Beyond the Stock Market

Turning from the stock market and the Fed back to inflation, 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% in 1994 to 8.5% in 2000. The average inflation for these countries remained in the single digits until 2022. Per the earlier discussion about the 1990s emerging-market financial crises and IMF programs (in the section Data and Descriptive Findings:

Stock Markets), 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 we presented that demonstrates, quite apart from the numerical levels themselves, high and moderate inflation are very different phenomena (see *Descriptive Differences and Case Studies* above). Average inflation fell quickly from high in 1994 to moderate (39.2%) 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% versus 1.6%—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% versus 4.05%—than it was in the previous ten-year period (Chari, Henry, and Reyes 2021). These numbers are subject to the caveat (in *Descriptive Differences and Case Studies* above) about evaluating disinflation programs based on 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.

Conclusion

US inflation has declined from its forty-year high in 2022. Yet it remains above the Fed's 2% target, and throughout the current disinflation, US financial markets have been ignoring a simple reality. There is no historical precedent for a painless return from moderate to low inflation.

Former Fed chairman Paul 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 fifty-six 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 from high inflation, but because developing country policymakers lacked the credibility of their advanced economy counterparts. As emphasized by Sargent (1982) and Cochrane (2023), 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 2% 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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Notes

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

DISCUSSANT REMARKS

Joshua D. Raub

Thank you very much, as I lower the microphone here. I was at a dinner last night, and I was sitting next to Art Laffer. And we stood up—I had been arguing with him about something a little bit—and he said, “I like your . . .” and I heard a word. I thought he said, “attitude.”

And I said, “Okay.”

He replied, “Did you hear what I said?” It turned out he’d said *altitude*, “I like your altitude.” So he and I have a similar altitude. Peter Blair Henry and I have different altitudes.

Well, first of all, thanks very much to John Taylor. Congratulations on the thirty years of the Taylor rule, and it’s an honor to have the opportunity to discuss this paper by Anusha Chari and Peter Henry on disinflation in the stock market. I’m not a macroeconomist. I’m not a monetary economist. I am a finance economist, and my research expertise is on fiscal policy, although I do a lot on valuation and discounting. Hopefully, through that lens, I’ll be able to say something useful.

But the first thing I’ll just say is I really enjoyed reading this paper and learned a lot from it, and I recommend that you all read it as well. One can learn a great deal from this technique of looking at other countries that have gone through attempts at disinflation and what has happened to markets when they’ve done so.

Essentially, the paper asks us: if we’re going to get from here to there, where *here* is the US experiencing moderate inflation and *there* is the Federal Reserve’s 2% target, what should we expect the stock market to do based on the experience of other countries?

Since Henry did a great job describing the paper and its results, I won't go through too much detail about it. But it's a study of twenty-one countries and eighty-one disinflation programs. That means that a number of these countries have multiple disinflation programs. And it uses a finance event-study methodology.

One of the things I'm going to talk a little bit about is the chosen timing—in other words, the chosen event window. The event begins with a time zero for the event that is twelve months prior to the announcement of an intention to stabilize inflation or to engineer disinflation by signing an official agreement with the International Monetary Fund (IMF). The idea is that there is some foresight into this disinflationary attempt that's going to happen. And then, the outcome is the twelve-month stock return. So we're looking at a time period that is from a year before the actual signing of the official agreement, or formal announcement, up until the date of that event. And the key sample split—as Henry described—was looking at cases where inflation was high, defined as greater than 40% over the time period, or twenty-four months to one month before the announcement of the disinflationary attempts. And then the moderate cases are those where inflation was in the 10 to 40% range during that two-year period.

Here's a graphical representation of the results as I see them if we take out the lines going over time and just look at a histogram (figure A). And I put up coefficients here on real dollar returns and real local currency returns from the regressions.

Henry didn't have much time to talk about this, but they're actually quite similar. For the high-inflation countries, you get a 48% increase in stock market values over the measured time period. Same for the real local currency returns. For the moderate inflation, the hit that Peter measures from implementing the disinflation is lower in the real local currency return setting, which I thought was interesting. If we think about what might be going on in currencies, really, we think that the disinflation should be strengthening

