NBER WORKING PAPERS SERIES

MODERATE INFLATION

Rudiger Dornbusch

Stanley Fischer

Working Paper No. 3896

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 1991

NBER Working Paper #3896
November 1991

MODERATE INFLATION

ABSTRACT

Inflation persists at moderate rates of 15-30 percent in all the countries that successfully reduced triple digit inflations in the 1980s. Several other countries, for example Colombia, have experienced moderate inflation for prolonged periods. In this paper we first set out theories of persistent inflation, which can be classified into those emphasizing seigniorage as a source of government finance and those that emphasize the costs of ending inflation. We then examine the sources and persistence of moderate inflation episodes. Most were triggered by commodity price shocks; they were brief; and very few ended in higher inflation. We then present case studies of eight countries, including three that now suffer from moderate inflation, and four that successfully moved down to single digit inflation rates. We examine the roles of seigniorage, indexation and disindexation, the exchange rate commitment, and monetary and fiscal policy. The evidence suggests that seigniorage plays at most a modest role in the persistence of moderate inflations, and that such inflations can be reduced only at a substantial short-term cost to growth.

Rudiger Dornbusch
E52-373
M.I.T.
Cambridge, MA 02139
and NBER

Stanley Fischer
E52-373
M.I.T.
Cambridge, MA 02139
and NBER

September 1991

MODERATE INFLATION

Rudiger Dornbusch and Stanley Fischer[1]

Much attention has been paid to the process and stabilization of extreme inflations, at rates well in excess of 100 percent per year.[2] Much less attention has been devoted to the inflationary problem in countries that are stuck with stubborn low double digit inflation, around 20 percent per annum -- often in the aftermath of stabilization programs that successfully bring extreme inflations to an end. In the context of European disinflations in the 1980s, a parallel discussion has focused on how the European monetary system may have played a central role in allowing countries like Italy or Ireland to reduce their inflation rates to single digit levels.

We focus in this paper on the behavior of inflation in countries that occupy the inflationary middle ground, with persistent annual inflation rates of 15 to 30 percent. An example, shown in Figure 1, is Colombia, where inflation has hovered in the 20-30 percent range for more than a decade. Table 1 shows that the same pattern of persistent inflation in the 20 percent range prevails in Bolivia, Chile, Costa Rica, Egypt, El Salvador, Ghana, Hungary, Iceland, Israel, Mexico, and South Africa. In each instance inflation is too high to be disregarded and to permit a fixed exchange rate.

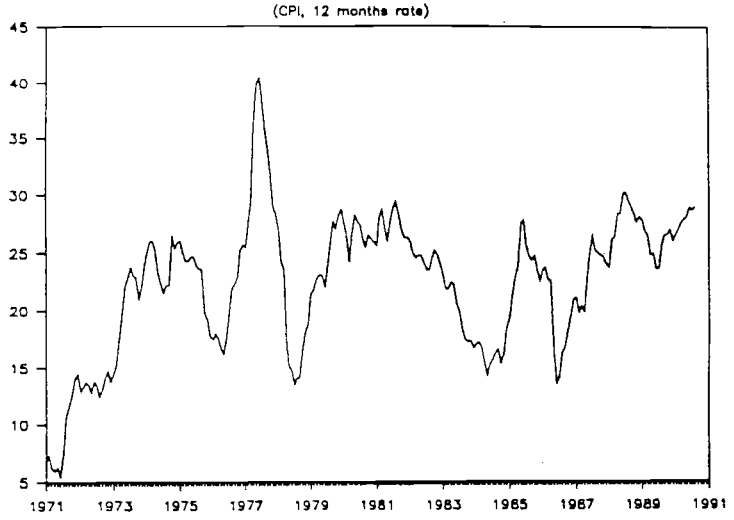
---

[1]The authors are at the Department of Economics, MIT, and Research Associates of the NBER. The research reported here was supported by the World Bank. We are grateful to Russ Cheetham, Heywood Fleisig, Danny Leipziger and Lisette Price for providing information, and to Jim Morsink, Tom Skinner and Mursalem Islam for valuable research assistance.

[2]See Bruno et al (1988, 1991), and Dornbusch, Sturzenegger and Wolf (1990).

FIGURE 1

COLOMBIA: INFLATION



But it is evidently also too low to warrant the apparent political and economic costs of a frontal attack on the problem.

The group of countries shown in Table 1 includes several -- such as Bolivia, Chile, Israel and Mexico -- that reached the moderate inflation range by stabilizing triple digit inflations. Moderate inflation persists also in countries that did not reach triple digit inflation, such as Costa Rica and Iceland. And some countries that did have moderate inflations -- such as Italy, Spain, Ireland and Korea -- have successfully moved into the single digit range.

Table 1 Some Recent Moderate Inflations

	1986	1987	1988	1989	1990*
Greece	23.0	16.4	13.5	13.7	20.4
Iceland	21.9	17.7	25.6	20.8	15.5
Ghana	24.6	39.8	31.4	25.2	
Malawi	14.0	25.2	33.9	12.5	
S.Africa	18.6	16.1	12.8	14.7	14.0
Tanzania	32.4	29.9	31.2		
Egypt	23.9	19.7	17.7	21.3	7.5
Israel	48.1	19.8	16.3	20.2	18.0
Bolivia	276.3	15.0	16.0	15.0	
Chile	19.5	19.9	14.7	17.0	26.0
Colombia	18.9	23.3	28.1	25.8	31.0
Costa Rica	11.8	16.8	20.8	16.9	19.0
El Salvador	31.9	24.9	19.8	17.6	20.8
Mexico	86.2	131.8	114.2	20.0	26.7
Paraguay	31.7	21.8	22.8	26.2	

* Last 12 months
Source: IFS, various issues

For purposes of this paper, we define moderate inflation as an inflation that persists for at least three years in the 15-30 percent per

annum range.[3] By requiring the inflation to persist, we exclude shorter double digit inflation experiences associated with the supply shocks of the seventies.

We seek to answer three basic questions about moderate inflations. First, what are the causes of moderate inflation? Second, are these inflations stable, or does a moderate inflation rate tend to increase unless definite policies are put in place to reduce it? And third, what policies will move a country from the moderate inflation range to single digit inflation?

We first review some positive theories of inflation, including those that focus on seigniorage as well as those that emphasize Phillips Curve type tradeoffs. From there we proceed to the statistical background, cataloging the moderate inflation episodes since the mid-1950s, and detailing whether the country moved out of the moderate inflation category successfully, by reducing inflation, unsuccessfully by moving on to higher inflation, or sideways by remaining in about the same inflationary range. We examine also the stability properties of these inflations.

---

[3]Some of the episodes in Table 1 therefore do not qualify as moderate inflations by our definition. Numerical definitions of high, extreme, and hyperinflations are far from standardized. Dornbusch et al (1990) define extreme inflation as more than 6 percent per month, corresponding almost exactly to 100 percent per year. Dornbusch and Fischer (1990) define hyperinflation as more than 1000 percent per year, a rate well below that implied in Cagan's classic study (1956), which is close to 13,000 percent per year. One consistent set of definitions is to describe inflation as moderate in the 15-30 percent range, high in the 30-100 percent range, extreme at 100-1000 percent, and hyperinflation at more than 1000 percent per annum. We recognize, however, that these descriptions are unlikely to gain complete acceptance, both because inflation that is moderate in Bolivia is extreme in Switzerland, and because the number of years needed to achieve persistence can be argued about.

We then present eight brief case studies of countries that have experienced moderate inflation episodes: Brazil, Chile, Colombia, Indonesia, Ireland, Korea, Mexico, and Spain. Their inflationary experience is summarized in Table 2. In each case we identify the

Table 2 Case Studies

Current Moderate Inflation		Former Moderate Inflation	
Reached from high inflation	Reached from low inflation	Inflation now high	Inflation now low
Chile	Colombia	Brazil	Korea
Mexico			Indonesia
			Ireland
			Spain

circumstances through which the country reached the moderate inflation range, and how long it stayed there. We describe the mechanisms of instability when inflation is in the moderate range. We are particularly interested in the four countries that successfully disinflated from the moderate range. So far as we are aware, Indonesia is the only country that in the period since 1960 has suffered sustained extreme inflation (more than 100 percent) and then stabilized to the single digit range.[4] Of course, the classic hyperinflation countries achieved that feat earlier.

[4]It is for this reason that we include a case study of Indonesia even though, as we shall see below, it does not meet the strict criterion for having experienced a moderate inflation episode. Korea experienced extreme inflation at the end of World War II and during the Korean War, and therefore is similar to Indonesia in now being a low inflation country, having experienced extreme and moderate inflation.

In the case studies, we pursue the factors that determined the choice between allowing the inflation to continue versus disinflating. We detail the implementation of disinflation policies in those countries that succeeded in stabilizing, examining the exchange rate commitment, the use of incomes policy, and trade liberalization, as well as monetary and fiscal policies. We also discuss the costs of stabilization.

In Section IV we draw on the case studies to summarize some lessons of disinflation from moderate inflation, as well as the lessons from the other cases where countries have not yet disinflated or else moved on to higher inflation.

I. WHY IS THERE INFLATION?

There are basically two answers to the question, why is there inflation? One is that inflation is an integral part of a country's public finance. The other is that inflation continues because it is too hard or too costly to stop it.

1. Inflation and Public Finance

At least since the 1920s it has been understood that money creation is one way, albeit not the preferred one, of financing budget deficits. In his classic article, Keynes (1923, Chapter 2) in commenting on the hyperinflation experiences of Germany and Russia clearly pointed out that even the weakest government always has one way left to pay its bills, namely printing money.

It might be thought that the seigniorage argument is only relevant to extreme high inflation economies, but of course that is not the case. As Table 3 shows, inflationary money creation accounts for a significant

portion of government revenue even in economies with moderate rates of inflation. It is therefore not implausible to consider inflation as a conscious part of public finance.[5]

Table 3 **Inflation and Seigniorage**

	Inflation	Seigniorage[a]	Seigniorage/Rev[b]
Colombia[c]	23.4	2.5	17.6
Greece[d]	19.7	2.6	11.2
Portugal[d]	19.3	3.5	6.5
Chile[e]	22.8	0.4	

[a]Change in highpowered money as a percent of GDP.
[b]Seigniorage as a percent of government revenue including seigniorage.
[c]1976-85 [d]1982-87 [e] 1982-89
Source: IFS

What predictions can we get from the seigniorage argument? In his classic work, Cagan (1956) introduced the notion of a revenue-maximizing rate of inflation, and also showed that most countries were inflating at well beyond those rates in the hyperinflations. Friedman (1971) went further and noted the role of real income growth as a source of seigniorage revenue. The revenue from money creation can be written as the sum of two terms, the first arising from inflationary money creation, the second from growth-induced increases in money demand:

$$\dot{M}/P = (\pi + (n + \eta g))m$$

where π is the rate of inflation, n the growth rate of population, η the income elasticity of real money demand, and g the growth rate of real income. Friedman focused on the tradeoff between the seigniorage revenue

[5]See, for example, Phelps (1972) and Fischer (1982) on optimal inflation in a theory of public finance.

from inflationary money creation (πm) and the revenues that accrue from money creation linked to economic growth ($(n + \eta g)m$). With higher rates of inflation real balances are lower and hence the growth benefits apply to a smaller base.

Suppose the demand for real balances takes the Cagan form $L = Nf(y)e^{-b\pi}$, then the revenue maximizing rate of inflation π^* is given by

$$\pi^* = 1/b - (n+\eta g) \qquad (2)$$

where the term $(n+\eta g)$ is the Friedman modification. However, the modification leads at high inflation rates to relatively little change in the revenue maximizing inflation rate. Cagan (1956) estimates b (denoted α in his paper) to be about 6 months, or 0.5 years. With b = 0.5, the peak of the seigniorage Laffer curve would be reached at 200 percent per annum. Assuming that η is unity, the revenue maximizing inflation rate would be 190%, even for a real growth rate as high as 10 percent per annum. The illustrative calculations in Table 4 show how sensitive the revenue maximizing inflation rate is to the estimate of b, and how relatively insensitive it is to the Friedman correction.

Table 4 Maximal Seigniorage in the Friedman Approach
(Percent inflation per year)

	Value of b			
	0.25	0.5	1	5
Growth rate, g:				
0.00	398	198	98	18
0.03	393.5.	193.5	93.5	13.5
0.06	389	189	89	9

Note: Calculations using equation (2) with n=.02 and η=1.5.

Bailey (1956) was the first to study the optimal inflation tax rate, which is of course below the revenue maximizing rate. He focused on

the welfare cost of reduced real balances, noting that the welfare cost increases with the square of the inflation rate. Hence extremely high inflation rates would be prima facie inefficient. Bailey concluded from this line of argument that inflation rates in excess of 10 percent per year would be implausible in an optimal design of government finance.

The optimal inflation rate is calculated by equating the marginal social cost of raising government revenue through inflation with the marginal social cost of alternative sources of revenue. Bailey's calculations, which do not take account of growth, imply that

(3) $\pi^{**} = \mu/(1+\mu)b$

where π^{**} is the optimal-tax inflation rate, and $(1+\mu)$ is the marginal social cost of raising an extra dollar in tax revenue. Table 5 shows optimal-tax inflation rates calculated from (3).[6]

Table 5 Optimal Inflation Rates in the Bailey Approach
(Percent inflation per year)

	Value of b		
	0.25	0.5	1
Value of μ			
0.1	36.4	18.2	9.1
0.2	66.7	33.3	16.7
0.5	133.3	66.6	33.3

Note: Calculations using equation (3)

[6]We have made two special assumptions in deriving (3). First, assuming the money demand function is $(M/P) = \gamma y\, e^{-b\pi}$, we have assumed $(\gamma y)=1$; this assumption does not affect the result. Second, we have assumed the optimal inflation rate is zero rather negative. With $(-\pi^*)$ as the optimal inflation rate, the full expression for the tax-optimal inflation rate is given by (3)' $\pi^{**} = [\mu/(1+\mu)b] - \pi^*$.

