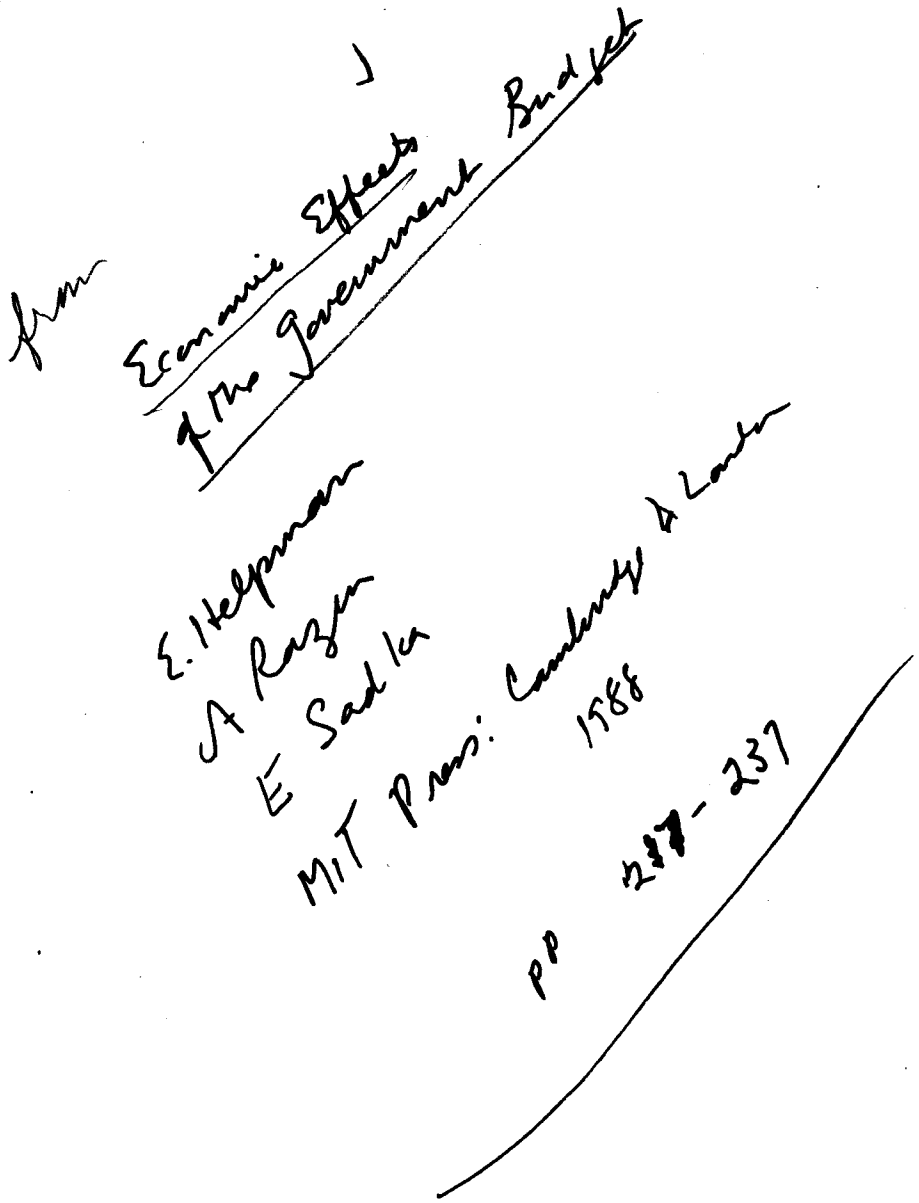

12 World Inflation Revisited

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12.1. Introduction

The occasion of the 1986 Pinhas Sapir Conference presented me with a rare opportunity to return to a line of investigation that I had earlier pursued for several years on the topic of world inflation. Coincidentally, one of my first major reports on this topic was presented at the 1979 Pinhas Sapir Conference, and was published in its proceedings volume.[1] The coincidence led me to the decision to make this chapter, which is based on a paper presented at the 1986 conference, to a considerable degree the "twin" of its predecessor—using, however, entirely new data. This idea might not have worked, but luck was with me. In only the seven years since the 1979 conference, a whole new generation of inflationary episodes of different types has been spawned—4 new episodes of acute inflation, 15 new cases of chronic inflation, 18 new cases of devaluation crisis. All this new evidence brings interest to the question of whether the new data support the principal conclusions of the earlier exercise.

12.2. The Key Variables Examined

The exercise is relevant for the present volume, since variables representing fiscal pressure play an important role. While the earlier study took it for granted that monetary expansion was an essential ingredient of the inflation process, its main focus was on *why* such expansion took place.

What I had in mind was a sort of "canonical inflation scenario" in which a fiscal deficit lay at the root of the inflationary process. The deficit is linked to inflation via monetary expansion only when the government turns to the banking system for financing its deficit are inflationary troubles engendered. One measure of the "pressure" that is put on the banking system by the need to finance the government is

β = (Δ banking system credit to the public sector) ÷ GDP.

The data on banking system credit to the public sector are derived from the consolidated accounts of the banking system, as given in the monetary survey of *International Financial Statistics* (*IFS*, lines 32an, 32b, 32c). In

calculating β, the increase in these items over the course of a year (i.e., from December to December) is expressed as a fraction of the nominal GDP of that year; β is thus the fraction of total GDP that the public sector siphons out of the banking system.

A second measure of the pressure put on the banking system by the government is

γ = (banking system credit to the public sector) ÷ total bank credit.