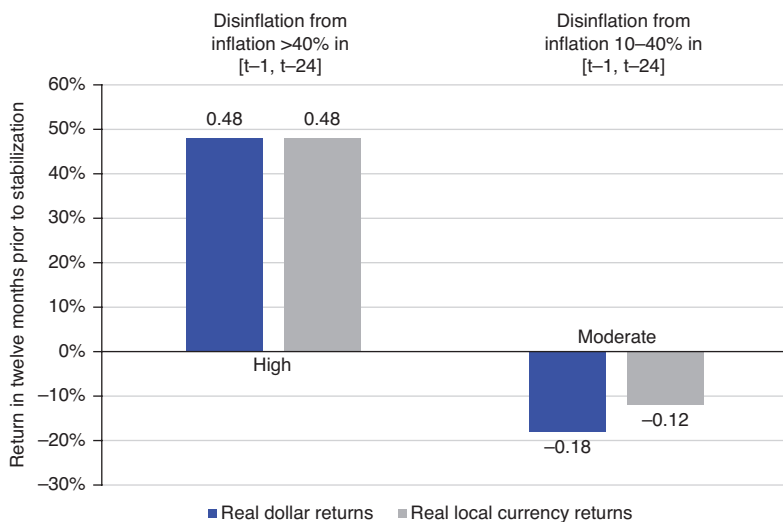


FIGURE A. Stock Market Return in High-Inflation and Moderate-Inflation Scenarios.

Note: Real dollar and real local currency returns of countries experiencing either high or moderate inflation in the period leading up to the announcement of a rate change by the central bank.

Source: Anusha Chari and Peter Blair Henry, “Disinflation and the Stock Market: Third World Lessons for First World Monetary Policy,” National Bureau of Economic Research Working Paper 31129, April 2023.

the currencies. So my intuition would have suggested that you might have expected better dollar returns. But perhaps the difference isn’t that significant. I suggest the authors say more about the effect of the disinflation on currencies in this setting.

Most of the paper emphasizes results in dollar returns, so I’m going to focus on that. The first comment is on timing. The paper is essentially looking at the stock market returns over this time period, twelve months to zero months. These are the returns that are measured in the regression. During this time, we see that the high inflation is already coming down. So there’s some effect happening in anticipation of the formal announcement of the program. There could be real actions also happening in the run-up to that formal signature. The reason I highlight the range, though, is

that it does appear that in the high-inflation episodes, the time period over which the authors are measuring stock returns is one where the inflation is already coming down. In contrast, in the moderate episodes, it's a time period where the inflation is actually continuing to accelerate. That's one kind of setting that we have to be aware of as we think about what's going on with the stock market in each of these instances.

The graph that Henry actually showed extends out so you can see what's going on in the stock market after the main period that's in the regressions. It extends it out for another six months. The stock market is pretty flat at that point. But that's the time period where the moderate-inflation countries are still seeing increases in inflation. A natural question that I had when looking at that was: what happens to markets after the moderate-inflation countries start to cool?

And another point they came up with in the presentation is, as Henry mentioned, there are only five cases defining a successful exit from a moderate inflation—getting below that 10% threshold. But these are countries where we're seeing an increase in inflation first and then a decrease in inflation. It does come down, although it's also going up during the time period where the authors are measuring the market returns. It'd be helpful to understand what was going on if the authors would present a few different windows of stock market behavior that might allow us to kind of understand the context of what's going on with inflation in these two sets of sample countries.

My second comment is on valuation. Why do we think the stock market should behave or react to disinflationary attempts by the central bank or by the government? Let's think about the valuation of the stock market as being a present-discounted value of expected free cash flows. I'm going to just use unlevered enterprise value and ignore leverage for now. So the standard valuation equation is:

$$\text{Unlevered } EV_0 = \sum_{t=1}^{\infty} \frac{E_0[FCF_t]}{(1+r_{A,t})^t}$$

The discount rate $r_{A,t}$ is going to be a risk-free rate plus a risk premium, where each cash flow is discounted by a point of the yield curve that is matched to that cash flow. What happens to this discount rate during disinflations? As a direct result of central bank monetary policy, we can say the short-term risk-free rate increases, and there may be effects farther out the yield curve as well, either due to the expectations hypothesis or the possibility of quantitative tightening. If discount rates increase, stock market values decline. In addition, the expected free cash flow is going to change as fewer investment opportunities are positive on a net present value basis (NPV). That is the finance analog to the macroeconomic point that Henry was making—the idea that lower growth, lower macroeconomic growth, is going to mean lower profits. In terms of investment opportunities that might have had positive NPV at a lower discount rate, these are now no longer positive NPV and are not going to create value for the firm.