The Bailey analysis appears to put tax-optimal inflation rates in the moderate inflation range.[7] We cannot be more categorical without better estimates of the functional form of the high-powered money demand function, its elasticity, and its stability properties. In addition, taking account of the non-menu costs of inflation would reduce the optimal inflation rate.

The non-menu costs of inflation, and the gradual shift away from money holding that is common in moderate inflation as well as high inflation economies, make us sceptical of the public finance argument for moderate inflation. However, we do accept the implication of the Bailey analysis that inflation rates will be higher in countries where alternative sources of revenue are costly. Bailey's results thus help account for generally higher inflation rates in Latin American countries, which have great difficulty raising normal tax revenues.

Game-Theoretic Complications

The central point of the simplest game-theoretic equilibrium models is that the public adjusts to any credible change in policy; thus disinflation is in principle no problem. But announcements of disinflation are not credible if the government has a separate agenda from the public. Specifically, if the government has an incentive to mislead the public then the public must anticipate this possibility and the only viable equilibrium is one where the marginal incentive to cheat is balanced by the marginal cost of doing so. This is typically a "bad" equilibrium for both the government and the private sector relative to equilibria that would be attainable if opportunistic government behavior could be ruled out.

---

[7] Bailey obtained a low tax-optimal rate of inflation because he assumed a very low collection cost, of only 7 percent of revenues, and also had a high b (0.75).

Barro (1983) and Bruno (1991) have placed the seigniorage argument in a game-theoretic context using the Barro-Gordon approach to the problem of precommitment.[8] Consider a policy maker who minimizes an objective function that has both the inflation rate and seigniorage as arguments:

$$V = \pi L(\pi^*) - \gamma\pi^2/2 \tag{4}$$

The policy maker optimizes conditional on the rate of expected inflation, π^*. But the equilibrium under rational expectations requires that the public's expectations recognize the temptation to inflate, so that in equilibrium, $\pi=\pi^*$. The equilibrium inflation rate in a situation without precommitment is therefore given by:

$$\pi = L(\pi)/\gamma \tag{5}$$

Figure 2 shows the conventional seigniorage-Laffer curve OL for a Cagan demand function with maximum revenue at point A and the corresponding inflation rate of π_o. Bruno (1991) shows that equilibrium inflation in this game may exceed the maximum revenue rate of inflation. Two competing considerations enter. While the marginal collection cost, $\gamma\pi$, works to dampen the equilibrium inflation, the absence of precommitment -- which requires that in equilibrium inflation be such that there is no temptation to surprise money holders -- tends to raise the inflation rate.

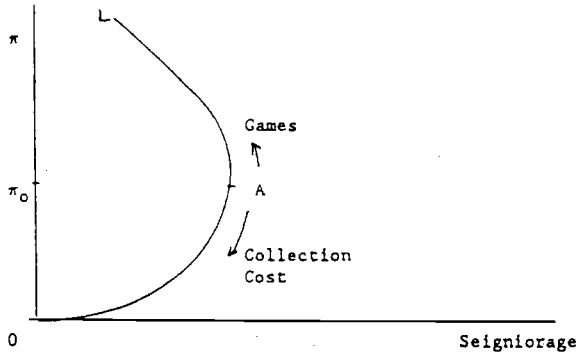
If the only social cost of inflation were the area under the demand curve, then the game theoretic analysis would imply a higher inflation rate than the optimal tax analysis. The possibility exists that this expanded model of seigniorage supports the notion of equilibrium inflation rates in the 15-30 percent range, but it would be difficult to calculate the equilibrium inflation rate that emerges from an analysis of this type.

---

[8] See, too, Kiguel and Liviatan (1990).

Figure 2

Seigniorage and Inflation



Implications for Stabilization

The seigniorage argument -- whether in the optimal tax, or in the game mode -- makes inflation plausible because, within a given tax structure, inflation is a relatively low-cost way of raising revenue. But clearly that is only true within a given structure.

If the marginal cost of raising government revenue can be lowered through tax reform, then optimal inflation too will be reduced. In this perspective tax reform would be an essential measure to accompnay and support inflation stabilization.

2. Inflation and Unemployment

The main alternative game-theoretic model of inflation also focuses on the lack of precommitment, but the cornerstone of the game is unemployment rather than seigniorage. Once again, wages and prices are assumed fully flexible and there would be no problem in shifting to a noninflationary equilibrium if only the government could credibly commit itself. Once again, the government has a separate agenda that introduces the temptation to cheat and surprise.

In this model due to Barro and Gordon (1983), the government minimizes a loss function in which the deviation of unemployment from the government's desired unemployment rate, ku*, and inflation are the arguments. Because of distortions, for example in the tax structure, or of taste differences, the government's target rate of unemployment is only a fraction k of the natural rate at which the labor market clears and that governs inflation dynamics.

$$V = (u - ku^*)^2 + \alpha\pi^2; \qquad 0 < k < 1 \tag{6}$$

In the labor market, inflation depends on inflationary expectations and on the discrepancy between the actual and natural rates of unemployment:

(7) $$\pi = \pi^* - \beta(u-u^*)$$

The government maximizes (6) subject to the inflation equation, taking the inflationary expectation as given. In equilibrium the solution must satisfy $\pi=\pi^*$. Equilibrium inflation therefore is:

(8) $$\pi = (1-k)u^*/\alpha\beta$$

Inflation in this model is strictly the result of a lack of precommitment. Equilibrium inflation does not come as a surprise and as a result it fails to reduce unemployment below the natural rate. The equilibrium level of inflation is higher the higher the wedge between the social and private natural rate of unemployment, the more the government is concerned with the employment objective rather than with inflation, and the smaller the impact of unemployment on inflation.

Depending on how ambitious and how stupid the government is, this model could support the idea of steady inflation at 20 or 30 percent. However the parameters that appear in (8) have not been estimated in a way that makes it possible to narrow down the implied range of inflation.

The general spirit of this model can be taken in several directions. One possibility is that the public does not know the characteristics of the policy maker. In this case learning and reputation building come into play.[9] Taking account of reputation generally reduces the equilibrium inflation rate below that implied by equation (8), but also suggests -- realistically -- that inflation rates are likely to be lower in

---

[9]See Andersen (1989), Persson (1988), Persson and Tabellini (1989), Driffill (1989), Blackburn and Christensen (1989).

countries with more stable governments where policymakers and the institutions in which they operate have the opportunity to establish reputations.

The central place of precommitment and reputation in game theoretic models supports the notion embodied in the creation of independent central banks that institutions and policy makers should be designed to reduce the incentives for opportunistic behavior and ambiguity about preferences. For example, appointing conservatives to run the central bank would lead to lower inflation. So would positive disincentives for policy makers to create inflation.

3. Inflation Too Costly to Stop

A different motive for inflation comes from the observation, or at least the belief, that inflation is costly to stop. One might call this the "Brookings School" view. Once a commonplace,[10] it came under attack in the 1980s, notably by Sargent (1982, 1986), who brought evidence from the end of hyperinflations, and from the UK and France in the 1920s to shift the focus of attention to the credibility issue and away from the notion of price stickiness that did not result from slow adjustment of expectations.

The typical persistence model, spelled out in some detail, is given in the following equations where w denotes wage inflation and e the rate of depreciation of the exchange rate. The disturbance term ψ is expressly recognized since supply shocks play an important role in the inflation

---

[10] See, for example, Tobin (1980) discussing the prospects for disinflation in the 1980s.

process.

(9) $\pi = \alpha w + (1-\alpha)e + \psi$ $\quad 0 < \alpha < 1$

(10) $w = \pi_{-1} - \lambda u$,

(11) $e = \beta\pi + (1-\beta)\pi_{-1}$ $\quad 0 < \beta < 1$

(12) $\pi = \pi_{-1} + \theta\psi - \alpha\lambda\theta u$; $\quad \theta = 1/[1-\beta(1-\alpha)]$

(13) $u = u_{-1} - \gamma(m-\pi) - \phi(e-\pi)$

The model includes cost-based pricing (equation (9)), a wage setting equation (10), and an exchange rate rule (11). These three equations imply an accelerationist Phillips curve (equation (12)); the model is completed by an aggregate demand equation with real money growth and real depreciation as the driving forces (equation (13)).

The model assumes persistence because lagged inflation appears mechanically as a determinant of current wage and price inflation. In such a model disinflation is costly because inflation can be lowered only via a protracted period of unemployment.

Indexation

In economies where inflation is substantial -- say 20 percent per year -- some implicit or explicit form of indexation is unavoidable. In many countries wage increases follow a regular pattern of once or twice a year adjustments, often mechanically based on past inflation. This is, of course, an extreme form of inertia: wage inflation is given by past price inflation. The higher is past price inflation, the more work that has to be done by unemployment in bringing down wage inflation. This point is quite obvious from equation (10) above.

However, some care has to be taken in discussing the relationship between indexation and inertia. As can be seen in Taylor (1982) or Fischer

(1986), indexation can speed up the response of prices to a reduction in money growth. The comparison that is being made in these papers is between indexed wages and wages that are predetermined; the response is more rapid with indexed wages because they adjust sooner to any initial reduction in inflation achieved by policy.

Indexation is associated with inertia, especially in the Latin American context, for at least two reasons. First, indexation leads to longer contracts than would exist in its absence. With high and unstable inflation rates, labor contracts would be very short if they could not compensate for inflation that was unanticipated at the time the contracts were made. But since longer contracts generally increase inertia, wage indexation tends in these circumstances to increase inflationary inertia. Second, the typical indexing formula used in practice tends to make the real wage a negative function of the inflation rate.[11] This means that the real wage rises when the inflation rate is reduced, implying higher unemployment.[12]

If wages are set by a formula depending mainly on the past behavior of inflation, there will be very little scope to enlist forward looking expectations effects. In a chronic inflation situation either a suspension of indexation or else protracted high unemployment will be inevitable in the process of stabilization. We return to the question of indexation in discussing incomes policy.

---

[11] This relationship has been examined by Modigliani and Padoa-Schioppa (1978) and Simonsen (1986); see Fischer (1988), equation (20).

[12] Of course, the short run impact of higher real wages also works through the demand side and on that account may well raise output, notably in the nontraded goods sector. This theme is familiar from the literature on contractionary devaluation.

Combining Inertia and Expectations

The above model neglects explicit expectations. Fischer (1977, 1986) and Taylor (1980, 1982) offered models that strike a balance between the fully flexible price models in which inflation is exclusively determined in a forward looking fashion and the fact of overlapping, long term contracts that introduce an element of inertia.[13] In these rational expectations models inflation is still linked to the past because existing wage settlements include expectations based on past information. But the more forward looking is pricing, and the shorter are contracts, the less recessionary a disinflation will be -- provided of course that the change in policy affects expectations of future prices and wages.

With full credibility, policies that stabilize inflation without creating unemployment can in principle be designed in these models.[14] However, non-recessionary disinflation takes very long -- in Taylor (1982), it requires 5 years to disinflate fully, even with full credibility for the policymakers. The job can be done faster if unemployment is allowed, but of course the assumption of full credibility will in practice not be satisfied and that may raise the unemployment cost very substantially.[15]

---

[13]See, too, Fellner et al (1981).

[14]In Fischer (1986), a stabilization program announced as far ahead as the longest contract in the economy can be implemented costlessly; Taylor (1982) presents numerical solutions for such programs.

[15]Calvo (1983a,1983b) has proposed a model of forward looking price setting in which one can investigate the effect of a change in the monetary growth rate. A change in money growth immediately change the rate of inflation, though not the level of prices. Fuhrer and Moore (1990) note that Calvo's model cannot account for sticky inflation and offer an ad hoc adaptation. Ball (1990, 1991) addresses the same issue and recognizes that in a Taylor setting the level, not the rate of change, of prices has inertia. He concludes that disinflation ought to lead to a boom -- as the lower expectation of future prices leads through the Taylor wage- and price-setting assumptions to a reduction in the current price level and thus higher real balances. The standard result is that the start of a credible disinflation should be accompanied by a step increase in the money supply, to provide for the increased real balances demanded as a result of lower expected inflation. This mechanism is not present in the Ball model.

Innovations in Credibility Management.

Recent policy experiments have focused on enhancing credibility along with actual monetary disinflation. In Chile, for example, the Central Bank was formally made independent of the government in 1989. In New Zealand an elaborate agreement between the Treasury and the Central Bank in 1989 obliged the latter to achieve a stable price level by the end of 1992. Part of that agreement ties the remuneration of the Governor of the Central Bank to success in disinflation.[16] The rate of inflation in calendar year 1990 was to be brought down to 3.5 percent, in 1991 it was to be in the 1.5 to 3.5 percent range; the inflation rate is supposed to be 0-2 percent in 1992. In the 3rd quarter of 1990 the 4 quarter inflation rate was still 5 percent, down from 1989 and falling, but above target. The economy was already in a serious recession.

Canada recently announced an agreement between the Minister of Finance and the Governor of the Bank of Canada to bring inflation down from 5 percent in 1990 to 3 percent by the end of 1992. A further reduction to 2 percent is to be accomplished by 1995. Although the Canadian package is far less ambitious than that of New Zealand, it too attempts to lower the cost of disinflation by directly influencing expectations.[17]

Summary

Even when there is some room for expectations to influence the current setting of wages and prices, the overhang of existing contracts prevents costless disinflation. The costs of disinflating would be higher

---

[16] See Reserve Bank of New Zealand.

[17] See Press Release dated February 26, 1991 of the Bank of Canada, Selody (1990) and Lipsey (1990) for the case of Canada.

the longer the average duration of existing contracts. At inflation rates of 15-30 percent, contracts tend to have a one year duration and hence near-instant disinflation is impossible without a sharp rise in unemployment.

Wage-price inertia models with rational expectations inevitably lead to an emphasis on the role of expectations and the hope that institutional changes can decisively stop inflation nearly costlessly. No doubt institutional changes can play a powerful role in cementing in a reduction in inflation. But the evidence from New Zealand and Chile suggests that such changes are unlikely to work immediate magic under conditions of moderate inflation.