Whereas β is a flow variable reflecting concurrent *action* by the public sector, γ deals with stocks and reflects the cumulative result of past actions. In the "canonical inflation scenario," the government might draw new credit from the banking system, and the banking system then curtail private sector credit by a like amount, thus "sterilizing" the effect on β on the money supply. Such sterilization might be easy in the first stages of an inflationary surge, if γ started at very low levels. But if sterilization continues, γ will rise, at each step squeezing private sector credit still further. Because the resistance against further squeezing of the share of the private sector will grow at each step, as will the true social cost thereof, we can expect that the higher is the level of γ, the less likely it is that new advances to the government will be offset through "sterilizing" reductions in private sector credit.[2]

Note that neither β nor γ alone has any direct mechanical connection to the increase in the money supply. As already shown, it is possible up to a point for the government to borrow from the banking system without the latter, in turn, increasing the money supply (M). But under a typical inflationary scenario we would expect that a high β would sooner or later lead to increases in M, especially when γ is itself already relatively high.

The choice of the third variable was similarly governed by a desire to avoid a "money supply identity." That variable is

λ = (Δ bank credit during year t) ÷ (total bank credit at end of $t-1$).

Obviously, there is more of a connection between the rate of increase in money (μ) and λ than between μ and β or γ, for domestic credit is usually the largest single item on the asset side of the banking system's consolidated balance sheet, while money is the largest single item on the liability side. The degree of connection between λ and μ is not complete, however. In a country with a fixed exchange rate, for example, the money supply is *not* a policy variable, but is endogenously determined by the tastes of the public for holding money. However, the distribution of the assets of the banking system, between domestic credit and net foreign assets, is subject to policy

control by the Central Bank and the natural instrument for exercising this control is the volume of domestic credit, with the Central Bank easing credit when it wants to get rid of international reserves and tightening credit when it wants to draw them in.

Thus one can at least say that the volume of credit *is* a policy variable and that it is *distinct from* the quantity of money. The volume of credit retains its identity as a policy variable even when the quantity of money is beyond the control of the Central Bank, as in a fixed exchange rate system, or one with a pre-fixed crawling peg. Nonetheless, when the rate of inflation gets to be high, it is most often driven by the domestic credit component of the asset side. (Only in rare cases does one witness a major price inflation that is simply fueled by a huge inflow of reserves.)

12.3. The Four Categories of Countries

All of the data used in the exercises presented here are drawn from *International Financial Statistics* (Washington, D.C.: International Monetary Fund, various issues and tapes). The objective was to place countries in groups according to the nature and severity of their inflationary processes. The countries in each group represent a virtual enumeration of the *IFS* data available for the category in question. Once a country met the criteria, it was left out only for lack of adequate data from *IFS*.[3] Apart from missing data, only small size (population less than 2 million) could cause a country to be left out.

There follows a listing of the groupings into which country-episodes were placed. In each case the criteria for a country's entering that particular classification are specified.

12.3.1. Acute Inflation

The annual average rate of inflation reported in *IFS* is the average level of the consumer price index (CPI) for one year minus the same index for the previous year. It can also be thought of as the average of twelve consecutive yearly inflation rates, each comparing one month of year t with the corresponding month of year $t-1$. If the rate of inflation, π, defined in this way exceeds 80% for two or more consecutive years, the span of time for which it remains greater than or equal to 80% is considered to be an episode of acute inflation.

12.3.2. Chronic Inflation

The annual average rate of CPI inflation reported in *IFS* had to equal or exceed 20% for four or more consecutive years. The episode of chronic inflation was defined as the period of years of consecutive inflations of greater than or equal to 20%. In order to preserve the separation between the data here analyzed and those dealt with in previous work, the new episode treated in this study began one year after the terminal year covered in the previous study. Thus, in the present case, the episodes of chronic inflation in Iceland, Ghana, Zaire, and Peru all have a starting date of 1980. This is because in a previous study data on these countries up to and including 1979 were analyzed.[4] In addition, small and short lapses below the 20% rate were not permitted to exempt a country from the chronic inflation category. Thus, Uruguay's inflation rate of 19% in 1982 did not prevent it from being characterized as a chronic inflation country for the full period 1976–85. Also in the case of Greece one year with 19% inflation was included.

12.3.3. Devaluation Crises

The basic principle underlying the definition of a devaluation crisis was quite clear: the crisis was an event that broke sharply with a history characterized by stable exchange rates. In previous work the specific definition said that the country's exchange rate vis-à-vis the dollar should have been stable for a period of at least four years, with the crisis being signaled by a devaluation of at least 20% in the lapse of a single year. But the tumultuous movements of relative exchange rates among the major currencies rendered the above criterion obsolete in the 1970s and 1980s, when not even the Deutschmark or the Swiss franc could have been classified as "stable" vis-à-vis the dollar over a four-year period.

In place of stability over a four-year period, the new definition required that the exchange rate with the dollar not exhibit much depreciation over a four-year period. In order for an episode to be characterized as an exchange-rate crisis the devaluation in a single year had to exceed 25% plus the particular country's range of variation vis-à-vis the dollar during the previous four years. Thus, if a currency had varied over an 8% range, vis-à-vis the dollar, in the four years prior to a devaluation episode, the amount of the devaluation in a single year would have to be 33% before the episode would be classified as a devaluation crisis.

A further complication with respect to devaluation crises concerns how to date them. *IFS* gives exchange rate data of two kinds, at the end of the period (ae) and average rate over the period (rf). In present paper, the choice was made to rely mainly on the rf series. This leads to the curiosity that a discrete devaluation of nearly 100% occurring in Sri Lanka in December 1977 is carried in this study with a 1978 date. This is because the average exchange rate of 1977 was only 5% higher than that for 1976, not enough to trigger our criterion for a devaluation crisis. This occurred in 1978, when all twelve months of data reflected the higher rate, and Sri Lanka's average (rf) exchange rate stood at 15,661 compared with 8,873 for 1977 and 8,412 for 1976.

The nature of the criterion for a devaluation crisis also led to other anomalies. For example, Ghana's currency was devalued by 139% (from 1.15 to 2.75 cedis to the dollar) toward the end of 1978. Its average exchange rate moved up by 32% in 1978, and by 83% in 1979. There was a strong temptation to date he devaluation in 1979, when the biggest change in the average occurred, but our criterion required it to be placed in 1978, and so it was.