We can explain the results by thinking that in cases of high inflation, the inflation per se might be very, very detrimental to the real cash flows that the firm is going to experience. When we have inflation above 40%, that would certainly create actual, real problems for the firm due to uncertainty about the future path of prices. In contrast, moderate inflation per se might not be that detrimental to real free cash flows. If inflation is expected, and at 2%, versus expected, and at 10%, if it's all expected, there's no economic model that's going to distinguish between those two scenarios. But when inflation is very high, these higher levels of inflation, also in practice, reflect considerable uncertainty about future inflation. If risk and uncertainty about inflation increase as the level of inflation increases, then I think the results in the paper are understandable through this framework.

For example, let's make an assumption that the average duration of the cash flows in the valuation is ten years. And for the sake of illustration, let's say the real yield goes up from 0.0 to 1.5%, similar

to the path followed by the medium-term real yields recently. That would be reflected in a 14% decline in the valuation of the stock market. So this is one way to motivate the results of the paper.

How high do real yields actually have to go in order to fight moderate inflation or to bring moderate inflation back down to the target levels? Or put another way, since they don't always succeed, how much do central banks actually need to increase real yields during times when they are trying to get out of moderate inflation or trying to get out of high inflation? And, of course, they don't usually have as much impact on this medium to longer end of the yield curve. They're looking at the shorter end of the yield curve. But the valuation impact might be more on these longer horizons. What is going on with this medium to long-term end of the bond market is going to be very relevant to what we actually see happening in the stock market.

As table A shows, if we go from, say, a 0% to a 10% real yield, we're now entering the realm of countries that might be looking at very big swings. That would be a 61% decline in the value of the stock market, and again this is how I would conceptualize the results in the paper.

In order to understand the results even better, I thought it might be useful to go and look at a few countries that I just picked

TABLE A. Effect of Changes in Real Yield on Valuation.

Valuation Impact for $Dur=10$		dEV(0) versus			
10yr Real Yield	$1/(1+r)^{10}$	0%	1.5%	3.0%	5.0%
0%	1.000				
1.5%	0.862	-14%			
3.0%	0.744	-26%	-14%		
5.0%	0.614	-39%	-29%	-17%	
10.0%	0.386	-61%	-55%	-48%	-37%

Note: The impacts of a decline in real yield on an investment with a given initial real yield ranging from 0.0 to 10.0% and a duration of ten years.

Source: Author's calculations.

at random out of the sample in the paper and to try to look at just how much the real yield actually did go up in these countries. Or at least see what the range of real yields is? This can be seen in figure B.

Since I didn't have the data on the exact episodes of when these inflationary episodes occurred, I can't really do something exact where I say, "Okay, in India, there was an inflation-fighting episode, and the real yield went up from 0.0 to 5%." But I can see that in India, it was around 0% around ten years ago. And that was a time when inflation was quite high, and those real yields went up to about 5% in part in order to bring that inflation down. In Brazil, you can see a similar pattern where, for a while, real yields are near zero. But preceding the time when inflation also seems to be coming down, real yields come up a lot. There, the maximum ten-year real yield was about 4.6% over this time horizon. Turkey, a country that I think in recent years, we'd say they're experiencing high inflation, actually gets cut off, because it spikes up too much above the chart. But the maximum real yield over the episodes that the authors are looking at in this paper is 11.25%. So the real yield had to go up to over 10% in order to take care of inflation, or at least to address inflation. In Mexico, the real yield topped out at about 6.5%.

If real valuation yields have to go up from, say, 0.0 to 5% or 10% to fight moderate inflation, is 18% a large effect, or would I really even have expected it to be even larger? Here is one hypothesis. Perhaps what is actually going on is that it would have been larger. Or maybe it actually is true that it is beneficial for managers of the cash flows of a company not to have to worry a lot about moderate inflation spiking up into very, very high inflation, and this is dampening what would be an even larger negative valuation impact.

My overall suggestion for the paper is to say more about these valuation impacts, including some of the ranges of where the rates (the valuation yields) might be going and what their expected impact on the market would be.