The disinflating policymaker has to deal with two elements central to different models -- seigniorage, and the mechanics of wage-price dynamics. Significant amounts of seigniorage, 2-3 percent of GNP, are typically being collected in moderate inflation countries, and inflation will not stop unless the government deals with the fiscal problem by cutting expenditures or raising taxes.

Second, inflationary inertia, whether resulting from the slow adjustment of expectations or from the presence of contracts, has to be taken into account. A convenient starting point is to go back to (9) repeated here for convenience in a slightly different form, adding and subtracting lagged inflation on the right hand side:

(9a) $$\pi = \pi_{-1} + \alpha(w-\pi_{-1}) + (1-\alpha)(e-\pi_{-1}) + \psi$$

The equation underlines the persistence of inflation. Inflation today will be equal to inflation yesterday except for any combination of the following:

• Wage inflation falls below past price inflation. This requires a break with any implicit or explicit backward looking indexation. The suspension of indexation, or introduction of an incomes policy could accomplish this.

• Exchange depreciation falls below the rate of past inflation.

• Favorable supply shocks lead to disinflation without the need for the exchange rate or wages to take the lead.

The basic point is that the inflation process tends to perpetuate itself even after a government has changed the policies that sustain the ongoing inflation. For inflation to fall, there has to be a major break in the process whereby each sector, including the monetary authorities, accommodates the inflation rate of every other sector. One possibility is a change in the structure of indexation among wages, prices and the exchange rate. Another is a change in the rules for setting the exchange rate and for public sector prices. Use of the exchange rate to initiate a disinflation is very common, but it risks leading to a situation of overvaluation which then greatly complicates the unwinding phase.[18] Or else it might be a change in the wage rules that move from compensating for past erosion of the purchasing power of wages to a forward setting based on

---

[18]Policies that attempt to reduce inflation by stabilizing the nominal exchange rate or other government controlled prices run enormous risks of unsustainability if inflation fails to respond. Thus there can be no way of pursuing these policies to the bitter end; they have at some stage to be abandoned if they fail to reduce inflation. All such policies have to be labelled toxic if taken to excess. The successful governments are those that know when and how to stop trying to use this particular medicine.

expected inflation.[19] But if all else fails, high unemployment will have to be used to slow inflation by reducing wage and demand pressures.

In the case studies below we will highlight how the problem of cutting into the inflationary process was addressed in each instance.

II. STATISTICAL OVERVIEW

There is need for a working definition of moderate inflation. The rate has to be high and persistent enough to set it apart from the problems of the U.K. or the U.S., yet low enough to put it in a category clearly distinct from high, extreme or hyperinflation. We define a moderate inflation episode as one in which the annual inflation rate is in the 15-30 percent range for at least three years.

The emphasis on the inflation being sustained is essential to set the experiences apart from supply shock inflation. The upper limit of the range is not very important, whether to end at 25 or 30 percent, but the lower limit does affect the number and length of episodes. The duration is more significant; there would be many more episodes if we used a two year duration and far fewer if we used a four year duration -- as can be seen in Table 7 below, which presents a list of the episodes of moderate inflation in the period since 1950, as well as in Table 8 which lists moderate inflation episodes by their duration.[20]

---

[19] If the stabilization program is indeed accompanied by a fundamental change in fiscal policy, then inertia can be reduced by a one-time suspension of indexation rules -- for example that workers and asset-holders forgo one inflation adjustment. Provided the new policies are consistent with low inflation, indexation can later be restored if that has to be done.

[20] Data are very incomplete for the 1950s and the weight of the experience therefore comes from the post-1960 period.

Table 7 **Episodes of Persistent Moderate Inflation**
(15-30 percent for at least 3 consecutive years)

Country	Period	Period Average Inflation		
		In Period	3 Years Before	3 Years After
New Zealand	1975-77	15.3	8.7	14.3
	1980-82	16.2	13.3	9.7
Finland	1974-76	16.3	8.2	9.3
Greece	1979-87	20.7	12.7	15.6
Iceland	1986-89	21.6	48.4	na
Ireland	1974-76	18.6	9.7	11.5
	1980-82	18.6	11.4	8.2
Italy	1974-77	17.8	7.1	16.0
	1980-82	18.5	14.7	11.6
Poland	1983-86	17.5	43.8	112.1
Portugal	1974-85	22.7	8.9	10.2
Spain	1974-80	17.6	9.3	13.7
Turkey	1955-59	18.0	11.9	1.6
	1973-77	19.0	11.4	71.4
Yugoslavia	1971-75	19.3	7.9	13.1
	1977-79	16.5	18.9	34.1
UK	1974-77	18.1	8.6	13.2
Ethiopia	1977-79	15.7	14.6	5.5*
Liberia	1973-75	17.5	1.6	6.4*
Seychelles	1972-75	20.6	na	13.9
Sierra Leone	1974-76	17.2	3.3	13.5*
Somalia	1974-76	17.3	1.0	15.0*
South Africa	1985-87	17.0	12.8	13.9
Sudan	1973-75	21.8	6.3	12.7
	1979-81	25.2	22.5	36.7
Swaziland	1979-81	18.3	11.0	12.0
Zaire	1972-74	20.3	6.7	66.0
Zambia	1976-78	18.3	8.2	11.4
Korea	1974-76	21.5	9.5	14.3
	1979-81	27.8	13.3	4.3
Pakistan	1973-75	23.6	5.1	7.8
Western Samoa	1981-83	18.4	15.4	9.4
Bahrain	1973-78	18.5	4.2	5.8
Egypt	1982-84	16.0	13.6	18.6
	1986-90	20.5	15.0	na
Iran	1980-83	20.8	16.5	11.8
Israel	1987-90	18.3	224.2	na
Syria	1980-82	17.3	7.1	10.9*

Bolivia	1987-90	15.3	4,435.8	na
Brazil	1968-72	20.7	45.9	23.1
Chile	1965-68	24.3	na	27.6
	1986-89	17.8	26.0	na*
Colombia	1973-76	22.1	9.7	25.2
	1978-89	23.1	25.4	na
Costa Rica	1987-90	18.3	13.0	na
El Salvador	1979-81	15.6	10.7	12.2
	1987-89	20.8	21.9	25.5
Grenada	1977-81	19.6	na	6.5
Guyana	1978-83	17.5	8.4	16.0
Haiti	1973-75	18.2	4.7	3.6
Mexico	1974-76	18.3	7.4	21.6
Paraguay	1955-57	20.4	69.7	8.1
Trinidad &Tobago	1973-75	17.9	5.1	10.9
	1979-81	15.5	10.9	13.4
Uruguay	1969-71	20.4	96.0	83.6

* These episodes include year(s) in which the inflation rate is between 14 and 15 percent.
Source: IFS, various issues

The table includes 55 episodes, drawn from the behavior of inflation in 131 countries. Just over half these episodes, 28 of them, started during the oil price shocks and lasted no more than four years. Clearly many of the moderate inflation episodes were triggered by commodity price shocks. The table leads us to raise a number of questions:

• Is there a high incidence of repeat offenders? The answer is clearly no.

• Where do countries that find themselves in moderate inflation spells come from and where do they go? Most countries come from low inflation. Leaving moderate inflation they typically stay on average in the neighborhood of moderate inflation, or go back to a lower inflation rate. Very few transit to higher inflation. Of the episodes in Table 7 for which post-episode information is available, 25 had average inflation below 15 percent for the next three years, 18 had inflation that averaged between 15 and 30 percent, and only 6 had inflation that averaged more than 30 percent.

Table 8 summarizes the persistence of moderate inflation episodes. The table shows the number of spells of a given duration in Table 7.[21] Thus, for example more than half the moderate inflation spells last only three years. The evidence thus shows that most countries that enter the moderate inflation zone do not stay there very long.

Table 8 **Spells of 15-30 Percent Inflation**

	Years of consecutive moderate inflation							
	3	4	5	6	7	8	9 ..	12
No. of spells	31	12	6	2	1	0	1	2
Percent	56.4	21.8	10.9	3.6	1.8	0	1.8	3.6

• For most countries moderate inflation is a transitory experience. There are very few countries where moderate inflation becomes a way of life: there are only six spells where inflation is in the 15-30 percent range for more than five years. The two longest spells are those of Portugal and Colombia, each lasting twelve years (and Colombia still continues).

---

[21]Some of the spells in Table 7 were not completed. All spells shown in Table 7 as ending in 1988 or earlier were completed; some of those shown as ending in 1989 may not have been completed (data for 1990 were not available for all countries); spells shown as ending in 1990 may be continuing.

III. CASE STUDIES

In this section we offer several case studies, representing different transitions into or out of moderate inflation, as shown in Table 2. We start with the countries that are currently experiencing moderate inflation after stabilizing a high inflation -- Chile and Mexico respectively. Other countries in this situation are Israel and Bolivia. We then examine the case of Colombia, which, having reached moderate inflation from low inflation, is the longest-lasting moderate inflation country. We turn next to Brazil, which stabilized a high inflation successfully and reached moderate inflation in 1968, but then failed to stay in this region and returned to high inflation. We conclude with four countries that have successfully reduced moderate inflations and now experience low inflation, Korea, Indonesia, Ireland, and Spain.

Chile

Chile is today seen as the example of successful macroeconomic stabilization and structural adjustment. There is no question about the success, but there should also be no illusion about the cost at which these accomplishments were attained -- violent political repression for almost two decades, and mass unemployment until very recently.

Table 9 reviews key Chilean variables in the 1980s and Figure 3 shows the path of inflation.

FIGURE 3

CHILE: INFLATION IN THE 1980s

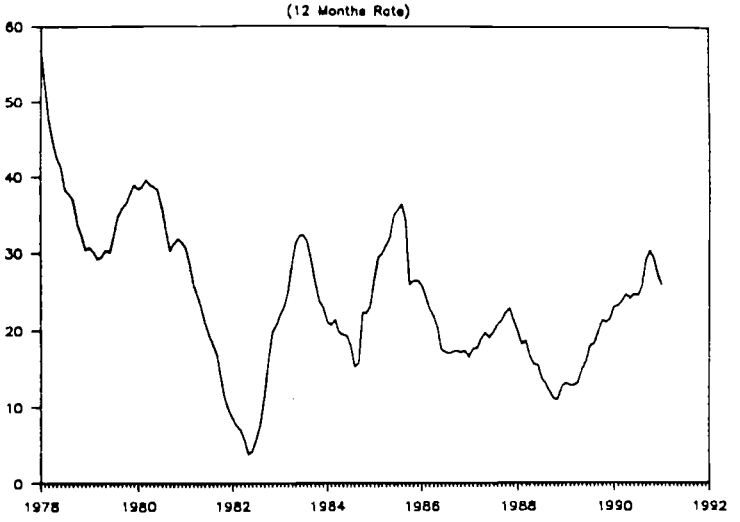


Table 9 Chilean Macroeconomic Variables in the 1980s

	Budget def.[a]	Real int. rate (%)[b]	Unemp. rate[c]	Real wage[d]	Real exch. rate[d]	Infl-ation	Seignior-age[e]
1980	5.5	12.2	14.5	88	95	35.1	2.4
1981	2.4	28.8	13.7	103	108	19.7	-0.7
1982	-2.2	35.1	27.2	103	97	9.9	-1.7
1983	-2.6	15.9	36.5	92	89	27.3	0.8
1984	-2.9	11.4	28.3	92	90	19.9	0.9
1985	-2.3	11.1	23.9	88	80	30.7	0.8
1986	-0.0	7.7	18.9	90	89	19.5	
1987	0.5	9.4	16.2	89	66	19.9	
1988	-0.3	9.9	12.0	95	61	14.7	
1989					62	17.0	

[a]Percent of GDP, general government [b]Realized active rate [c]Participants in government work program included among unemployed [d]Index, 1980-82=100
[e]Change in money base as percent of GDP.
Sources: IMF Government Financial Statistics, IFS, CIEPLAN "Estadisticas Economicas" various issues, and Morgan Guaranty.

The 1970s Miracle. Following the military coup in September 1973, the Pinochet government rapidly established fiscal austerity and tight monetary control. "Chicago monetarism" was the rule. From the shambles left in the aftermath of Allende's populism the economy was rebuilt to become by 1990 the showcase of what a developing economy ought to look like.[22] But disinflation was slow even though unemployment increased sharply. The reason was primarily automatic wage increases resulting from full backward-looking indexation provided for by law.

After the intial orthodox stabilization, the next step was an attempt to disinflate by using the exchange rate as a nominal anchor. Recognizing the cycle of inflation, exchange rate depreciation, and wage increases, to be followed by the next round of inflation, the government

[22]See Edwards and Edwards (1987), Ramos (1986) and Foxley (1983). Corbo and Solimano (1991) offer an excellent perspective on the entire experience

first implemented a preannounced tablita of exchange rate depreciation, and then fixed the exchange rate in 1979, despite an inflation of 30 percent. But as eqs. (9)-(11) show, with backward looking indexation, a fixed exchange rate will lead to real appreciation and consequently unemployment.

The fixed rate was maintained until 1982, resulting in growing real exchange rate appreciation and contributing to Chile's subsequent debt crisis. Over time, however, the fixed exchange rate combined with a budget surplus and tight money played its role: inflation started coming down. But, because of backward-linked indexation of wages the decline in inflation was slow and real wages started rising.[23] In the short run the gain in real wages sustained real aggregate demand and even gave the 1970s miracle a terminal boost. But by 1982 the overvaluation in conjunction with massive external shocks made an exchange rate collapse certain. The actual abandonment of fixed rates (amidst the debt crisis of 1982) was followed by major exchange depreciation and the prospect of renewed inflation.

The 1980s. Following the collapse of the fixed rate regime, very tight monetary policy and a cyclically adjusted budget surplus forced a deep depression of economic activity. Real GNP declined by 14 percent in 1982, and by another 1 percent in 1983.