The dating of the devaluation crises is relevant, because we shall end up making comparisons between data for the year of devaluation, for the year prior to devaluation, and for a period that preceded the devaluation by four years. The criterion followed in dating the crises obviously also has a bearing on those comparisons. So far as I can tell, however, it is not in any way critical; the broad conclusions of this chapter are sufficiently robust to survive any plausible change in the choice of periods (e.g., four years of exchange stability), levels (e.g., an increase of at least 25% to define a devaluation crisis), or criteria to fix the dating of a crises.

12.3.4. Control Group—"Stable" Exchange Rate Countries

Just as in the case of devaluation crises, the criteria for choosing a set of "stable" exchange rate countries to serve as a control group is influenced by the more flexible exchange rate system of the 1970s and 1980s. In the predecessor to this chapter and in other earlier work, the control group consisted of countries that had successfully maintained a fixed exchange rate for a relatively long period. Under the Bretton Woods system, a peg to any major currency was pretty much a peg to them all. After that system broke up, the only exchange rates that remained fixed to the dollar were those that were explicitly pegged to it.

To choose the control group a preliminary filter was imposed: a country had to exhibit an inflation rate of less than 10.5% per year for the 1970–82 period. To guard against the inclusion of crippled or totally stagnant economies, a minimum growth rate of 3% per year for total (not per capita) real GDP over the 1970–82 period was also imposed. Both these preliminary figures appeared in the World Bank's *World Development Report 1984*, so the filter was easy to apply.

The next step was to examine the 1970–80 exchange rate experience of twelve countries surviving the filtering process. They fell into four groups. Three (Dominican Republic, Guatemala, and Panama) met the old criterion of strict fixity vis-à-vis the dollar. Six (Jordan, Malawi, Morocco, Thailand, Togo, and Tunisia) experienced appreciations vis-à-vis the U.S. dollar. Two (Kenya and India) depreciated very slightly vis-à-vis the dollar, while one (Singapore) appreciated vis-à-vis both the dollar and the SDR.

12.4. On Chronic and Acute Inflations

In table 12.1 are presented the basic data for the cases of chronic and acute inflation that were identified in the course of the present study, as well as for the control group. Each data point in the table is itself the median value of that particular variable for the period specified.

Table 12.2 summarizes the results of the comparison of chronic and acute inflations with each other and with the control group. The picture emerging from this table is exceedingly clear. Inflationary countries siphon more resources out of their banking systems to finance their public sectors than do noninflationary countries. Similarly, countries where the inflation disease is acute do so in a more exaggerated way than do countries where the disease takes on the more sustainable "chronic" form.

These are exactly the conclusions that emerged from the predecessor study. Table 12.3 makes the comparison of the results of the two studies just for the medians of the three policy variables. The general hierarchical pattern—acute dominating chronic, chronic dominating control group—is apparent in both studies. This hierarchy also prevails when other parameters (quartiles, means, etc.) of the frequency distributions of β, γ, and λ are examined. Conclusion: fiscal deficits financed at the banking system, high government claims on the available supply of bank credit, and general lack of credit restraint on the part of monetary authorities play an impor-

Table 12.1
The new evidence: acute and chronic inflation episodes, plus control group[a]

Variable		π	β	γ	λ
Acute inflation cases					
Argentina	(1982–84)	2.546	.125	.325	3.123
Bolivia	(1982–84)	2.690	.142	.600	3.432
Brazil	(1980–85)	1.230	.015	.283	1.421
Israel	(1980–85)	1.383	.275	.363	1.631
Chronic inflation cases					
Iceland	1980–85	.499	.009	.053	.671
Ghana	1980–85	.500	.047	.894	.549
Sudan	1979–84	.281	.045	.656	.222
Tanzania	1980–84	.290	.078	.936	.216
Zaire	1980–84	.421	.062	.806	.471
Greece	1979–85	.203	.073	.408	.219
Portugal	1974–84	.228	.064	.162	.256
Turkey	1977–85	.450	.068	.466	.491
Yugoslavia	1979–84	.360	.003	.057	.282
Chile	1977–81	.351	.005	.282	.474
Mexico	1980–85	.583	.077	.613	.500
Nicaragua	1979–85	.353	.083	.345	.200
Peru	1980–85	.928	.033	.380	.853
Uruguay	1976–85	.531	.016	.140	.652
Control group: "stable" exchange rates (1970–1980)					
Dominican Republic		.092	.012	.287	.160
Guatemala		.109	.004	.186	.148
India		.056	.019	.449	.171
Jordan		.111	.032	.240	.293
Kenya		.114	.014	.252	.257
Malawi		.086	.018	.425	.287
Morocco		.083	.031	.517	.177
Panama		.052	.009	.087	.238
Singapore		.032	<0	<0	.201
Thailand		.075	.023	.251	.225
Togo		.076	.005	.035	.282
Tunisia		.053	.003	.140	.146

Source: International Monetary Fund, *International Financial Statistics*, various issues and tapes.
a. Data are median observations of the indicated variables during the period specified.

Table 12.2
Comparison of inflationary countries with control group[a]

	Acute inflation countries		Chronic inflation countries		Control group of stable LDCs
β = net increase in banking system credit to public sector expressed as a percentage of GDP					
First quartile	.070	>	.016	>	.004
Median	.133	>	.054	>	.013
Third quartile	.208	>	.073	>	.021
γ = public sector bank credit/total bank credit					
First quartile	.304	>	.162	>	.114
Median	.344	~	.394	>	.245
Third quartile	.481	<	.656	>	.356
λ = percent increase in total bank credit					
First quartile	1.526		.222		.166
Median	2.377		.472	>	.213
Third quartile	3.277		.549	>	.270
π = percent increase in consumer price index					
First quartile	1.307		.290		.054
Median	1.965		.390		.080
Third quartile	2.618		.500		.101

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ. Diagonal arrows indicate first quartile of one comparison group exceeds third quartile of the other.

tant role in causing the major inflationary episodes that we observe in the real world, period after period. The connection is not myth, but reality.