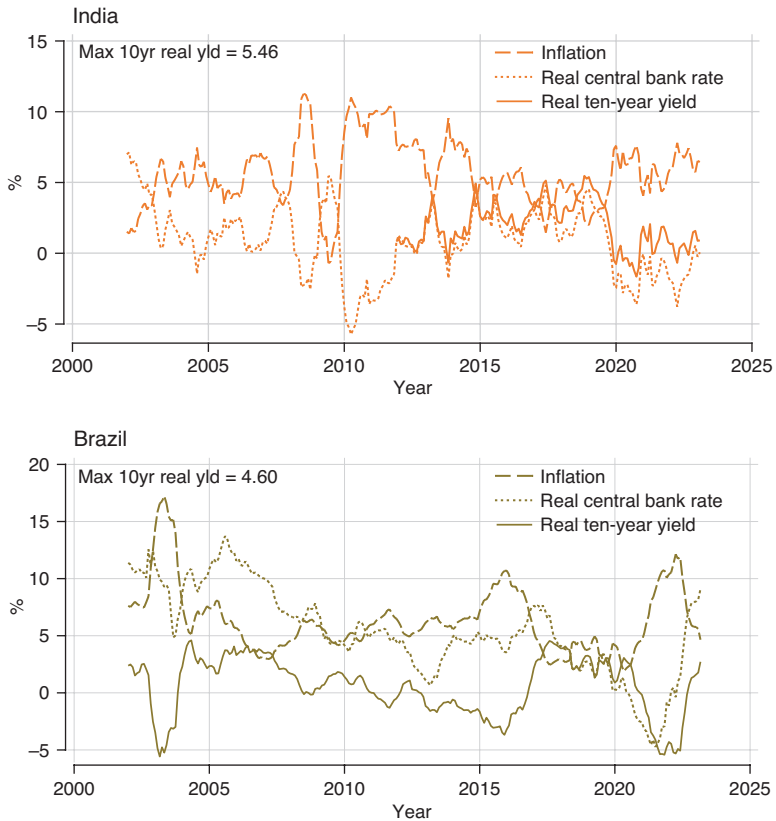
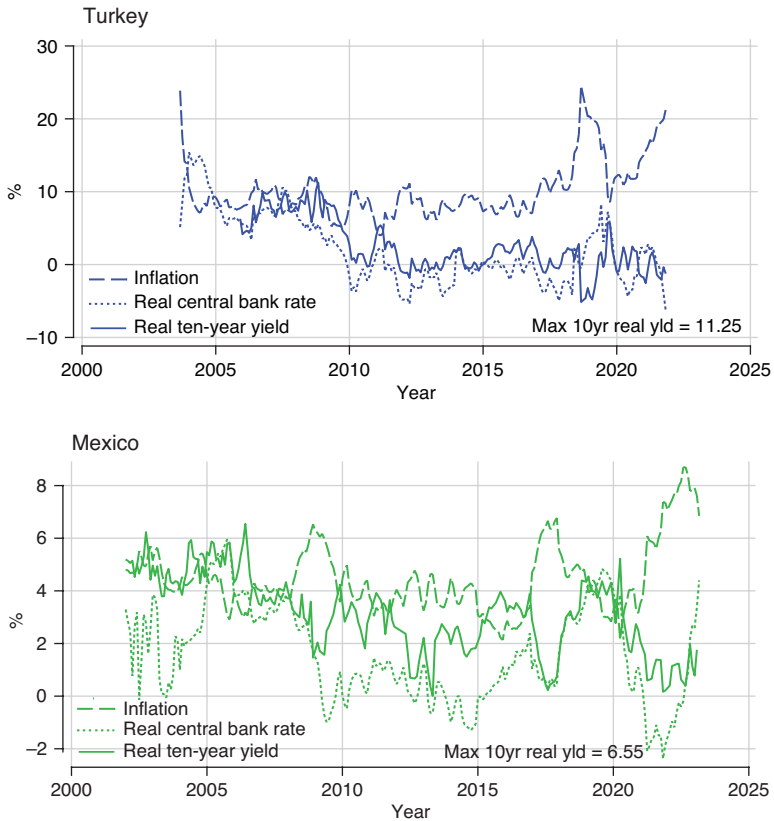


FIGURE B. Inflation, Central Bank Targets, and Ten-Year Bond Yield in India, Brazil, Turkey, and Mexico.

Note: Inflation rate, central bank target rate, and real ten-year yield on government bonds for India, Brazil, Turkey, and Mexico, 2002–23.

Sources: Bank for International Settlements; OECD; Eurostat.

My third comment is to ask whether these countries are valid comparisons? Henry addressed this to some extent, but I think we might want to discuss it a little bit more. Is the US more comparable to a low-inflation situation than a moderate-inflation situation? We never broke 10%. The kind of G7 countries that Henry mentioned were in the 9 to 11% range. That's the very low end of what you're calling in the paper "moderate inflation." And I wonder

FIGURE B. *continued*

whether one could draw a circle around countries that addressed, say, 5 to 15% inflation, and maybe that might be informative for what we might expect from the US. Also, I'm wondering whether the US history of cooling inflation in the 1980s is relevant. We, in contrast to most of the sample countries, did have a successful episode of bringing down inflation. So maybe that is going to bring more confidence in the Fed's ability to actually do it, which will require less dramatic increases in these valuation yields and will hit the stock market maybe a bit less.