Unemployment, including a government work program that paid a fraction of market wages soon accounted for more than 30 percent of the labor force. In the subsequent years recovery gradually brought down the record unemployment, but until the late 1980s unemployment was high enough to keep a firm lid on wage increases and hence on inflation. Even with the

---

[23]See Edwards and Edwards (1987) Corbo (1985) on the interaction between disinflation and real wage gains.

collapse of the exchange rate and the significant real depreciation between 1981 and 1988, inflation never went back to the high levels of the 1970s, but rather settled in the 15-25 percent range.

Unemployment was certainly not the only factor in maintaining inflation stability. Increasingly the government succeeded in establishing a consensus around economic policy. It came to be believed, more so after unemployment had come down from peak levels, that a demand-driven program of recovery could result in renewed inflation and chaos. That view was increasingly reinforced by the unhappy inflationary experience in other Latin American countries, notably Peru, Argentina and Brazil.

The relative stability of inflation seems puzzling to those who would expect the massive unemployment to exert far more of a disinflation effect. This puzzle helps solve the other puzzle, of why as large a real depreciation as occurred in 1984-86, and continuing moderate real depreciation afterwards, did not translate into an acceleration of inflation. Unemployment and real depreciation largely offset each other with the inflation rate remaining broadly unchanged. The government "de-indexed" the economy in 1982, abolishing the formal and legal obligation to pay wage increases of at least the past rate of inflation.[24] But, de facto, backward looking indexation continued to be largely practiced in the private sector. Falling oil prices after 1984 helped cushion the exchange rate depreciation's inflationary impact.

Seigniorage: Table 9 shows that government revenue from the printing of money was quantitatively unimportant in the 1980s. Seigniorage was more

---

[24]See Corbo and Solimano (1991).

important in earlier periods, in particular amounting to 17 percent of GDP in 1973, and remaining close to 5 percent of GDP through 1978. The fiscal disorder under Allende thus led to inflation via money printing, and the need for seigniorage could for some time have continued to be a factor supporting the continuation of inflation. But there is no reason to think that the need for seigniorage played any significant role in the maintenance of moderate inflation in Chile after 1982, especially given the massive fiscal effort that was undertaken during that period.

The 1990 Transition: Chile's success in institutionalizing conservative policies is most apparent in the transition to a democratic government in 1990. This was a natural time to fear that the opposition government, more open to the concerns of labor and the left, might quickly give in to pressures for spending and expansion. The risk posed by such policies was all the more real in that Chile had by 1989-90 been taken to the threshold of full employment. The transition was then an obvious point at which expectations of inflation and institutional instability might return and lead to an escalation of inflation.

This did indeed happen, though perhaps more as a result of Pinochet's overheating the economy at the very end than as a result of fears of immediate mismanagement of the democratic government. But against a background of an acceleration of inflation the incoming government took a firm stand: in the campaign they assertively endorsed highly conservative economic management. Once in office they actually practiced it. 1990 was a year of slower growth, necessary to cool off the economy and set the stage for sustained and stable growth in the years to come. Inflation did rise in the calendar year to 27 percent. But by December the growth-recession had

done its work and inflation rates had been pushed down sharply. The point had been made that inflation at 20-25 percent was acceptable, but open-ended inflation was not.

The transition was marked by an important institutional innovation. An independent Central Bank was established whose organic law established its responsibility to assure monetary stability and the normal functioning of the payments mechanism. Growth or full employment were not made part of its task description. The creation of an independent central bank is widely viewed in Latin America today as the key step in stopping inflation -- in Chile it was more the final step in assuring that a disinflation process was locked in.

It is important to recognize that Chile today, and throughout the 1980s, never achieved inflation in the single digit range except just before the 1982-3 depression. Even today the government is not undertaking policies that would attain single digit inflation in the foreseeable future. Inflation in the 20 percent range appears to be accepted and the chief focus of attention is to avoid its acceleration, if necessary with an unpopular slowdown. Figure 3 shows a decade of inflation in the 20 percent range. Clearly it is possible to stay in this range for a long time. But the experience of 1990 marks just how essential it is, at a key political juncture or in an external crisis, to establish firmly the determination to avoid acceleration.

Today in Chile there appears to be a political economy equilibrium with broad support. It involves the recognition that inflation acceleration must be resisted because it would ultimately impose a large cost in terms of political and economic instability. But the equilibrium appears also to

include the recognition that rapid disinflation to a level below 10 percent, say, would involve unemployment at levels that are not worth the price.

Mexico

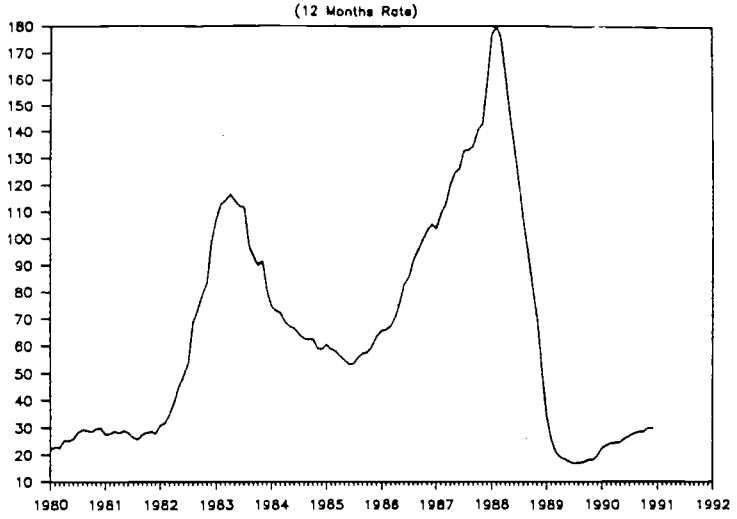
Mexico, like many other countries, entered the moderate inflation range during the first oil shock, in 1974. It stayed in that range through 1981, having had to move to a floating exchange rate in 1976. Despite its booming oil exports, Mexico ran large balance of payments and budget deficits at the end of the seventies and the beginning of the eighties, using real exchange rate appreciation to help keep the lid on inflation.

In the 1980s Mexico fell apart. Gross mismanagement in the public sector in the early 1980s, exchange overvaluation and excess indebtedness caused a collapse in 1982. The rest of the decade was devoted to rebuilding the country. Real wages fell dramatically as real depreciation was required to finance debt service and capital flight. Growth disappeared. Inflation exploded on two occasions, in 1983, in the aftermath of a typical election year, and again in 1987-88. (See Figure 4)

The reconstruction of financial stability started in the administration of Miguel de La Madrid (1982-88). Noninterest budget surpluses were built up (Table 10) to finance domestic and external debt service in a noninflationary fashion. But inflation control remained the biggest challenge. The lessons of Argentina, Brazil, Israel and Peru were closely studied and conclusions drawn: incomes policy and price freezes worked for a while in Argentina, Brazil and Peru, but succeeded in the longer term only with fiscal consolidation, as in Israel. The right lesson was drawn: that disinflation without fiscal discipline was unsustainable.

FIGURE 4

MEXICO: INFLATION IN THE 1980s



But a positive lesson was drawn too, namely that disinflation without incomes policy, relying solely on tight money and tight budgets, would be unnecessarily expensive.

Table 10 **Mexico's Stabilization**

	1985-87	1988	1989	1990
Growth	0.2	1.3	3.1	3.9
Inflation	94	159	20	29
Primary budget surplus	3.2	8.1	8.3	7.5
Real interest rate	-3.3[a]	34	20.3	12.5
Real exchange rate[b]	73	77	74	70
Seigniorage[c]	2.8	1.6	0.4	1.2

[a]1986-87 [b]Index 1980-82=100 [c]Share of GDP
Source: IFS, Morgan Guaranty and Hacienda, Mexico

The Mexican disinflation program -- the Pacto -- was initiated in December 1988 and is still underway. The Pacto is a tripartite agreement among the government, unions, and business. The public sector committed itself to fiscal discipline, and to specified policies for the exchange rate and public sector prices. As a counterpart there were agreements for wages and private sector prices. The program was rounded out by an aggressive trade liberalization.

Key features of the Pacto were wage agreements that kept a very firm lid on wage increases and an exchange rate policy that reduced the rate of depreciation. Until mid-1990 the exchange rate was depreciated by 1 peso a day, corresponding to an annual depreciation rate of about 15 percent. Subsequently the rate of depreciation was cut to 0.8 pesos a day and most recently to 0.4 pesos. The exchange rate policy was designed to contribute to disinflation. Interestingly, it did not lead to overvaluation, unlike in the Chilean and many other cases. One reason was surely that the wage

policy cut decisively into wage inflation. Control of public sector prices, in some areas at the expense of serious misalignment, similarly contributed to maintaining low inflation.

The exchange rate and wage policy were sustained by a very tight monetary policy reflected in exceptionally high realized real interest rates. Gradually, as the exchange rate policy came to be believed, real interest rates were allowed to come down. On the budget side a large primary surplus was maintained throughout.

The combination of high real interest rates and a tight budget put pressure on growth: until 1989 there was no growth to speak of. But more recently, largely as a result of declining real interest rates, rising real wages, and a gain in confidence, growth is picking up.

Seigniorage: Seigniorage revenue has been small since the inauguration of the Pacto, but in earlier years after the onset of high inflation amounted typically to 4 to 6 percent of GDP, and to about one quarter of total government revenues. Seigniorage was especially large in 1982 and 1983, the years that inflation jumped from the moderate to high inflation range. Mexico's heavy dependence on seigniorage through 1984 meant that reduction of inflation required a large fiscal effort, as indeed was made in the second half of the 1980s.[25]

The Next Challenge: Mexico, like Chile, has succeeded in forming a consensus around conservative macroeconomic policies and microeconomic reforms. The next question is whether these policies can be carried a step further to bring inflation down all the way and sustain a fixed exchange

---

[25]We see no evidence that Mexico was in the range of the Laffer curve where lower inflation would have brought in more seigniorage revenue.

rate with the US. Mexico did have a fixed exchange rate between 1954 and 1976 and the period is remembered as one of stability and growth. But how can Mexico get there?

Because of substantial price adjustments in the public sector, and because of recovery, Mexican inflation toward the end of 1990 was rising to an uncomfortable 25-30 percent range. These numbers overstate the core inflation because of a bunching of price corrections undertaken well in advance of the 1991 Congressional elections. The temptation now might be to go for broke: fix the exchange rate on the dollar at the current level and allow the discipline of an open economy to push inflation down. The policy is tempting, except for the Chilean experience in the late seventies and early eighties..

Without a new incomes policy agreement, the fixed exchange rate strategy might be considered outright dangerous. But incomes policy is already strained after 3 years of pacts. The dilemma then is how to get out of the Pacto without renewed inflation and how to make progress on further disinflation without recession. Probably a fixed exchange rate is the most plausible mechanism provided imbalances can be financed and the budget is not allowed to deteriorate. The likely result would be real appreciation. But some real appreciation can be tolerated if Mexico enters a Free Trade Agreement with the US and in so doing receives a major credibility bonus.

Colombia

Colombia is the moderate inflation country par excellence: it entered the moderate inflation range in 1973 and has been there since, with the brief exception of 1977 when inflation rose above 30 percent (Figure 1

and Table 11).[26] Colombia's growth performance during that period has been good, especially by Latin American standards, and it avoided rescheduling its debt during the debt crisis. During this period, 30 percent has become a red line for inflation: policy swings into action when the line is about to be breached, as in 1977 and 1990.

Table 11: Colombian Inflation and Growth, 1970-78

	1970-71	1972	1973	1974	1975	1976	1977	1978
GDP growth	6.6	7.6	6.7	5.8	2.1	4.8	4.1	8.4
Inflation (CPI)	10.1*	13.4	20.8	24.3	22.9	20.2	33.1	17.8

Source: GDP growth from World Bank, World Tables; CPI from IFS.
* GDP deflator for 1970-71

Colombia introduced a crawling peg exchange rate in 1967, as part of an export-oriented package to revive growth. Despite the crawling peg, and the introduction of indexation of both deposits and loans in the housing finance system in 1971, inflation stayed low until 1971. By 1973, Colombia was in the moderate inflation range, as were many other countries affected by the worldwide boom and commodities inflation, which included coffee. But Colombia was there to stay, with the assistance of mechanisms for living with inflation: the crawling peg; indexation of the system of housing finance; and indexation of tax brackets and the cost basis for asset taxation, introduced in a 1979 tax reform. The Musgrave Commission, which reported before the 1974 tax reform, recommended against recognizing the distinction between nominal and real returns on assets on the grounds that this would weaken the political will to fight inflation.

---

[26] For accounts of Colombian economic policy, see World Bank (1984), and Urrutia (1989), and Hommes (1990).

At the beginning of the moderate inflation period, in 1974, the Lopez administration committed itself to reducing inflation to world levels. It identified the budget deficit as the main source of inflation, and the lack of tax revenue as the main source of the deficit. It undertook a fiscal reform, which raised the share of government revenues in GNP. But it also had to deal with the balance of payments, for which purpose it devalued by 10 percent. The devaluation created a small increase in inflation, but the combination of tightened fiscal policy and abating world inflation brought the inflation rate down during the next two years, to the extent that by the end of 1976 it would have been reasonable to believe that steady contractionary pressure would force inflation down to world levels. However, after 1974, money growth was generally expansionary, reflecting the government's reluctance to fight inflation with full force.

The jump in inflation in 1977 is associated with a coffee and external payments boom in 1976, during which coffee prices virtually doubled, and money growth was allowed to increase. A stabilization program, tightening fiscal and monetary policy, and slowing devaluation, was put in place at the beginning of 1977, and by the end of 1977 it had virtually stopped inflation. The high growth of 1978 derived in part from large agricultural output increases, as well as strong exports; money growth continued high as a result of an unsterilized balance of payments surplus. This is the first of several episodes in which the upper bound of 30 percent was established for acceptable inflation.

Colombia's economic performance during the period from 1978 to 1982 (the Turbay administration) has much in common with that in the rest of Latin America (Table 12), in that the government budget moved from a small

surplus in 1978 to a deficit of 7.6 percent of GDP, the real exchange rate appreciated, the current account deteriorated dramatically, and growth slowed. Both the appreciation and the collapse of coffee prices contributed to the worsening of the current account. Although the tax share of GNP increased during this period, expenditures increased more rapidly. The debt to GDP ratio from 28 percent in 1980 to 44 percent in 1985.