12.5. On Devaluation Crises

The devaluation crisis became a subject of our study many years ago. It was apparent that the inflation disease took on forms other than the ones we had defined as chronic and acute. That is, there were many countries that had undeniably suffered from the disease (above and beyond the "world inflation" shared by nearly everybody), yet which were not identified as inflationary countries by the criteria adopted for the terms "chronic" and "acute" to be applied. Additional classifications were required to pick up some or all of these remaining cases of the inflation syndrome. It should come as no surprise that the devaluation crisis seemed a very natural category to add.

Table 12.4 gives the basic data for the new cases of devaluation crisis

Table 12.3
Comparison of present with previous results[a]

	Acute inflation countries		Chronic inflation countries		Control group of stable LDCs
Median values for β					
Old study	.037	>	.023	>	.005
New study	.133	>	.054	>	.013
Median values for γ					
Old study	.467	>	.316	~	.247
New study	.344	~	.394	>	.245
Median values for λ					
Old study	1.20	>	.34	>	.13
New study	2.377	>	.472	>	.213

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ.

that are being reported on for the first time in this chapter. In previous work, data for the year of devaluation were first reported, then compared with data for the year prior to devaluation. The basic conclusions were that devaluation crisis countries looked much like chronic inflation countries, in terms of the variables, β, γ, and λ. Moreover, this similarity was also true the year before the devaluation, indicating that policy weaknesses (as reflected in high values of β, λ, and γ) probably played a significant role in bringing on the crises.

These conclusions from earlier work are borne out in the new data analyzed for the first time here. The conclusions of the previous work are all repeated here (see table 12.5). If anything, the present chapter shows that the policy behavior of the devaluation crisis countries was a little more dangerous (with β, γ, and λ a little higher) one year before the devaluation than in the year of devaluation itself.

In the present chapter a new element is added: we also present data for the year $t-4$ where the devaluation is dated at t. This enables us to check (in table 12.6) on two matters: (a) whether the similarity of behavior between year t and year $t-1$ carries all the way back to $t-4$ and (b) whether (if behavior in $t-4$ is in fact more moderate than in $t-1$ and t) that behavior comes close to approximating the norm given by the control group of stable countries. The answer to (a) is negative, with the policy signs in $t-4$ being substantially more moderate than in t or $t-1$. On the other hand, the answer to (b) is also negative. Though the devaluation crises countries have

Table 12.4
Devaluation countries: key variables in year of devaluation (t), in year before devaluation ($t-1$), and 4 years before devaluation ($t-4$)[a]

Country (year of devaluation)	β Δ public sector credit as percent of GDP t	$(t-1)$	$(t-4)$	γ public sector credit/total bank credit t	$(t-1)$	$(t-4)$	λ % increase total credit t	$(t-1)$	$(t-4)$
Bangladesh (1975)	.004	.168	n.a.	.409	.427	n.a.	.122	n.a.	n.a.
Costa Rica (1981)	.011	.060	.036	.346	.359	.214	.119	.272	.309
Ecuador (1982)	.012	<0	<0	<0	<0	<0	.388	.304	.110
Egypt (1979)	.109	.265	.180	.732	.743	.707	.253	.572	.505
Ghana (1978)	.083	.108	.045	.701	.722	.466	.677	.584	.487
Ghana (1983)	.079	.005	.013	.865	.587	.662	.722	.216	.148
Italy (1981)	.042	.046	.072	.402	.397	.380	.127	.166	.163
Indonesia (1979)	<0	<0	.027	<0	<0	.066	.044	.382	.958
Indonesia (1983)	<0	.006	<0	<0	<0	<0	.187	.500	.044
Jamaica (1978)	.069	.080	<0	.603	.585	.151	.287	.120	.087
Jamaica (1984)	.034	.132	<0	.611	.631	.632	.120	.305	.049
Mexico (1982)	.179	.055	.027	.582	.446	.468	1.131	.495	.314
Paraguay (1984)	.007	.021	<0	.143	.121	<0	.215	.205	.525
Peru (1976)	.057	.024	.019	.326	.235	.301	.543	.412	.265
Sierra Leone (1983)	.086	.109	.068	.855	.844	.771	.247	.329	.293
Sri Lanka (1978)	<0	.030	<0	.343	.458	.413	.250	.380	.203
Zaire (1976)	.127	.063	.022	.678	.582	.642	.564	.369	.302
Zambia (1983)	.072	.135	.032	.685	.683	.710	.150	.280	.095
First quartile	.011	.021	<0	.326	.235	.108	.127	.244	.102
Median	.050	.058	.022	.494	.452	.413	.249	.329	.265
Third quartile	.083	.109	.041	.685	.631	.652	.543	.453	.400

Source: International Monetary Fund, *International Financial Statistics*, various issues.
a. Data are observations for the year in question.

Table 12.5
Comparison of devaluation crisis countries with chronic and acute inflation episodes[a]

	Acute inflation countries		Devaluation crisis countries year $t-1$		Devaluation crisis countries year t		Chronic inflation countries
β = net increase in banking system credit to public sector expressed as a percentage of GDP							
First quartile	.070	>	0.021	>	.011	~	.016
Median	.133	>	.058	>	.050	~	.054
Third quartile	.208	>	.109	>	.083	>	.073
γ = public sector bank credit/total bank credit							
First quartile	.304	~	.235	~	.326	>	.162
Median	.344	<	.452	~	.494	>	.394
Third quartile	.481	<	.631	~	.685	~	.656
λ = percent increase in total bank credit							
First quartile	1.526	>	.244	>	.127	~	.222
Median	2.377	>	.329	~	.249	<	.472
Third quartile	3.277	>	.453	~	.543	~	.549

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ.