Part of what we might be seeing in this paper is a reflection of the fact that in economic models, the cost of expected moderate inflation is just not that high. So presumably, the reason the Fed is fighting moderate inflation is to demonstrate credibility in being able to respond quickly to unexpected inflationary shocks. It was painful that inflation went up from bumbling along the 2% level to suddenly being at 10%. And so this is the reason, presumably, to say, “Okay, now we’re in this moderate-inflation realm, we’re going to fight this.” We’re not just going to say, “Well, now you’re going to live with 10% inflation going forward.” By setting the precedent that they can respond quickly to unexpected inflationary shocks, the Fed can limit the damage to those unexpected inflationary shocks.

One final comment I want to mention on the redistribution question. Hanno Lustig—who I see in the audience—has done a lot of work on how the lowering of interest rates has impacted income and wealth distribution. Much of this inflation fighting is intimately linked to raising real interest rates, and much of the valuation factors in the stock market are about how those increases in real rates are affecting the longer end of the yield curve and hence the appropriate valuation discount rates for stocks. It may, therefore, be that going in reverse is going to have the opposite effect on wealth distribution. I think that’s a valuable point to bring into the paper.

GENERAL DISCUSSION

WILLIAM NELSON (INTRODUCTION): All right, everyone, now turning to the next session, where we're going to be discussing "Disinflation and the Stock Market: Third-World Lessons for First-World Monetary Policy," by Anusha Chari and Peter Henry. So, Peter is the Class of 1984 Senior Fellow at Hoover, a senior fellow at Stanford's Freeman Spogli Institute for International Studies, and dean emeritus of Stern. Being a dean emeritus sounds like a great job, actually.

PETER BLAIR HENRY: It's much easier than being dean.

NELSON: I encourage you all to read the bios in the program for both of our presenters, which are extraordinarily impressive. Among other things, Peter was a college finalist in a slam dunk competition. So that's something we have in common actually. [*Laughter*] So, you're to speak for twenty-five minutes. I'm sorry, I should have introduced myself. I'm Bill Nelson. I'm the chief economist at the Bank Policy Institute.

And for our discussant, Josh Rauh is the Ormond Family Professor of Finance at the Stanford Graduate School of Business, as well as a senior fellow at Hoover. And Josh, you have twenty minutes to present your discussion.

I wanted to just say, Peter, I thought this was just a remarkably clear and compelling paper. Very much on topic. It draws on—as you all will shortly hear—it draws on emerging-market-economy experiences to help inform a very pressing current policy debate here in developing countries of how costly it is to fight inflation, using eighty-one new episodes. The bottom line being that it's easier to reduce high inflation, over 40%, than it is moderate inflation, and with the clear implication that the Fed

should drive inflation up by 40% before commencing to reduce it. [*Laughter*] But a more serious implication, of course, is one that I think the FOMC [Federal Open Market Committee] should have, could have learned from over the last couple of years, that things aren't always necessarily going to go the way you expect them to go. And this could be a tough, tough slog. Don't just base your communications and plans on your baseline outlook. So with that, I'll turn it over to you.

* * *

NELSON: Peter, would you like to respond?

HENRY: Thank you, Josh [Rauh], for the helpful comments. I agree with everything you said. In particular, your point about distinguishing between the cash flow and discount rate effects is particularly important. I would love to have done it for the time period in question. The trouble is that because of high inflation, the bond market data for a lot of these countries in the 1970s and 1980s is not wonderful. But I'm still hoping that one day I'll actually be able to do something significant to address your observation, because it's an important point. Other than that comment, I really want to allow the audience to jump in, because Josh did a great job discussing the paper.

NELSON: All right. So, maybe I'll take the moderator's privilege here and ask my first question. I was actually going to ask something about debt overhang. But the lawyers looked into it, and evidently, Darrell [Duffie] has a pretty-solid-lock copyright on some questions about debt overhang. So I'll turn to another question, which is: In your paper, the regression results that you report for all of the episodes left me wondering, is there a difference? Were the results different when you look at the successful episodes versus the unsuccessful episodes? I could actually see it going in either direction. But I was curious.

HENRY: It's a good question. I didn't include those results, but I do have them, and the picture's not qualitatively different. It's slightly different, but not in a way that changes the thrust of things.