Table 12: **Colombia: Macroeconomic Performance, 1980-89**

	Real GDP	CPI	M1	Budget def.	Current acc.	Seignior-age	Real ER
1980	4.1	26.6	27.9	2.5	0.4	2.8	73.1
1981	2.3	27.5	19.9	6.1	-6.7	2.4	70.7
1982	1.0	24.6	25.4	7.6	-11.3	1.7	65.6
1983	1.6	19.7	29.7	7.5	-10.8	1.7	67.3
1984	3.4	16.2	23.4	6.3	-7.6	2.0	71.9
1985	3.1	24.0	28.2	3.5	-4.9	1.4	92.4
1986	5.8	18.9	22.8	-0.6	1.6	1.7	100.0
1987	5.4	23.3	33.0	1.9	0.2	1.9	99.7
1988	3.6	28.1	25.8	2.1	-1.0	1.6	97.7
1989	3.3	25.9	29.0	1.8	-0.4	1.8	105.0
1990	3.7	29.1	25.8	0.1	1.0	1.3	117.8

* Annual rates of change for first three columns; columns 4, 5, and 6 are percent of GDP, with current account surplus shown as positive; real exchange rate is index with 1986=100.
Source: World Bank.

A major adjustment program was undertaken in 1984. The budget deficit was reduced by nearly 7 percent of GNP over two years, through increased revenues -- obtained in part through tougher collection, reductions in public employment, and reduced public enterprise deficits. At the same time, the rate of depreciation of the exchange rate was sharply increased, though there was no step devaluation. The tightening of fiscal policy moderated the impact of devaluation on inflation. In addition, the government liberalized imports. The real lending interest rate was

increased, but there is no other sign in the data of a tightening of monetary policy.

The adjustment program, aided by the recovery of growth in the world economy, succeeded in reducing the balance of payments deficit to a sustainable level. Growth increased from 1984, but remained below the rates of the previous decade.

The main aims of the 1984 stabilization program were to end the balance of payments crisis and restore growth. Both these goals were achieved. There is little evidence that the government placed much weight on the goal of significantly reducing inflation, and inflation did not decline. Both the rapid devaluation and the continuance of money growth at previous rates ensured that moderate inflation would continue.

Seigniorage: Throughout the moderate inflation period, seigniorage revenue has accounted for a significant share, on average about 20 percent, of total government revenues. That share declined during the 1980s, as tax reforms were implemented and tax collection improved. Inflation stabilization would require an increase in taxes to offset the decline in seigniorage revenue.

Summary: Since 1985 the Colombian economy has been hit by a variety of shocks, particularly to coffee and oil prices, leading to fluctuations in the balance of payments and inflation, but with fiscal policy being used actively to prevent inflation rising much above 30 percent.

However, between 1974 and 1990, no government made the reduction of inflation a high priority, and the economy was well-adapted to living with inflation. The incoming Gaviria administration in 1990 appears more concerned about inflation than its recent predecessors, perhaps because the inflation rate has been uncomfortably close to 30 percent. The new

administration promises a serious attack on inflation, aiming to get the rate down below 15 percent by 1994. With the exchange rate so depreciated and the current account and fiscal deficit in good shape, the government has some room for manouevre. The administration cannot doubt that a concentrated anti-inflationary policy will temporarily reduce growth, but expresses the view that reducing inflation is worth the cost.

Brazil

In March 1964 a military coup put an end to the constitutional populist regime of Joao Goulart. In the preceding few years inflation had risen from a comfortable 20 percent in the late 1950s to 144 percent, fueled by money printing, in the first quarter of 1964. The middle class, threatened by economic instability and radical rhetoric, supported military intervention. The coup was followed by more than a decade of political repression and an economic miracle.

Disinflation. The Economic Action Program of the new government detailed a plan to reduce inflation gradually over three years by tightening fiscal policy and using an incomes policy. Fiscal consolidation reduced the budget deficit from 4.2 percent of GDP in 1963 to only 1 percent in 1966. Inflation came down rapidly to the moderate inflation range (see Figure 5 and Table 13) and without a major impact on growth.

FIGURE 5

BRAZIL: INFLATION

(General price level, 12 months rate)

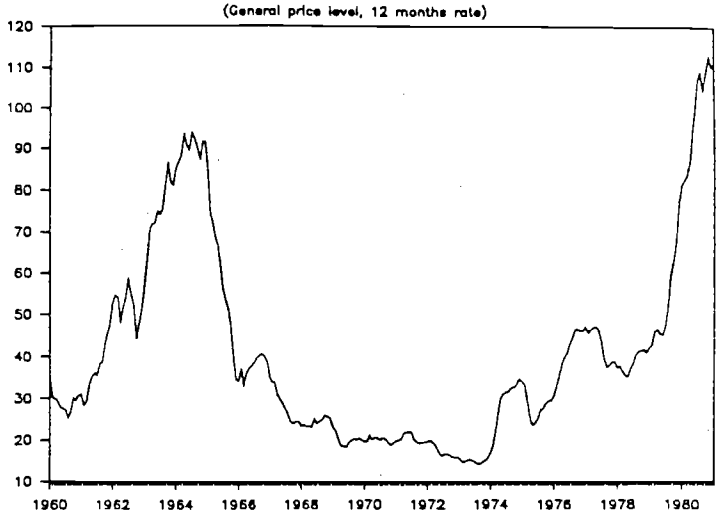


Table 13 Brazil in the 1960s

	1960-63	1964	1965	1966	1967	1968-72
Inflation	45	92	66	41	31	23
Growth	6.9	2.9	2.7	5.1	4.8	12.9
Budget Deficit[a]	3.7	3.2	1.6	1.1	1.7	0.5
Seigniorage[a]	5.4[b]	5.0	4.7	2.1	1.9	2.0
Seign/Rev[c]	40.0[b]	39.3	34.9	18.3	19.8	17.8

[a]Percent of GDP [b]1962-63 [c]Seigniorage/total government revenue (including seigniorage) as percent
Source: Simonsen (1974), IFS, and Cardoso and Fishlow (1990).

A key aspect of the program was a change in the wage indexation formula. From an automatic backward-looking mechanism that built in inertia, the formula was changed to link the current month's wage settlements, lasting 12 months, to "expected" inflation, i.e. to a government inflation forecast.[27] Simonsen (1986,p.118) notes that the new wage laws were binding, leaving no degrees of freedom in wage setting for the employers or the employees.

The change in indexation rule operated as a disinflation mechanism because productivity allowances and inflation forecasts were entirely up to the government.[28] It can be no surprise that these "forecasts" diverged sharply from reality: the allowances for 1965-67 were respectively 25, 10, and 15 percent while the actual cost of living increases over the period were 46, 41, and 24 percent. As a result real wages declined by 25 percent

[27]See Simonsen (1986,pp.118-129) and Fishlow (1974).
[28]The exact formula, as reported in Simonsen (1986,p.119) was:
$w = p^*_{-1} + .5\pi^e_t + .5(w_{-1} - p^*_{-1} + w_{-2} - p^*_{-2}) + z_t$
where p^* is the cost of living at the end of the year and all variables are in logs except for the inflation forecast, π^e and the productivity growth allowance z_t.

in this period.[29] In terms of our earlier discussion, the deceleration in wage increases provided the initial slowdown in inflation. Thus labor paid for the disinflation process, at least initially.

In commenting on the wage indexation formula introduced to help disinflation, Fishlow (1974,p.267-8) notes: "Because the central components of the formula were expectations rather than realizations, wage correction was in fact not indexed at all. Nominal wage increases could be granted in any magnitude deemed convenient, simply by assuming the appropriate rate of inflation."

In Brazil's case, with almost every aspect of policy, including fiscal policy, pointing in the same direction, it is hard to identify the key element in the disinflation. Three factors contributed: the change of political and economic regime and the accompanying repression of labor militancy; the sharp tightening of the budget; and the change in the indexation formula that effectively produced a disinflation of costs through legislation. It is interesting to note that the disinflation did not cause a recession. However some impact of the disinflation is evident from the fact that growth was sharply higher both before and after the disinflation than during the period.

Three other points are worth noting. First, there was really no monetary crunch, except possibly in 1966 after disinflation was already well underway. Table 14 shows December-December growth rates of money and prices. Money growth remained high in 1965, well above the inflation rate, thereby permitting the rebuilding of real money balances to a level

---

[29]See Simonsen (1986,p.119).

consistent with lower inflation. The absence of a monetary crunch in that year suggests that fiscal policy, the credibility effects of the military government, and perhaps most of all the change in the indexation rule must be given the credit for disinflation.

Second, there was no attempt to move inflation below the moderate inflation range. The Brazilian stabilization thus presents an early example -- and perhaps a warning -- of the type of problem that is being faced at present by countries like Bolivia, Israel, and Mexico, which have successfully reduced extreme inflations but not moved below the moderate inflation range.

Table 14 **Brazil: Money and Inflation**
(December to December Growth)

	Money Growth	Inflation	Real Money Index 1961=100
1962	63.3	51.3	108
1963	64.0	81.3	98
1964	85.8	91.9	95
1965	75.4	34.5	124
1966	16.8	38.6	104
1967	42.4	24.3	120
1968	43.0	25.4	137

Source: Simonsen (1974)

Third, seigniorage accounted for an important share of total government revenues in the early 1960s, as the inflation accelerated. Seigniorage declined as fiscal consolidation took place, but nonetheless still amounted to over one-sixth of government revenues after inflation declined. It continued to represent somewhere between 15 and 30 percent of government revenues through the next decade.

In 1968-70, once disinflation had been put in place, structural reform helped support the program for growth. The exchange rate regime became a crawling peg with frequent mini-devaluations. Trade was in some measure liberalized, by streamlining tariffs and quotas, and by putting in place a system of duty rebates for exports. Public finance was improved radically on the side of tax collection: receipts were raised from only 15 percent of GDP in the mid-60s to almost 25 percent in the early 70s. These measures helped prolong the boom by preventing the two most common causes of policy reversals: foreign exchange bottlenecks, and problems of public finance.

By the early 1970s Brazil had learnt to live with inflation, thanks to pervasive indexation.[30] In fact, there was a certain pride in managing inflation without tears.[31] Thus Simonsen (1974,p.118) notes: "A respectable current of economic thinking admits today that 15 percent inflation per year, in the actual conditions of Brazil, represents a situation far less serious than 5 to 6 percent inflation in a country not equipped to deal with inflation, that is without pervasive indexation and a crawling peg exchange rate policy."

Resurgence of Inflation: The reduced inflation of the 1964-68 stabilization program was carried into the early 1970s. The economic miracle produced record growth rates with falling rates of inflation. In fact, in 1973 "official" inflation fell to only 12.7 percent and real inflation was not much higher. Pervasive indexation of wages -- the formula for which had

---

[30]See especially the discussion in Fishlow (1974).

[31]There was a similar attitude to living with inflation in Israel at that time.

again become backward looking -- and especially of public sector prices and financial assets ensured that living with inflation was no problem at all. In fact, it was so little of a problem that inflation was not taken very seriously even when it increased to 100 percent.

The key fact is that when inflation came down to 20 percent, and when public sector deficits and the misalignment of relative prices had been cured, the doors were open to an extraordinary boom. And the government was in no mind to do anything -- such as trying to reduce inflation -- that could stop the boom. The early 1970s, before the oil shocks, would have been the time to make the institutional and policy changes that might have taken inflation all the way down to industrial country levels, but the problem was not sufficiently pressing for the government to want to make the attempt.

The resurgence of inflation in Brazil occurred in the mid-1970s in the context of an overheating economy -- the average growth rate for the period 1967-74 was 10 percent per year! The oil shock in combination with backward looking indexation -- which causes difficulties in the face of supply shocks -- rapidly increased inflation. Table 15 shows the pattern of a doubling of inflation rates every few years. A key ingredient in the speedup was the progressive shortening of indexation intervals.

Table 15 Accelerating Brazilian Inflation
(Period Average)

1970-75	1976-79	1980-82	1983-85
21.4	44.3	97.8	188.3

Source: IFS

The chief lessons from Brazil's experience concern the roles of indexation, demand management, and the need to deal opportunely with inflation. In effect, deindexation of wages was used in the 1964-66 stabilization (in combination with political and wage repression) to sharply decelerate inflation without creating massive unemployment. But indexation was reintroduced, and because it was backward-looking served to accelerate inflation when supply shocks appeared in the 1970s.[32]

Two different types of opportunity were missed in dealing with inflation. First, when conditions were booming in the early seventies, the government could have attempted to move the inflation rate down below the moderate inflation range, without much fear of a recession. And second, as inflation accelerated in the first oil shock, Brazil could have implemented policies to try to keep inflation in the moderate range. It did neither, and inflation later exploded, with consequences that are still being suffered.

Korea

Korea has a long inflationary history[33], which includes an increase of over 2300 percent in the wholesale price index in July and August 1945 as price controls were removed at the end of World War II. Inflation returned to the triple digit range during the Korean War, and, fueled by rapid money growth, stayed high after the war.

Serious inflation stabilization measures were taken in 1956, with a Combined (Korean and U.S.) Economic Board approving an annual financial

---

[32]On these mechanisms see Dornbusch, Sturzenegger and Wolf (1990).
[33]Cole and Park (1983), Chapter 8, describe the history of inflation since the 1860s.

program that set ceilings for money growth and other financial variables, including government borrowing from the central bank. Inflation fell rapidly, and was actually negative in 1958. However the reduction in inflation over this period was accompanied by a decline in real growth until 1960, a factor cited by the military as justification for the 1961 coup.

The military government that took over in 1961 relaxed monetary and fiscal policies, brought the Bank of Korea under the legal control of the Finance Ministry, created new lending agencies, and in 1962 undertook an unsuccessful currency reform (Coles and Park, Chapter 3). Along with the expansionary policies, a new forceful industrial policy, increased foreign aid, reductions in import controls, and a devaluation in 1964 pushed Korea into its modern growth era, as well as to higher inflation rates -- the years 1962-64 qualify as an episode of moderate inflation.