more moderate policy behavior four years earlier than in years t and $t-1$, they do not come close to the degree of moderation exhibited by the control group. This confirms another conclusion from earlier work: that the basic policy stance of the exchange rate crisis countries seems to exhibit greater willingness to run inflation risks than is the case in the stable countries. This was found to be true in terms of the distributions of the ratio of international reserves (R) to domestic credit (D) of the banking system,[5] where the devaluation crisis countries kept systematically lower international reserves (even in noncrisis years) than did the successful countries. It was also true that in the successful countries, policies of defending international reserves (by reducing credit when international reserves were falling) were triggered at higher levels of $[R/(R+D)]$ than was the case for the crisis countries (see table 14 in the work cited in note 4). Finally, a much higher fraction of the stable countries shifted to a reserve-defending monetary policy when international reserves fell into operationally defined danger zones.[6]

In short, the evidence examined in earlier work led to the conclusion that the countries that ended up having devaluation crises played riskier policy games than the stable countries, even in years when no crisis was im-

Table 12.6
Comparison of devaluation crisis countries with control group[a]

	Devaluation countries year t		Chronic inflation countries		Devaluation countries year $t-4$		Control groups of stable LDCs
β = net increase in banking system credit to the public sector, expressed as a percentage of GDP							
First quartile	.011	~	.016	>	<0	~	.004
Median	.050	~	.054	>	.023	>	.013
Third quartile	.083	>	.073	>	.041	>	.021
γ = public sector bank credit/total bank credit							
First quartile	.326	>	.162	~	.108	~	.114
Median	.494	>	.394	~	.413	>	.245
Third quartile	.685	~	.656	~	.652	>	.356
λ = percent increase in total bank credit							
First quartile	.127	~	.222	>	.102	~	.166
Median	.249	<	.472	>	.265	~	.213
Third quartile	.543	~	.549	>	.400	>	.270

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ.

pending. To determine whether this sort of behavior was also reflected in the new evidence of the present chapter, a simple test would compare the devaluation crisis countries, four years before their respective devaluations, with the control group. This is done in table 12.7, which also shows the other relevant comparisons. It is shown therein that for every comparison made, the crisis countries revealed either greater riskiness (>) or approximately equal riskiness (~). There were no cases at all of lower riskiness. Even assuming a probability as low as one-third to the (<) category, the change of getting no observations of this kind in nine tries is less than .03.

12.6. On Major Disinflations

A final message concerns the experience of countries with major disinflations. In earlier work (see note 4), Edwards and myself reported on ten major disinflations. In each of them we calculated the average rate of growth of real GDP as the rate of CPI inflation was rising, and compared it (in table 19 of the work cited in note 4) to the average growth rate of GDP during the period of disinflation. At the same time we compared (in table 20 of the work cited in note 4) the growth rate of GDP in the year of

peak inflation to the growth rate in the year immediately following the peak. These two sets of comparisons gave the following results, considering approximate equality (~) to prevail in cases where the difference in GDP growth rates was less than 1%. Comparing the period of rising with the period of declining inflation, the average rate of GDP growth was greater in the period of falling inflation rates in seven out of ten comparisons. Approximate equality prevailed in two cases. Only Israel revealed a greater GDP growth during rising inflation (13.6%, 1951–52) than during declining inflation (10.6%, 1952–55). When the single peak year of inflation is compared with the first year of disinflation, the disinflation year showed the higher rate of growth in five out of nine cases, approximate equality held in three, and the peak inflation year (1974) exhibited higher real growth than the first disinflation year (1975) only in one case (Chile).[7]

In preparing this chapter we encountered five additional cases, which are reported in table 12.7. In this instance the verdict is unanimous. In each of the five countries, the GDP growth rate was higher on the way down from the inflationary peak than it was on the way up. This evidence may be surprising to some, but it simply replicates what we have found in earlier work.

I do not believe that this evidence is sufficient to provide a total challenge to conventional wisdom concerning the high net costs of disinflation, the big trade-off between inflation and growth. However, I would rather limit my comment to cases where the brakes are applied only after inflation has reached the 80–100% range or higher. My own guess is that when inflation gets this high, it is because policymakers have caved in to pressures of many kinds. Doing so typically affects not only the inflationary aspect but also many other facets of policy. Thus, when the government gathers the necessary courage, or has the necessary luck, or when the various groups in the population have been sufficiently worn down by inflationary experience to permit a genuine disinflationary policy to be imposed, many other improvements in economic policy are carried out at the same time. Thus, according to my interpretation, what we are seeing in this repeated evidence is the reflection of a generalized deterioration of policy in the stage where the inflation rate is rising, and a generalized improvement in the stage where that rate is falling. The low growth rates while inflation rises are thus attributed to the general deterioration of the policy package, and the higher growth rates under disinflation to a general policy improvement. But nonetheless—and this is extremely important—let no one scare you away

Table 12.7
Basic data and major disinflations[a]

Country	Period	Annual rate of growth of real GDP (IFS): Rising inflation (%/annum)	Annual rate of growth of real GDP (IFS): Declining inflation (%/annum)	Annual rate of inflation: Average (%/annum)	Annual rate of inflation: Maximum (%/annum)	Annual rate of inflation: Minimum (%/annum)
Turkey	1976–80–82	1.4	4.0	51.4	110.2	27.1
Zaire	1975–79–82	−2.4	0.7	58.1	108.6	29.0
Ghana	1975–77–80	−0.7	1.7	68.4	116.5	29.8
Uruguay	1971–73–76	−0.6	4.3	51.6	97.0	24.0
Costa Rica	1980–82–84	−4.8	5.1	40.2	90.1	11.9

a. Average rates over periods are compound growth rates between the terminal values of the variable in question (real GDP or CPI). Basic data from *International Financial Statistics*.

from a serious disinflationary effort, on grounds of its high cost, in cases where the inflation disease is already acute. In such cases the evidence from the past loudly proclaims the compatibility of "disinflation plus growth."

12.7. Some Reflections on Methodology

In this section I attempt to articulate some of the considerations that motivated the approach taken in this chapter. Certainly I do not regard it as a mere whim or caprice. On the contrary, I take it quite seriously—not pompously so, I hope, but seriously enough to encourage others to follow related approaches in their own work.