NELSON: So how much time do we have now? Does anybody know? So I saw John [Cochrane]'s hand jump up and then Andy [Filardo]. Maybe after John. What's that? Sebastian [Edwards]? We'll take those three questions.

JOHN COCHRANE: I have two quick questions. First, there's nothing like saying, "There is no episode" to lead one to scratch one's mind about episodes. Two come to mind. One is [Thomas] Sargent's "Methods of Poincaré and Thatcher."¹ Poincaré faced a moderate inflation but was stopped by the same mechanisms as the Germans and Austrians. A credible change in regime stopped inflation cold without any output loss. The second is the inflation-targeting countries that aren't in your sample because they're more advanced countries. New Zealand, Israel, Canada, and Sweden all stopped inflation in its tracks with no recession. Again, they implemented a credible and durable change in regime—fiscal, monetary, and microeconomic growth-oriented regimes. So it does seem like it's possible even for moderate inflations.

But that echoes your first comment. Is the US headed to this kind of disinflation? It doesn't look to me that we are headed to a credible change of fiscal, monetary, and microeconomic regime. So I would agree with that. That brings up a suggestion: You have the data to tell us why some attempted stabilizations worked and some didn't work. I suspect I know the answer. I suspect Sebastian's going to tell us more about that at dinner. When the central bank tries to go it alone, and the country doesn't solve the underlying fiscal and microeconomic growth problems, inflation stabilization doesn't stick or comes with big output losses. And maybe even the central bank isn't really committing itself to stabilization. But when there is a committed durable fiscal, monetary, and microeconomic reform, it does work.

NELSON: Andy?

ANDREW FILARDO: This is a really great paper, but my recollection is that over the past two decades after your sample ends, the disinflationary experiences among emerging-market economies and small, open, advanced economies were quite different from those in your study. We saw economies move from a 5%–10% inflation range—with a few starting above 10%—to below 5%. Those disinflationary episodes in general went fairly smoothly, and stock market returns were generally strong. Overall, those central banks would say that their disinflations were welfare improving. So the more recent central banking history may give you a somewhat different and richer set of implications than those emphasized in the paper.

Having said that, I don't think that the more recent disinflationary examples suggest that the Fed has an easy disinflationary challenge going forward. During the disinflations, central banks started from a place of low competence in their ability to target inflation and built up credibility. Notably, many achieved success by announcing intermediate inflation targets. They didn't move from almost 10% inflation to sub-5% in one fell swoop. Many did it in steps. I was a little skeptical at the time that they'd be able to achieve a moderate disinflationary path, but they did. Now the Fed has lost its inflation-targeting credibility, many are skeptical that the Fed can quickly disinflate down to 2%. Moreover, I think the Fed is understating to the public its true sense of how confident it is that it can rapidly restore price stability. If the Fed were to announce intermediate inflation targets, learning from the example of the earlier moderate inflation reductions, the Fed might be more likely to succeed and be more credible.

NELSON: Professor Edwards?

SEBASTIAN EDWARDS: This is a superinteresting paper, which I have not read. So many of the questions maybe are answered in the

paper, the issues I'm going to raise. But first a question. You ended in 1994. So, Peter, that reminded me of our very dear Ronald McKinnon, and his repression in financial markets. During most of your period, many of these countries didn't have a well-functioning stock market, maybe some of them didn't even have a stock exchange. So I think that emphasizing the stock market as a methodological issue, as Joshua [Rauh] pointed out, is a great thing, but we'd have to look at every one of these countries. So, if one were to do what Joshua did, looking at the recent episodes, you looked at Turkey, Mexico, and two other countries. Chile just did it. Right. Inflation in Chile, it was announced two days ago, it's 9.9%. And it was 14%. So it went from moderate to a successful one. And the stock market is going up. But it's going up because there's one dominant stock in the index, which is SQM [Sociedad Química y Minera], which is the number-one or number-two lithium producer in the world. And this has to do with EVs [electric vehicles]. And there's also the political issue that I'm going to talk about tonight [see chapter 15]. So I think that probably the paper has more details. That's very important.

The second point is something that Joshua brought up, which is the exchange rate. And the two groups of countries have very different approaches to exchange rates. And if you define the attempts as IMF [International Monetary Fund] programs, most of the time the IMF asks for a devaluation up front. Right? But the magnitude of the devaluation is very different across countries. And I think that is something that should be taken into account, or tell us what you guys did about that.

And the final point is that I think that you can reinterpret your results. It's less controversial now than it used to be, but as an evaluation of IMF programs, what you're telling us is that out of eighty-one programs, only eight plus five worked out, or eight plus two, no, five plus two, so only seven out of eighty-one. So

it's a pretty negative result relative to the effectiveness of IMF programs, and I wonder what you think about that?