Inflation was in the double-digits in Korea in every year between 1963 and 1981, except for 1973 (Figure 6).[34] After 1982, the annual inflation rate was comfortably in single digits. Using the CPI as a measure of inflation, Korea suffered two spells of moderate inflation in the period since 1971: 1974-76, and 1979-81. Measuring inflation by the GNP deflator, Korea was in the moderate inflation range between 1975 and 1981.

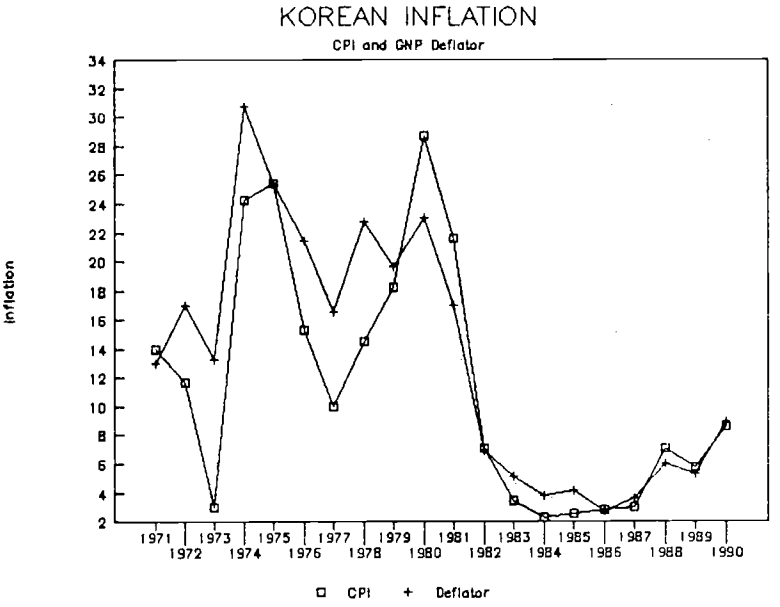
Either way, Korea is one of the few developing countries which has moved decisively from moderate to low inflation.[35] We examine two

---

[34]In that year, CPI inflation was 3.0%, while the GDP deflator increased 13.5%. The deflator typically increased more rapidly than the CPI; in turn the CPI usually rose more rapidly than the WPI. This pattern is familiar from Japan, and results from the rapid increase in real wages and thus the price of services.

[35]Korea has also flirted with hyperinflation and extreme inflation in the post-World War II period. Since the hyperinflation was confined to two months, taking the form of a jump in the price level rather than a continuing process of inflation, we do not regard Korea as one of the rare post-War cases where a country has moved from hyper- or extreme inflation to low inflation.

FIGURE 6


KOREAN INFLATION
CPI and GNP Deflator
Inflation
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
CPI
Deflator

questions: Why was inflation in the moderate range up to 1981? How did Korea reduce its inflation rate so decisively?

Inflation was not a major concern of the Korean government in the period before the late 1970s. The 1964 devaluation marked the definitive start of the Korean export promotion drive and the modern Korean growth phenomenon. For the period 1965-71, with growth averaging just under 10 percent and inflation just over 10 percent per annum, there was not much reason to worry about inflation. Cole and Park (p213) describe 1965-71 as a Golden Age, to which foreign capital inflows contributed. Despite the double digit inflation, there was no wage indexation; productivity gains produced rising real wages in any case. Particularly since it showed no sign of getting out of control, inflation was not regarded as a policy problem.

Korea's first moderate inflation episode in the modern high growth era came with the first oil shock (Table 16). The government responded to the shock by raising taxes on oil, but otherwise going for growth, expanding investment, exports (including labor) to the Middle East, and foreign borrowing. The nominal exchange rate, which had been pegged in 1972, was devalued by 20 percent at the end of 1974, and fiscal[36] and credit policies were expansionary.

---

[36]Corbo and Nam (1990) calculate a full employment deficit, which behaves in much the same way as the actual deficit shown in Table K3.

Table 16: Korean Inflation, 1972-77

	1972	1973	1974	1975	1976	1977
GDP growth	5.9	14.4	7.9	6.5	13.2	10.9
Inflation: CPI	11.5	3.2	24.3	25.3	15.3	10.2
GDP deflator	16.5	13.5	29.5	26.9	20.9	16.4
M2 growth	33.8	35.9	24.0	28.2	33.5	39.7
Credit growth	29.1	29.6	52.6	32.5	22.7	24.0
Budget deficit	4.6	1.6	4.0	4.6	2.9	2.6
Seigniorage	3.3	3.6	2.0	3.0	2.6	3.5
Nominal exchange rate	6.9	-0.4	21.8	0.0	0.0	0.0
Current a/c deficit	3.5	2.3	10.8	8.9	1.1	-0.0
Nominal wages	17.5	11.5	31.9	29.5	35.5	32.1
Productivity	11.8	8.5	6.3	5.9	7.0	9.9
Import prices: All items	6.9	25.9	40.2	-4.0	3.0	1.2
Petroleum*	-3.5	18.8	56.1	-8.5	-3.5	-6.6

* Chemicals, petroleum, and coal products
Sources: IFS, Major Statistics of the Korean Economy, 1990 (National Bureau of Statistics, Economic Planning Board).

The decision to emphasize growth during the first oil shock was also a decision not to fight inflation. On the cost side, the jump in inflation between 1973 and 1974 can be traced to higher import prices, and to wage inflation. In the absence of restrictive policy, and because unemployment increased very little, wage inflation continued at 30 percent in 1975 and 1976. The fixed exchange rate and declining import prices by contrast tended to reduce the inflation rate.

The growth policy was extremely successful, but the high inflation of 1974 and 1975, combined with a fixed exchange rate, led to a tightening of credit in 1976, as well as a shift to more restrictive fiscal policy. In

addition, price controls were imposed on both consumer and producer goods. Inflation slowed appreciably in 1976 and 1977, while growth increased, but wage inflation did not decline, in part because of Middle Eastern demand for Korean labor. The current account was in surplus in 1977. In 1977, the Korean approach to the oil shock appeared to be entirely successful.

However, after 1977 Korea began to display Latin American symptoms: the currency was increasingly overvalued[37], foreign borrowing was growing, and inflation was increasing. There was some tightening of monetary and fiscal policy in late 1978, but at the same time the heavy and chemicals industries investment drive pushed the rate of investment above 30 percent for the first time.

Table 17: Korean Inflation, 1978-84

	1978	1979	1980	1981	1982	1983	1984
GDP growth	9.7	7.4	-2.0	6.7	7.3	11.8	9.4
Inflation: CPI	14.4	18.3	28.7	21.3	7.2	3.4	2.3
GDP deflator	22.7	19.8	24.0	17.0	6.9	4.9	4.0
M2 growth	35.0	24.6	26.9	25.0	27.0	15.2	7.7
Credit growth	45.4	35.7	40.6	31.1	25.1	16.0	13.1
Budget deficit	2.5	1.4	3.2	4.6	4.3	1.6	1.4
Seigniorage	3.0	2.1	-0.6	-0.9	1.9	0.4	0.2
Nominal exchange rate	0.0	0.0	36.3	6.2	6.9	6.2	4.0
Current a/c deficit	2.2	6.4	8.5	6.7	3.6	2.0	1.5
Nominal wages	35.0	28.3	23.4	20.7	15.8	11.0	8.7
Productivity	11.6	15.3	10.7	16.8	7.3	12.9	10.0
Import prices: All items	4.1	26.6	27.5	2.4	-5.3	-4.2	0.3
Petroleum*	-4.6	47.0	12.8	-4.1	-2.8	-3.3	0.1

* Chemicals, petroleum, and coal products

Sources: IFS, Major Statistics of the Korean Economy, 1990 (National Bureau of Statistics, Economic Planning Board).

[37] In 1979, the dollar value of Korean exports declined.

For the first time in the modern growth era, inflation became a central concern of policy. Sang-woo Nam (1984) explains:

> As inflation accelerated, it became clear that sustained economic growth is simply impossible without curbing inflation. Weakening export competitiveness, unproductive activities of businesses preoccupied with inflationary gains, and the growing frustration of workers confronting a widening disparity in the distribution of income and wealth, all indicated that growth potential was being seriously undermined by chronic inflation.

Foremost among the reasons to fight inflation was the labor unrest caused by the increasing visibility of speculative incomes, especially in real estate and the stock market. The argument tying export performance to inflation appears to assume a fixed exchange rate; perhaps it is being implicitly argued that devaluation would have worsened inflation. In any case, by the end of the seventies, the Korean government had decided to fight inflation.

In April 1979, before the second oil price shock, the government adopted the CMES (Comprehensive Measures for Economic Stabilization) stabilization program.[38] The plan was to cut current government expenditures by 5 percent, and to cut back on investment.[39] Interest rates were raised and subsidized lending reduced. In addition, a price stabilization program was announced for necessities, including measures to expand domestic supply, improve distribution of foodstuffs, and liberalize imports.

This program was derailed by both the second oil price shock and the assassination of President Park. The oil price shock added to the

---

[38] We draw here on Nam (1984), and on Corbo and Nam (1991, Chapter 5).
[39] Corbo and Nam (Chapter III) show a reduction in the full employment deficit of about 1.5 percent of GNP in 1979.

effects of poor harvests in 1978 and 1979 to worsen the balance of payments. High world interest rates and the deteriorating debt situation meant that this time Korea could not go for growth and borrow its way through the second oil shock. The oil price increase was passed on to domestic prices directly. There was also a widespread diagnosis that the heavy and chemicals industries drive of the late seventies had been a mistake, and that the economy needed trade and domestic liberalization.

Early in 1980, the won was devalued by 20 percent, and shortly thereafter was tied to a basket rather than the dollar. To counteract the inflationary effects of devaluation, interest rates were increased by 5-6 percent, the loan rate increasing from 19 percent to 25 percent. The aggregate thrust of fiscal policy was essentially unchanged, but its micro details changed from supporting heavy industry towards small and medium-sized firms and residential construction. A poor rice crop and the collapse of external markets made 1980 the first year of negative growth in over two decades[40], while the price shocks kept inflation high.

There is little sign in Table 17 of a tightening of fiscal and monetary policies between 1979 and 1982, except for the reduction in seigniorage revenues. Fiscal policy tightened only in 1981.[41] Interest rates were raised in 1979, money growth declined, but the real volume of credit expanded in 1980 and 1981. The extra ingredient was incomes policy.

---

[40] GNP fell by over 5 percent, while GDP fell between 2 and 3 percent. The difference can be traced in large part to the impact of the devaluation on the value of net interest payments to foreigners. The sharp decline in agricultural output alone reduced GNP by 4 percent.

[41] All measures of the overall fiscal impulse show a significant tightening, by about 1.5 percent of GNP, in 1981. See Corbo and Nam (1991), Chapter 3, Table 8; and also Aghevli and Marquez-Ruarte (1985), Table 8.

Wage increases in the government sector were reduced in 1981, and 1982; by convention, and with the assistance of jawboning, the private sector followed. In addition, a mass education campaign, undertaken at the end of 1980, "stressed the need for restraining the demand for excessive wage increases and for a higher government purchase price of rice." (Nam, 1984).

Nominal wage growth and inflation continued to decline after 1982, along with the rates of growth of money and credit; at the same time the Korean growth machine revived. Inflation has stayed low since. Corresponding to the decline in inflation, seigniorage accounts now for only a small share of government revenues.

It took almost three years from the beginning of the comprehensive stabilization program in 1979 until inflation came down to the single digit range. That lag was in large part caused by the massive international shocks, as well as the domestic agricultural shock, that hit Korea between 1979 and 1982. By any standards -- and especially by Korean standards -- 1980 was a recession year. This invites the question of how much of the recession was due to anti-inflationary policies. To estimate the answer, we would need both to specify the alternative policy and a model to calculate the impact. One alternative would have been to accommodate the inflation, allowing inflation to rise by the extent of the price shocks of 1980. Such a policy would have produced a smaller recession in 1980, but we do not have a model that would allow us to calculate the tradeoff.[42]

---

[42]Corbo and Nam (1991) present a wage-price model, but it does not explicitly include monetary and fiscal policy. Unemployment is treated as exogenous, but the estimates of their Phillips curve show small effects of higher unemployment on inflation.

Contrasting the results of Korea's economic policies in the 1980-82 period with those of Latin American countries that accommodated the inflation, it is hard to believe there would have been a significant tradeoff over any long period. It is clear also that the authoritarian structure of policymaking in Korea significantly reduced the output sacrifice needed to reduce inflation.

Indonesia

After extreme inflation and a violent revolution in the mid-sixties, Indonesia was growing fast by 1968 and had single digit inflation by 1971 (Table 18 and Figure 7).[43] The stabilization was orthodox, with both the budget deficit and monetary growth being reduced

Table 18: Indonesian Inflation and Growth, 1965-72

	1965	1966	1967	1968	1969	1970	1971	1972
GDP growth	0.0	2.3	2.3	11.1	6.0	7.5	7.0	9.4
Inflation	596	636	111	84	10	9	4	26

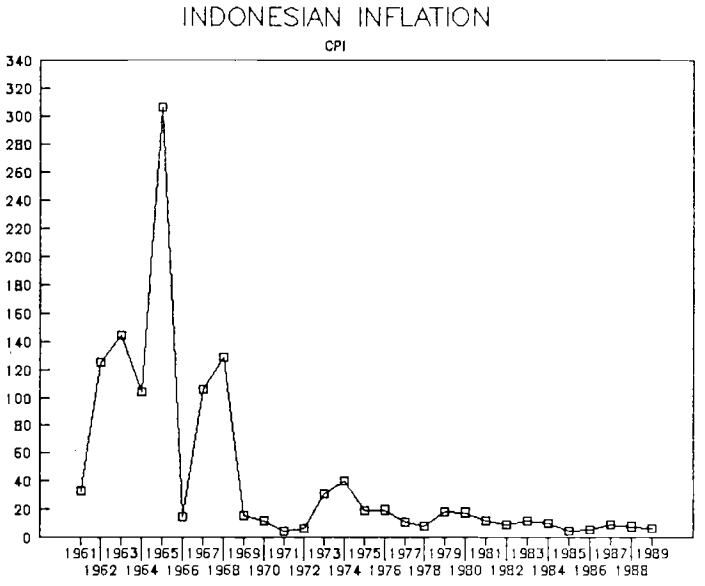
Source: GNP growth from IFS; inflation rate is year-end to year-end change in Jakarta CPI, from Gillis (1984), p.237.

rapidly.[44] The restoration of real balances after the hyperinflation, financial reform, and growing monetization in Indonesia in the period of rapid growth, permitted money growth rates well in excess of the rate of

[43]Both GNP and inflation data for this period are of poor quality; the CPI is based on Jakarta prices, but there are frequently large differences in inflation rates in different parts of the country.