12.7.1. Setting the Limits That Define Categories

I am fully aware that many of the choices involved in this sort of work reflect a professional "feel" acquired as a result of extensive work with real numbers over a long period of time. Decisions as to how to define a category like chronic or acute inflation were, so to speak, pulled out of the air, not at random, but neither after any significant process of search. Rather they were boundaries that "made sense" to me in the light of years of observation and experience. But the sense they make is rough, not at all fine-tuned or otherwise refined. For example, when I choose 80% as a criterion level for acute inflation, I do so because it makes sense to me; it "feels right." But so, too, do 75 or 85 or 90%. Pushing it up to 250% would be "wrong," because I have the sense that 90% inflations and 80% inflations share similar attributes—belong to the same class, as it were—with inflation at much higher rates. I would not want to exclude quite a few truly acute inflations by setting the boundary line as high as, say, 150%. One the other hand, 30 or 40% per annum is too low for acute inflation. Too many countries have lived "reasonably well" with such rates of inflation for quite extended periods of time—30 and 40% are rates that are properly chronic; they can be adapted to and lived with, much as many people do with conditions like diabetes or heart arrhythmia.

Of course, man's ingenuity with respect to living with inflation may have raised the threshold of what can be tolerated. My own appreciation is that the substantial spates of inflation in excess of 100% that have been experienced—for example, by Argentina, say, during the ministry of Martinez de Hoz, and by Brazil and Israel over the last several years—would not have been so long sustained in the 1950s or 1960s. The tech-

niques of adaptation were not yet sufficiently developed then. But I have not allowed this particular judgment to cause me to alter the numerical limits placed on the categories of chronic and acute. Rather, I take this greater ease of adaptation as one of several reasons why we have recently had more "outbreaks" of both kinds of inflation per quinquennium or per decade, say, than we had in earlier times.

12.7.2. Avoiding Cross-Country Regressions

I am very troubled by the amount of work I see using cross-country regression analysis. To me, the ideal regression equation is a behavior or technical relation—like the demand for sugar, the supply of wheat, or the production function for cigarettes. These relations typically hold for given sets of demanders, of farmers, of producers. Even here we often have to allow for changes in tastes and technology, but on the whole we can point to a fair number of more than modest successes with the time-series analysis of behavior relations.

As we move away from demand and supply relations to policy relations, I am already worried, even by time-series analyses following the history of a particular country. Why? Because I have watched too many changes of government, even of key ministers within a given government, which have entailed very major changes in policy behavior—in terms of the objectives pursued, the instruments used, and the manner of use of given instruments. So I am even leery of doing time-series regressions explaining policy behavior for a single country, except where I feel that there was substantial continuity of the same basic policy processes and norms.

You can imagine how much worse I feel about a cross-section regression that throws into the same hopper the policymakers of Switzerland and Iceland, of Indonesia and India, of Argentina and Australia, of Ghana and the Ivory Coast, and of Burma and Thailand. I do not believe for a minute that the same regression could summarize the policy behavior of all these countries, or even of the two countries that constitute each of the listed pairs.

But lots of cross-country policy regressions do throw together, hence imputing similar behavior patterns to, countries as dissimilar as these. I find that to be of the same order of mistake as, say, lumping India and Pakistan together in a cross-section study of the demand for beef. In fact, most cross-sectional policy regressions are easy to pull apart. Where good

R^2s are present, they are usually determined by a few outlier observations. Get rid of the outliers, and what remains is usually a shapeless blob of data points.

Conclusion: Be wary of policy regressions over time, even in a single country. Be doubly or triply wary of regressions that in effect presume the existence of similar behavior parameters across countries.

12.7.3. Policy Triggers versus Policy Parameters

Even from economic theory alone, we should not expect most economic policy actions to be well described by standard-looking regressions. In a Central Bank a reduction of foreign exchange reserves from 80% to 40% of assets may be treated with utter indifference, while a reduction of reserves from 15% to 10% of total assets may trigger something close to panic. The solution is not to be found in artful choice of equation forms. The solution lies instead in recognizing the relevance of the idea of a perceived "danger zone" for the ratio of foreign reserves to assets. When we do so, and look at the data of many countries, we begin to perceive the reality of the notion of a danger zone. In a word, the data "confirm" the usefulness of the concept of danger zone, a policy trigger.

12.7.4. Policy Responses Are Often Not "Mechanical"

I think of a "mechanical" response as a movement along some sort of function: linear, logarithmic, quadratic, etc. There are lots of problems for which the mechanical response might not be the relevant one. As people move their hands across a line near a fire, a certain fraction will draw them back. As the fire gets a bit hotter, the fraction of people drawing back their hands will (I would assert) increase—not necessarily (or equally predictably) the distance to which they draw their hands away.

So it is with, say, international reserves. Probably at any one time each central banker has a critical trigger, which could move him to constrict credit in order to defend or rebuild his international reserves. But the same banker may change his mind from time to time, and his successor may think differently from him. So, too, central bankers in other countries may have different levels of $[R/(R + D)]$ that trigger reserves-defending responses.

Beyond this, when a policymaker decides he is going to defend reserves by constricting credit, he may one time be moved to slam on the brakes, another time to apply them slowly. And there is no reason at all why central bankers in different countries should all have the same "style" of credit

restrictions—some may opt quite regularly for sharp curbs, others for more gradual tightening.

Now the type of behavior just described can very easily create havoc with a standard regression. This is just the type of circumstance where a couple of outliers can dominate the entire picture. But with a different procedure—at least in some ways more sensitive and more subtle—one can get the data to tell a coherent (and robust) story: The lower we set the critical value of $[R/(R + D)]$, the greater will be the fraction of central bankers undertaking to restrict credit. And if, of two identifiable sets of central bankers, one set has a consistently lower fraction of response, we can conclude certainly that there is a systematic difference in behavior between these groups. Most probably this would be due to a greater propensity to run "risks," though we cannot totally ignore the possibility that some of the nonresponders face objectively lower risks, hence have less "need" for reserves.