NELSON: So maybe we'll answer those questions, and then we'll take another round. So, Peter?

HENRY: Thanks for all the comments. In the interest of time, I won't go into great detail, but let me just say a few things.

So, John, thanks for mentioning the Poincaré and Thatcher episodes. I'll go back and look at those. I don't remember Dornbusch and Fischer talking about the Thatcher episode, but I'll go back and investigate. And similarly with the New Zealand and Canada episodes as well.

Let me tie together two comments—the question about the low-inflation regime we've seen in emerging economies and Sebastian's point about 1994. The reason I broke the sample in 1994 is that starting in 1994, most of the IMF programs we saw in emerging-market and developing economies—really as Dornbusch has pointed out in his work, and I think Sebastian is talking about this as well—were really related to financial crises rather than inflation crises. And so for some methodological reasons, I take a different approach, but your point is very well taken. In a separate paper that Anusha [Chari] and I wrote with Hector Reyes, who's a PhD student here at Stanford as part of the PhD Excellence Initiative, that I mentioned at the outset of my presentation. In that paper, it's called “The Baker Hypothesis” and was published in the *Journal of Economic Perspectives* in 2021, we show that a big part of the acceleration in growth that happens in emerging and developing economies, post-1994, is because in 1994, we see inflation dropping like a stone in the emerging-market and developing economies.² Starting from an average that's close to 40% per year in the early 1990s, it falls radically in 1994–95. And then it's basically in single digits until 2021. And so the bigger message, which I should have emphasized here, is that getting rid of inflation

has been a boon to growth in emerging-market and developing economies. But there are important political economy questions related to Sebastian's point about how effective the IMF is in getting countries to stay the course, particularly in moderate-inflation cases. Because we know that, again, from the data, once you get to moderate inflation, there are a lot of benefits. But the transition path there can be quite hard, and again to Sebastian's point, the IMF doesn't seem to actually add much value.

To Sebastian's point about the methodological challenges, the exchange rate and so forth, I didn't mention them very much in the talk, but we have addressed those issues. And even in the high-inflation cases, where there were a lot of exchange-rate-based stabilizations, controlling for all those things, the results still go through.

But I do think that the broader question a lot of folks have alluded to in terms of thinking about the relative effect of discount rates versus cash flows is vital, but also really digging in more deeply into what was it about the fiscal side that didn't happen in the unsuccessful cases. It is important to understand, more generally, what happened in the country—Jamaica, where I'm from, with the most failed IMF programs—there were eleven failed IMF programs in the sample. I was in Jamaica in 2017, when Christine Lagarde went there to have a major IMF conference, because Jamaica had finally successfully completed an IMF program. So why is it that for eleven straight programs over the course of forty years, you fail, you fail, you fail. And then suddenly, you actually get a successful program. I do think that's worth digging into, and it's probably, dare I say it, a book or something. I'm looking at my colleague John Cochrane. He's written a fantastic book, but it's taken him quite a long time to complete it. I'm not sure I have the same amount of temerity he does. But let me stop there.

NELSON: Jim [Bullard] and Mike [Bordo] and Andy [Levin], and the gentleman in the back there whom I don't know.

JAMES BULLARD: Jim Bullard, St. Louis Fed. I love this paper. I've been an advocate of the Sargent school, which says that maybe you can get a soft landing out of this. There is a famous paper by Goodfriend and King called "The Incredible Volcker Disinflation."³ It argues that the reason the Volcker disinflation was costly was that Volcker had to earn credibility. There's some learning going on, and initially it's not credible. Volcker had to prove credibility, and this caused a big disruption in the economy. The alternative to that is if you have more credibility, then you have a better chance of achieving a soft landing and an immaculate disinflation. I think the modern Fed has a lot more credibility than Volcker had going into the big inflation in the early 1980s. So I think we have more chance of success because of that.

There's also a paper that takes that across countries, by Gibbs and Kulish.⁴ They have a model that has learning and time-varying credibility. The costly disinflations were the ones that were not credible, and the less costly disinflations were the ones that were more credible. They've got estimates on that across countries. Gibbs and Kulish have a different sample than what you have here: I think more post-1994. I also like the emphasis on trying to look at equity pricing as a way to get a metric on whether the disinflation was costly or not.

NELSON: Okay, there's an emphasis now on being concise, because we're a few minutes over time. But, Michael, I'm told we have about five minutes for more questions. Okay.