[44]For descriptions of the Indonesian economy, see Glassburner (1971), Papanek (1980), Booth and McCawley (1981), Gillis (1984), Gelb and Glassburner (1988) and the regular reports on recent economic developments in the Bulletin of Indonesian Economic Studies.

FIGURE 7


INDONESIAN INFLATION
CPI
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989

growth of nominal GNP after 1968, and meant that seigniorage typically accounted for about 15 percent of total government revenues. In the early stages of the stabilization, until the end of 1968, the exchange rate floated; it was then pegged to the dollar, but with large devaluations in 1970 and 1971. Remarkably, capital movements were freed, and have remained free since 1970, despite an adjustable peg exchange rate.

Strictly speaking, Indonesia has not experienced any episodes of moderate inflation in the period since 1972. In the first oil price shock, inflation was above 30 percent for 1973 and 1974, and around 20 percent in 1975 and 1976; inflation was lower in the second oil price shock, in the moderate range for only two years. Given its inflationary history, it is easy to imagine that Indonesia could have gone into a prolonged inflation as a result of the oil price shocks; we study the first oil shock episode to discover how it avoided the inflation trap.

Because it is an oil exporter, Indonesia's budget benefitted

Table 19: Indonesia: the First Oil Shock*

	Real GDP	CPI	M2	Credit	Budget def.	Seignior-age	Current acc.def.
1972	9.4	6.5	48.6	33.7	2.7	2.7	3.0
1973	11.3	31.0	41.6	64.7	2.5	2.3	2.9
1974	7.6	40.6	40.4	41.3	1.6	2.9	-2.3
1975	5.0	19.0	35.2	47.6	3.9	2.2	3.6
1976	6.9	19.9	25.7	18.5	4.6	1.6	2.4
1977	8.8	11.1	25.3	45.2	2.1	1.8	0.2
1978	7.8	8.1	24.0	4.5	3.5	0.7	4.5

* Annual rates of change, for first four columns; last three columns are as percent of GDP.
Source: IFS

from the oil price increase (Table 19). It is clear from the table that in Indonesia, as much of the rest of the world, inflation was on the rise

before the oil price shock, which hit only at the end of 1973. Increasing rice prices, a result of rising import prices, inefficient domestic procurement policies, and a poor domestic crop, were a major factor in the 1973 inflation.[45] Rising export prices, the boom, and accommodating monetary policies, added to the inflation.

Indonesia is distinguished from other oil exporters by its relatively careful budget policies.[46] The budget deficit was not allowed to rise above 5 percent of GNP, even in 1976 when the real price of oil was x% below its 1974 level. Equally important, Indonesia used the oil windfalls mainly to finance investment spending. Thus while government spending was pro-cyclical, it was the investment component that fluctuated most.

A major stabilization program was initiated in April 1974. The monetary measures were conventional: interest rates were raised, reserve requirements doubled, foreign borrowing was taxed, and credit ceilings were imposed[47]. Fiscal measures were more complex: sales taxes on luxuries were raised while those on essentials were reduced; imports of rice and fertilizer were heavily subsidized; and it was decided to aim for a budget surplus (Arndt, 1974). Although Indonesia did not achieve a budget surplus, the deficit never rose out of control, and dependence on seigniorage was reduced.

---

[45]This episode is discussed in McCawley (1973).

[46]Gillis (1984) interprets the balanced budget rule that has been a principle of policy followed by the long-lasting Indonesian economic team.

[47]A 30 percent non-interest bearing deposit at the central bank was imposed against private sector foreign borrowing except for financing imports and for long-term borrowing.

In 1974, Pertamina, the national oil company, which had borrowed extensively and -- to avoid government constraints -- short-term, was unable to service its debts. The government assumed the debts and allocated nearly half of one year's oil revenues to their service, thereby in effect using oil revenues to increase net foreign assets, at the time when real oil prices were close to peak.

The anti-inflation policy implemented in 1974 gradually took effect during the next two years, although a budget surplus was not achieved. By 1978 the inflation rate was back to single digits. However, the real exchange rate had appreciated since 1973, and a major devaluation was undertaken in November, both to improve incentives for non-oil exports, and to increase the rupiah value of government oil revenues. This devaluation set off another round of inflation, but careful macroeconomic policies kept inflation at 18 percent in 1979 and 1980, close to 10 percent through 1984, and in single digits since then.

The Indonesian experience shows a government that both brought hyperinflation under control and prevented prolonged moderate inflation by following mostly orthodox monetary and fiscal policies, with some supply side fiscal elements thrown in. No doubt Indonesia benefitted from being an oil exporter, but as Mexican experience shows, being an oil exporter was not sufficient to avoid the inflationary virus. There was a slight slowdown in growth in 1975 as inflation declined, but essentially Indonesia was able to maintain high growth rates even while inflation came down.[48]

---

[48] In 1982 and 1985 there is some sign that counter-inflationary policy helped reduce growth -- though growth has not fallen below 2 percent per annum in the period since 1966.

Ireland

Ireland's inflation entered the double digit range during the first oil shock. Increased oil prices and a tight link to the collapsing pound were the main sources of higher inflation. The chief mechanism for translating supply shocks into increased inflation were sticky real wages. "National Wage Agreements" and "National Understandings" did more to protect real wages and relative wages than to help absorb real shocks without sharply raising inflation. The situation was aggravated by substantial wage gains in the public sector, which made it difficult for the private sector to resist wage inflation. Moreover, exchange rate policy was broadly accommodating. Rounds of inflation were followed by depreciation. And inflation accelerated sharply, reaching more than 20 percent in 1981-82 (see Figure 8).

Having pegged to sterling since 1922, Ireland abandoned the currency link with the U.K. and joined the EMS in 1979. Until the early 1980s the EMS had relatively little effect: frequent realignments were needed because the inflation differentials with Germany and other EMS partners were substantial. In fact, there were 7 EMS realignments in the 1980-84 period. But increasingly the EMS became more of a constraint, or at least was used as such by policy makers. Early 1982 marks the first case of an EMS realignment in which the Irish pound was not devalued (in terms of the ECU). The exchange rate peg became progressively firmer (see Figure 9).

A first factior in disinflation was the decline of external inflation. Specifically, Ireland's main trading partners, Great Britain, continental Europe and the US saw a major decline in their inflation rates.

FIGURE 8

IRELAND: INFLATION

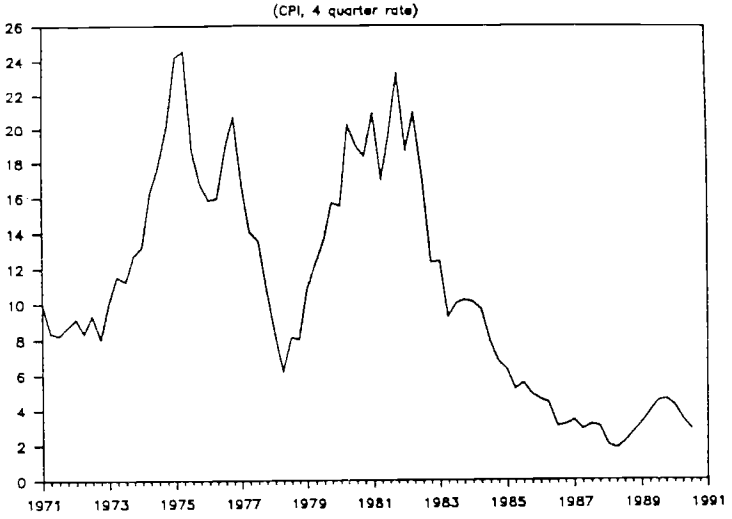
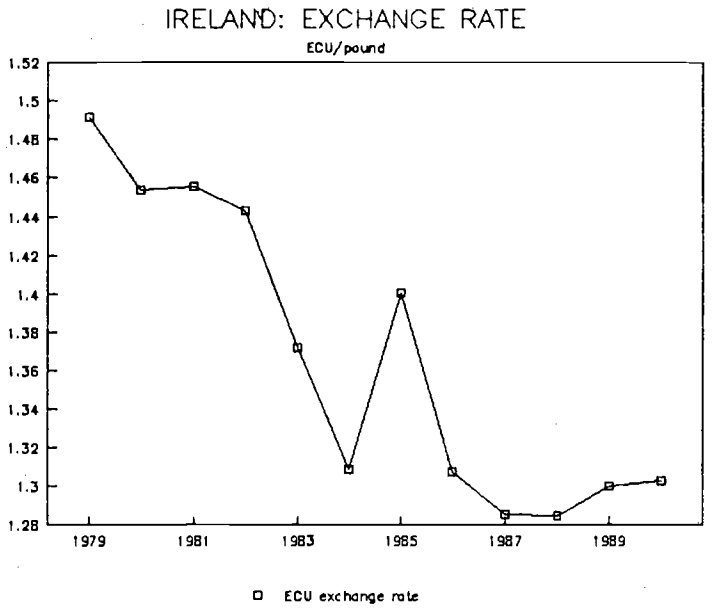


FIGURE 9


IRELAND: EXCHANGE RATE
ECU/pound
1.52
1.5
1.48
1.46
1.44
1.42
1.4
1.38
1.36
1.34
1.32
1.3
1.28
1979
1981
1983
1985
1987
1989
ECU exchange rate

continental Europe and the US saw a major decline in their inflation rates. Given the fixed exchange rate, declining foreign inflation tended to reduce inflation in Ireland. But most of the work was clearly domestic. There was a decisive turnaround on the budget in 1982: after one government fell on the budget issue, the new government returned the same budget and got it passed. Increasingly the view that fiscal discipline and stable exchange rates were essential ingredients for macroeconomic stabilization gained acceptance. Tight money supported the move to lower inflation.

Inflation stabilization did not come cheaply. As Table 20 shows, the unemployment rate rose from 9.5 to more than 17 percent between the early 1980s and 1987. A massive shift in the primary budget from a deficit of 4-8 percent to a surplus of 4 percent was behind the sharp cooling off in economic activity.[49] And the fiscal tightening was accompanied by a major increase in realized real interest rates, as a result of both declining inflation and tight money. With a stable exchange rate, budget tightening and increased real interest there could be no crowding-in. Unemployment was the result.

Table 21 Ireland's Stabilization

	Inflation	Unemployment	Budget[a]	Seigniorage	Real interest rate
1980-82	18.6	9.5	7.8	0.8	-1.7
1983-85	8.1	15.6	4.3	0.8	4.7
1986-88	5.2	17.5	-0.9	0.5	5.9
1989-90	3.5	14.8	-4.8	0.4[b]	
1991[c]	3.1	13.9	-4.5		

[a]Primary budget deficit [b]1989 [c]OECD forecast
Source: OECD and IFS

[49]Seigniorage revenue was small throughout, suggesting that seigniorage cannot have been a significant factor underlying inflation in Ireland.

But the unwavering commitment to disinflation did pay off: inflation came down to German levels by the end of the 1980s, after almost 10 years of disinflation. Even then, unemployment remained high and helped reinforce the anti-inflationary discipline of monetary and fiscal policy.

There is an interesting question to which no definitive answer is as yet available: did EMS participation help disinflation, over and above what monetary and fiscal policy accomplished?[50] There is no ready evidence of the kind a clear-cut, irreversible change in regime might produce, such as an immediate drop in long term interest rates reflecting a collapse of inflationary expectations. Rather, disinflation was a day-by-day affair and the question whether the currency would be devalued was always alive when EMS realignments came up. There is certainly a plausible claim that EMS membership helped secure the disinflation: without the EMS commitment, the government might at a number of points been more inclined to accommodate inflationary pressures or relent in its restrictive policies -- in brief, the EMS commitment served as a nominal anchor for policy.

This claim may well be right, but it must not obscure the basic message: through 1988, Ireland spent nearly a decade with record unemployment despite an extraordinary shift in monetary and fiscal policy. While Ireland undoubtedly did change the policy regime, there was no obvious credibility bonus for the government.

The Programme for National Recovery. By 1987 inflation had come down substantially, but the cost in terms of unemployment was extremely high.

---

[50]This is the argument Kremers (1990) advances and supports.

The Programme for National Recovery (PNR) was intended to substitute incomes policy for unemployment as a means of further disinflation. To keep inflation low, exchange rate depreciation had to be avoided, but inflation was still too high to sustain a fixed rate indefinitely. The PNR addressed this issue by an agreement between the Irish Congress of Trade Unions and the Federated Union of Employers, which cut rates of wage increase in half. These pay agreements were widely followed in private settlements. A 1989 survey showed that 97 percent of agreements were within the guidelines and that 78 percent of these agreements covered a 3 year period. In the public sector the pay agreements paralleled those for the private sector, except that they included a front-end 6 months pay pause.

Thus at the end of the 1980s incomes policy became a powerful means of combining lower inflation with economic recovery. Exchange rate policy fully supported the incomes policy: the exchange rate on the DM suffered no further realignment so that Ireland now had a hard currency. In 1988 it seemed questionable whether the policy could be called successful.[51] Unemployment was extremely high, real interest rates remained very high and the debt to GDP ratio was steadily climbing. By 1991 it was quite clear that Ireland had indeed turned the corner: growth was strong, inflation continued to be low and a consensus had formed around the new macroeconomic policies.