This is the sort of contrast that we found between the devaluation crisis countries and the control groups in our earlier study, and that I confidently expect to hold for the new groups emerging in the present chapter. Meanwhile, the tests reported in table 12.6 bear out in a different vein the hypothesis that the devaluation crisis countries seem to follow, certainly one year before the crisis, but even as much as four years ahead, policies that are riskier (as measured by β, γ, and λ) than those of their control-group counterparts.

12.7.5. Probabilistic Connections between Risk and Reward

The human behavior we see around us would be a lot different if there were a mechanical link between smoking and dying of cancer or between drinking and dropping dead of a heart attack or of cirrhosis (i.e., if, for example, cigarette smokers could expect to drop dead after half a million cigarettes, with, say, a coefficient of variation of 10 or 20%). But it is not that way. Nature has been more insidious, more cruel, in providing the temptation without a ready and clear perception of the risk. People with the habit are soothed and calmed by smoking, made to feel pleasantly at ease by drinking. They also see around them many who live to a ripe old age, both unsullied by their addiction and unrepentant in it. It is "natural" for many of them to proceed as if unmindful of the risks they run. And self-selection works to make us see these very people: the truly risk-perceptive and risk-averse probably never started the habit in the first place; others may have started once or twice, but quit early.

So it is with the policies that lead to inflation. Financing government deficits by the banking system (β) feels good to begin with; so also does generalized credit expansion (λ). Increasing the share of total bank credit going to the government (γ) may also be a temporary palliative, though in the end a high γ, like sedimentary rock, imbeds in layers the record of successive policy erosions in the past.

I think the analogy with addictions of various kinds is quite apt. Those who fall prey are succumbing to temptation; those who resist (or who, once victims, return to surmount their nemesis) reveal character. Governments, as well as presidents and ministers and central bankers, reflect these characteristics on the policy scene. The relatively weak ones are swayed by temptation, and end up letting themselves be convinced by one or another "plausible excuse" for taking the route that is momentarily easy and painless. Only later do they *sometimes* pay the price.

Sometimes is an important word here, for the fact is that those who indulge do not always pay a price (at least not always a heavy one). This leads the vulnerable to succumb to temptation that much more easily. Note how, in table 12.2, the distributions of β, γ, and λ for the chronic inflation countries overlap those for the control group, and how, in table 12.6, the same applies between the devaluation crisis countries and the control group. This overlap permits people to get the idea that one can get away with pretty high values of β, γ, and λ, both adding to the temptation to run the risk and weakening resistance to it.

12.8. Conclusion

Policymakers, like individuals, are often tempted to follow the path of least resistance—the easy way. When they do so, it is easy for them to select out precedents where one country or another followed this path with apparent impunity. The connection between risky or "wrong" policies and their consequences is, unfortunately, probabilistic rather than mechanical, and the probability distributions of the outcomes of bad and better policies have the unfortunate habit of overlapping. They are not disjoint.

This chapter is one of a series attempting to link policy actions to their consequences in ways that are less mechanical, less parametric than usual. Since several years have passed since the predecessor studies; we here employ fresh data on new cases.

Applying to these new cases the same procedures used in previous studies

gave results that were essentially "the same" as those obtained before. There are no surprises here, just confirmations of what "good economists" and "wise policymakers" knew all along.

Running a modest fiscal deficit does not create problems, but running big deficits financed at the banking system (or by printing money) is a dangerous step, linked to symptoms of the inflation disease in much the same way as smoking is linked to cancer. The same is true for letting the public sector absorb "too high" a fraction of bank credit, or allowing total bank credit to expand too rapidly.

This chapter totally confirms previous work in demonstrating the link between these risky policies on the one hand and inflationary consequences on the other. The procedure does not deny—on the contrary, it quite explicitly accepts—the familiar link between excessive monetary expansion and inflation. Rather, what it tries to do is "go behind the money supply" to other, perhaps more fundamental, causes.

In addition to giving empirical underpinning to some inherited canons of prudent policy behavior, this chapter examines new cases for evidence on the link between inflation and growth. Here again the new evidence confirms earlier conclusions: countries experiencing inflations peaking at 80 or 90 or 100% or more, and then successfully disinflating, reveal significantly higher growth rates of real GDP "on the way down" than "on the way up." This evidence surprised me when I first uncovered it, mainly because our profession has paid so much lip service to the great "costs of disinflation." These costs are hard to find among the sets of cases examined here and in earlier work.

This does not mean that conventional wisdom and conventional characterizations are just a myth. Rather I reach the more modest interpretation that countries work up to inflation rates of near 100% not out of conscious desire but out of policy weakness. I believe that policy weakness on the inflation front is usually accompanied by policy weakness on many other fronts as well. I also believe that when, finally, the upsurge of inflation rates is stopped, and actual reduction sets in, this usually comes as part of a broad reform, a rather general correction of policy mistakes, an overall improvement of the quality of the economic policy package.

In particular, I do not want to assert that reducing inflation from 10% to 0% comes without important costs of the type traditionally implied. But there is no doubt concerning the lessons of experience that in actual fact disinflations from peaks of 80, 90, 100% and more have, on the whole, been accompanied by greater prosperity. It is here, in this subset of our experience, that one finds it hard to document the traditional view of the "high costs of disinflation."

Notes

1. See Arnold C. Harberger, "In Step and Out of Step with World Inflation: A Summary History of Countries, 1952–1976," in *Development in an Inflationary World*, edited by Assaf Razin and June M. Flanders (New York: Academic Press, 1981), pp. 35–46.

2. But bear in mind that rises in γ can act to absorb inflationary pressure. Therefore and quite clearly, the relevant variable is γ (a pure stock variable) rather than $\Delta\gamma$ (a flow variable).

3. Since the data used for individual observations on β, λ, γ, and π are median observations over the years contained in each given period, it was possible to handle cases where observations were missing for a small fraction of the years. But there were a few cases of countries for which data on GDP were not available for any of the relevant years. This precluded β being calculated, and thus caused the elimination of the country observation. Similarly, when all but one or two years of data were missing for a country during a given episode, that episode was left out.