MICHAEL BORDO: I wish to amplify on John Cochrane's remarks. My research with Pierre Siklos for a Bank of Chile conference in 2019 showed for a large panel of emerging countries, which goes back to the period discussed in this paper, that emerging-market countries that adopted inflation targeting [IT] did much

better in reducing inflation and improving their real economies compared to countries that did not adopt IT. We also showed that it took time for successful emerging-market economies that adopted IT to earn the credibility necessary to successfully restore price stability.

ANDREW LEVIN: Really great paper. Following up on what Mike said, we wrote a Hoover working paper that was published last year in the *IMF Economic Review*, and it noted what we call the “quiet revolution in monetary policy.”⁵ The paper is focused on low-income countries. So it’s focused on countries with even lower incomes than the tabulation for emerging-market economies. It’s been dramatic over the last twenty-five years how most low-income countries have succeeded in bringing inflation down not just to single digits, but in most cases to below 5%. Now that includes sub-Saharan African countries as well as countries in Central Asia and Southeast Asia. And the reason I want to emphasize this is that it builds on the same legacy that we discussed this morning, John Taylor’s legacy of systematic monetary policy frameworks with a clear policy strategy. And I would say that over the last twenty years, the IMF has been remarkably effective in providing ongoing technical assistance to help many of these low-income countries implement monetary policy frameworks that have been quietly successful year after year. So I would urge Peter to extend the sample to the more recent period and to incorporate those countries into the analysis.

NELSON: And the gentleman in the back in the blue shirt and the brown jacket, and then who had his hand up first.

PETER BLAIR: Hi, Peter Blair, Harvard and Hoover. I just wanted to commend the use of data from developing countries to understand macroeconomic policy in the United States. I think it’s a huge conceptual leap, and one that brought me into the profession, because I think oftentimes, development economists and macroeconomists view developing countries a bit cynically in

terms of saying, “How can we provide them with microinterventions,” whether it’s bed nets or something like that. But what you’re really saying is that we can learn lessons from those countries. And I think you’ve quite rightly foregrounded that in the presentation. I hope that it’s very foregrounded in the paper and that for all of us in the audience here, as we teach students, that we bring that lens. That there are policy experiments happening around the world, macroeconomic policy experiments, not just in developed countries but in developing countries, that we can learn from.

NELSON: One last question.

JOHN GUNN: Hi. I just gotta say something about John Taylor. This is not about the Taylor rule. I don’t quite understand it. This guy over there, when he was under secretary of the Treasury for international affairs from 2000 to 2004, went to Iraq and set up at the central bank with a number of Iraqis. And that central bank has had one devaluation in the last twenty years, and it just got reversed. And the currency went up against the dollar. And the country is booming. And so it’s just a . . . it’s another version of the Taylor rule.

NELSON: Any final comments, Josh and Peter? No? Thanks very much.

HENRY: Lastly, I’ll say, I think appropriately connecting to John Gunn’s point, John Taylor’s had an enormous impact, obviously, even on inflation targeting, and I think the point is well taken. I certainly hope the Fed has enough credibility to get us back to 2% quickly and painlessly. My suspicion is that it’s going to be harder than people realize. And I think the biggest measure of that is frankly, right now, the difference between where the Fed thinks rates are going to be and where the market thinks rates are going. But the lesson in emerging economies is deep. And inflation targeting was a big part of it. My only point here is that the Chilean example specifically was a more gradual approach

that was taken, as part of a broader strategy. And Fed officials have made it clear they want to get inflation down to 2% quickly. And so that's where I think we're looking at a different scenario, but as my fourteen-year-old son likes to say, time will tell.

Notes

1. See, e.g., Thomas J. Sargent, "Stopping Moderate Inflation: The Methods of Poincaré and Thatcher," chapter 4 in *Rational Expectations and Inflation* (Princeton, NJ: Princeton University Press, 2013), 111–58.
2. See *Journal of Economic Perspectives* 35, no. 3 (Summer 2021): 83–108.
3. See M. Goodfriend and R. G. King, "The Incredible Volcker Disinflation," *Journal of Monetary Economics* 52, no. 5 (July 2005): 981–1015.
4. See C. G. Gibbs and M. Kulish, "Disinflations in a Model of Imperfectly Anchored Expectations," *European Economic Review* 100 (November 2017): 157–74.
5. Alina Carare, Carlos de Resende, Andrew T. Levin, and Chelsea Zhang, "Do Monetary Policy Frameworks Matter in Low-Income Countries?" *IMF Economic Review* (published online October 26, 2022).