4. The previous study in this case was Arnold C. Harberger and Sebastian Edwards, "Causes of Inflation in Developing Countries: Some New Evidence," a paper presented at the annual meeting of the American Economic Association in New York, December 1982.

5. See Harberger and Edwards, op. cit., table 13 and the surrounding text. That table presents data on 932 quarters of observation for 18 devaluation crisis countries and a 1,123 quarters of observation for 23 successful (control group) countries. The data on $R/(R + D)$ were grouped into five classes (less than 0.1, 0.1–0.2, 0.2–0.3, 0.3–0.5 and over). The crisis countries exhibited systematically lower reserves ratios than the control group, having twice as high a fraction of cases with $R/(R + D)$ less than 0.1 and less than a fifth as high a fraction of cases with $R/(R + D)$ at 0.5 or above. A χ^2-test with ten cells (five classes × two groups) yielded $\chi^2(4) = 263.36$. The critical comparison level was $\chi^2_{.001}(4) = 18.47$.

6. The danger zones were $[R/(R + D)]$ below 0.1 and falling ("serious danger") and $[R/(R + D)]$ between 0.1 and 0.2 and falling ("moderate danger"). A reserves target policy was indicated by a contraction of credit, a monetary-target policy by an expansion (so as to help keep the quantity of money constant in the face of falling reserves). While monetary target policies were more frequent for both the crisis countries and the control group, the latter group pursued reserve-targets with more than ten times the frequency of the crisis countries in situations of "serious danger" and more than three times the frequency of the crisis countries in cases of "moderate danger." The $\chi^2(1)$ covering 224 quarterly observations of crisis countries and 150 observations of successful (control group) countries was 29.76 for situations of "serious danger," and that for 115 observations of crisis countries and 184 of successful countries was 12.33. In comparison, $\chi^2_{.001}(1)$ is 10.83. See Harberger and Edwards, op. cit., table 15.

7. The ten episodes covered here include Argentina I (1958–59–60), Argentina II (1970–73–74), Bolivia I (1953–56–58), Bolivia II (1969–70–76), Brazil (1961–64–68), Chile I (1962–64–67), Chile II (1972–74–78), Paraguay (1951–52–56), Uruguay (1963–69–70), and Israel (1951–52–55). Here the span between the first two dates in each triad represents the period of rising inflation, while the period of falling inflation goes from the second to the third dates. The middle date is obviously the year of peak inflation. Data reported here are drawn from *International Financial Statistics*. Parallel series of real GDP drawn from United Nations/World Bank sources lead to similar results.

Table 12.2
Comparison of inflationary countries with control group[a]

	Acute inflation countries		Chronic inflation countries		Control group of stable LDCs
β = net increase in banking system credit to public sector expressed as a percentage of GDP					
First quartile	.070	>	.016	>	.004
Median	.133	>	.054	>	.013
Third quartile	.208	>	.073	>	.021
γ = public sector bank credit/total bank credit					
First quartile	.304	>	.162	>	.114
Median	.344	~	.394	>	.245
Third quartile	.481	<	.656	>	.356
λ = percent increase in total bank credit					
First quartile	1.526		.222		.166
Median	2.377		.472	>	.213
Third quartile	3.277		.549	>	.270
π = percent increase in consumer price index					
First quartile	1.307		.290		.054
Median	1.965		.390		.080
Third quartile	2.618		.500		.101

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ. Diagonal arrows indicate first quartile of one comparison group exceeds third quartile of the other.

tant role in causing the major inflationary episodes that we observe in the real world, period after period. The connection is not myth, but reality.

12.5. On Devaluation Crises

The devaluation crisis became a subject of our study many years ago. It was apparent that the inflation disease took on forms other than the ones we had defined as chronic and acute. That is, there were many countries that had undeniably suffered from the disease (above and beyond the "world inflation" shared by nearly everybody), yet which were not identified as inflationary countries by the criteria adopted for the terms "chronic" and "acute" to be applied. Additional classifications were required to pick up some or all of these remaining cases of the inflation syndrome. It should come as no surprise that the devaluation crisis seemed a very natural category to add.

Table 12.4 gives the basic data for the new cases of devaluation crisis

Table 12.3
Comparison of present with previous results[a]

	Acute inflation countries		Chronic inflation countries		Control group of stable LDCs
Median values for β					
Old study	.037	>	.023	>	.005
New study	.133	>	.054	>	.013
Median values for γ					
Old study	.467	>	.316	~	.247
New study	.344	~	.394	>	.245
Median values for λ					
Old study	1.20	>	.34	>	.13
New study	2.377	>	.472	>	.213

a. Criterion for approximate equality designation (~): Difference should be less than .01 for β, less than .10 for γ and λ.

that are being reported on for the first time in this chapter. In previous work, data for the year of devaluation were first reported, then compared with data for the year prior to devaluation. The basic conclusions were that devaluation crisis countries looked much like chronic inflation countries, in terms of the variables, β, γ, and λ. Moreover, this similarity was also true the year before the devaluation, indicating that policy weaknesses (as reflected in high values of β, λ, and γ) probably played a significant role in bringing on the crises.

These conclusions from earlier work are borne out in the new data analyzed for the first time here. The conclusions of the previous work are all repeated here (see table 12.5). If anything, the present chapter shows that the policy behavior of the devaluation crisis countries was a little more dangerous (with β, γ, and λ a little higher) one year before the devaluation than in the year of devaluation itself.

In the present chapter a new element is added: we also present data for the year $t-4$ where the devaluation is dated at t. This enables us to check (in table 12.6) on two matters: (a) whether the similarity of behavior between year t and year $t-1$ carries all the way back to $t-4$ and (b) whether (if behavior in $t-4$ is in fact more moderate than in $t-1$ and t) that behavior comes close to approximating the norm given by the control group of stable countries. The answer to (a) is negative, with the policy signs in $t-4$ being substantially more moderate than in t or $t-1$. On the other hand, the answer to (b) is also negative. Though the devaluation crises countries have