Spain

In the 1970s Spain had to grapple with the economic implications of the advent of democracy, the introduction of modern labor market

---

[51]For a highly pessimistic assessment of Ireland's prospects, written at the trough in 1988, see Dornbusch (1989).

institutions, and with the oil shocks. As a result, in 1977 inflation reached 25 percent. (See Figure 10). Social agreements combining politics and the labor market started with the Moncloa Agreements in 1977.[52]

Since then disinflation in Spain has brought into play the full range of instruments, from incomes policy to tight fiscal management, tight money, trade opening and a real appreciation (See Table 22). Joining the EMS in 1989 represented what was hoped to be the final measure to lock in disinflation.

Table 22 Spanish Macroeconomic Indicators

	Inflation	Real int. rate[a]	Primary budget[b]	Seignior-age[b]	Real ER[c]	Unemp. rate[d]	Employ. growth
1979-82	15.3	1.5		2.4	100	12.2	
1983	12.1	7.4	-4.2	na[e]	91	17.0	
1984	11.2	4.0	-4.1	0.9	96	19.7	-1.8
1985	8.8	2.2	-4.5	0.8	98	21.1	-0.9
1986	8.8	2.5	-3.0	1.5	97	20.8	2.2
1987	5.2	6.2	-0.5	4.9	100	20.1	3.1
1988	4.8	4.6	-1.0	1.4	104	19.1	2.7
1989	6.8	6.3	-0.1	3.1	109	16.9	2.2
1990	6.7	7.5	-0.9		116		1.2

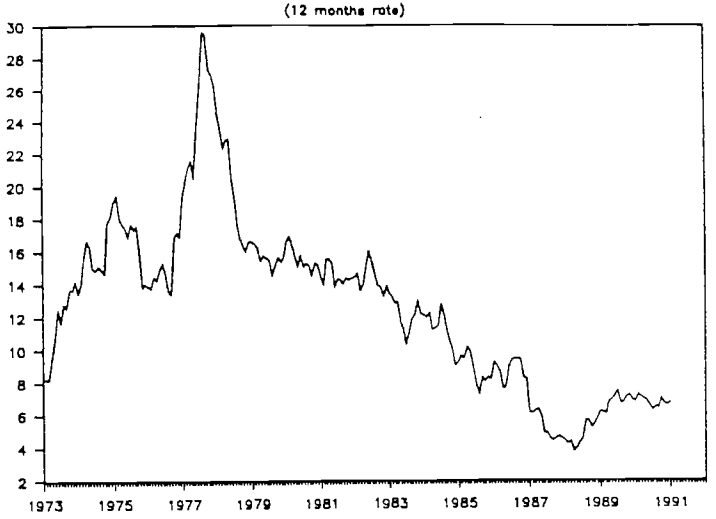
[a]Realized real T-bill rate [b]Percent of GDP [c]Index 1980-82=100 [d]OECD measure of the standardized unemployment rate [e]Change in data series.
Source: IFS, OECD and Morgan Guaranty

It is difficult, as in the case of Ireland, to disentangle which of the policy instruments played the dominant role. It is clear from Table 22 that unemployment was certainly a major factor, however imperfectly the unemployment rate measures slack in the labor market. With high growth of the labor force, negative or moderate rates of employment growth directly add to unemployment. But care must be taken in using the unemployment rate alone as a

[52]See especially Blanchard and Bentolila (1990), Coricelli (1990) and Jimeno and Toharia (1991).

FIGURE 10

SPAIN: THE INFLATION RATE



measure because of important changes in the structure of the labor market, notably significantly rising female labor force participation.

The rise in unemployment is not difficult to understand: monetary policy tightened very sharply with a shift, paralleling that in other countries, to realized real interest rates on Treasury bills from 1.5 percent in 1979-82 to more than 5 percent on average in the 1983-90 period. After 1985-86 a sharp tightening of fiscal policy reinforced the disinflationary stance of aggregate demand policies. Exchange rate policy also shifted to an unaccommodating stance in 1985 when the sustained real appreciation started.

Observers of Spain's disinflation place importance on the neo-corporatist industrial relations structure.[53] The basic proposition is that in a centralized industrial relations setting which involves joint bargaining among firms, the government and labor, better tradeoffs between inflation and unemployment can be realized than in a less structured setting where essential coordination issues go unresolved. In Spain's case explicit wage agreements as part of the concertacion social were particularly important in the period 1985-86. Specifically, the wage agreements provided for a sharp reduction in the rate of wage increase below the level of inflation in the preceding year, thus making it possible to push disinflation ahead, as in equation (9a). The cut in real wages, as a result of unemployment and wage agreements, thus serves as the disinflation mechanism.

---

[53]See Coricelli (1990) and Jimeno and Toharia (1991).

Table 23 Spain: Wage Contracts and Inflation

	Wage Contract	Inflation Current	Inflation Last Year
1983	11.4	12.1	14.4
1984	7.8	11.2	12.1
1985	7.9	8.8	11.2
1986	8.2	8.8	8.8
1987	6.5	5.2	8.8
1988	6.4	4.8	5.2
1989	6.7	6.8	4.8

Wage agreements were supported by a disinflation strategy involving exchange rate management and on the trade side. Figure 11 shows the real appreciation of the peseta since 1985. The progressive opening of trade required by Common Market membership created import competition that along with the exchange rate commitment increased domestic disinflationary pressure.

Although there is debate about the significance of the Spanish unemployment data, there is little doubt that Spanish disinflation, like Irish, involved a long hard slog. There was a sharp rise in unemployment as Spain moved out of the moderate inflation range in the early 1980s, and then prolonged high unemployment as the inflation rate was brought down to European levels. The exchange rate commitment no doubt helped maintain the resolve of the Spanish government, concertacion made the need for coordinated price and wage inflation reductions explicit, but they did not make possible a disinflation without tears.

IV. CONCLUSIONS

Most of the countries whose experiences are studied here, reached moderate or high inflation as a result of external, and particularly commodity price, shocks. Those countries that remained in the moderate inflation range after arriving there, notably Colombia and Chile, and for a shorter time

Mexico, did so only by taking decisive action to prevent inflation from rising at certain specific points. Brazil, which was not willing to slow growth to stay in the moderate inflation range, found itself as a result with high and sometimes extreme inflation.

Three of the countries that successfully disinflated to low inflation, Ireland, Korea, and Spain, did so at a significant output cost. Each of those countries used non-market measures, the equivalent of an incomes policy, to assist the disinflation. In the Korean case, wage growth was restrained through restraint over public sector wages and moral suasion on the private sector. Even in the Indonesian case, subsidization of rice constitutes an unorthodox incomes-type policy. There is little evidence in the data that the Indonesian disinflation imposed significant output costs.

Each of the disinflations was accompanied by a very strong fiscal contraction. Fiscal contractions were undertaken also in the Chilean and Mexican cases to reduce high inflation to the moderate range, and in Colombia to keep inflation moderate.

Countries in the moderate inflation range typically had flexible exchange rates. The European disinflators, Ireland and Spain, used an exchange rate commitment as part of their disinflationary strategy. Mexico likewise relied on an exchange rate anchor in bringing down high inflation. None of the evidence reviewed for this paper, nor evidence in other studies, establishes firmly that the exchange rate commitment significantly reduced the costs of disinflating.

Indexation and disindexation appears to have played an important role in the Latin American inflations and disinflations.[54] In Mexico, in the

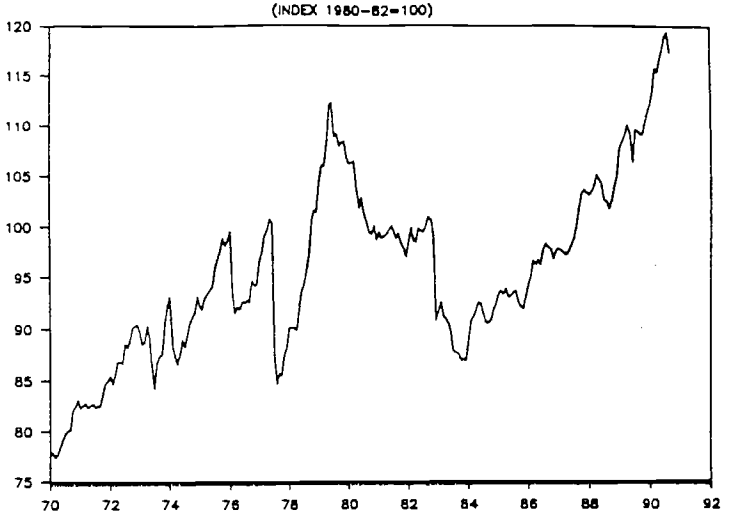
---

[54]In Italy (not reviewed here), disindexation of wages played a critical role.

FIGURE 11

SPAIN: THE REAL EXCHANGE RATE

(INDEX 1980-82=100)



context of the pacto, the departure from backward-looking pay increases was an essential part of the stabilization.

Colombia in effect decided to live with inflation by permitting the introduction of indexation. Neither Korea nor Indonesia used indexation widely, and nor did Spain or Ireland. Whether disinflation is easier in the absence of indexation, or whether the absence of indexation indicates a government's commitment not to live with inflation, is difficult to say at this point.

Seigniorage revenues accounted for a significant share of government revenues in most of the moderate inflation countries. Seigniorage was especially high at the start of most of the inflationary episodes. This affected the fiscal effort that had to be made to reduce inflation, but there is little evidence in the literature that seigniorage considerations played an important role in the thinking of any government. This absence may reflect a general lack of understanding of the inflationary process, or may rather mean that seigniorage is rarely an explicit reason for a government to pursue inflationary policies. We believe the latter interpretation.

In summary, countries typically find themselves in moderate or high inflations as a result of external shocks. It takes explicit counter-inflationary policies to prevent inflation from rising when the next inflationary shocks hit, so that moderate inflation is not a state in which economies stay without a government commitment to prevent further increases in inflation. Governments have successfully reduced moderate to low inflations, through a combination of tight fiscal policy, incomes policy, and generally some exchange rate commitment. But there is unfortunately little encouragement

in these case studies for the view that an exchange rate commitment, or incomes policy, allows a country to move at low cost from moderate to low inflation.[55]

APPENDIX

Table A-1 Experiences of Moderate Inflation
(15 to 30 Percent for at Least 4 Consecutive Years)

Country	Period	Avg. in Period	Avg. Before	Avg. After
Iceland	1986-90	20.9	48.6	-
Italy	1974-77	17.8	7.1	16.0
Spain	1974-80	19.8	9.3	13.7
UK	1974-77	18.2	8.6	13.2
Seychelles	1972-75	20.6	14.9	13.8
Zaire	1972-75	22.0	6.7	66.0
Mayanmar	1987-90	21.6	6.9	-
Greece	1979-87	20.7	12.7	15.6
Poland	1983-87	19.0	43.8	468.2
Portugal	1974-85	22.7	0.7	10.2
Turkey	1956-59	19.0	13.1	1.6
	1973-77	19.0	11.4	71.4
Yugoslavia	1971-75	19.3	7.9	13.1
Bahrain	1974-78	19.3	8.4	5.8
Egypt	1986-90	20.5	15.0	-
Iran	1980-83	20.8	16.5	11.8
	1986-89	24.5	12.2	6.5
Israel	1987-90	18.3	242.2	-
Argentina	1962-65	25.7	20.7	25.7
Bolivia	1987-90	15.3	4,435.8	-
Brazil	1968-72	20.7	45.9	23.1
Chile	1965-68	24.3	46.0	27.6
	1983-87	23.5	21.6	18.9
Colombia	1973-76	22.1	9.7	25.2
	1978-90	23.4	25.4	-
Costa Rica	1987-90	17.8	13.0	-
El Salvador	1987-90	22.0	21.9	-
Grenada	1977-81	19.6	-	6.5
Mexico	1974-81	21.7	7.4	75.4
Paraguay	1954-57	22.4	74.7	8.1

Source: IFS, various issues.

[55] We say "little" rather than "no" encouragement because Indonesia in fact stabilized at apparently low cost. Indonesia's governmental structure, level of economic development, and the relative unimportance of industry, mean that the precedent is not especially relevant to more industrialized and developed economies.

REFERENCES

Aghevli, B. and J. Marquez-Ruarte (1985). "A Case of Successful Adjustment: Korea's Experience during 1980-84". IMF Occasional Paper No. 39.

Andersen,T. (1989) "Credibility of Policy Announcements." European Economic Review. vol. 33, 1, 13-20.

Arndt, H.W. (1974). "Survey of Recent Developments", Bulletin of Indonesian Economic Studies, X, 2 (July), 1-34.

Bailey, M. (1956) "The Welfare Cost of Inflationary Finance". Journal of Political Economy.64 (2) April, 93-110.

Ball,L. (1990) "Credible Disinflation with Staggered Price Setting." NBER Working Paper No. 3555

------ (1991) "The Genesis of Inflation and the Costs of Disinflation." NBER Working Paper No.3621, February.

Barro,R. (1983) "Inflationary Finance under Discretion and Rules." Canadian Journal of Economics, 16,(1), 1-16.

------- and D.Gordon (1983) "A Positive Theory of Inflation in a Natural Rate Model." Journal of Political Economy 91,4, (August) pp.589-610.

Blackburn,K. and Christensen,M. (1989) "Monetary Theory and Policy Credibility: Theories and Evidence." Journal of Economic Literature Vol. 27, March, pp. 1-45.

Blanchard,O. and S. Bentolila (1990) "Spanish Unemployment." Economic Policy, 10, April, 234-281.

Booth, Anne and Peter McCawley, (1981). The Indonesian Economy During the Soeharto Era. New York: Oxford University Press.

Bruno, M. (1991) "High Inflation and the Nominal Anchors of an Open Economy." Princeton Essays in International Finance, No. 183.

Bruno, M. et al (eds.) (1988) Inflation and Stabilization. Cambridge,Mass: MIT Press

Bruno, M. et al (eds.) (1991) Lessons of Economic Stabilization and Its AftermathInflation and Stabilization. Cambridge,Mass: MIT Press

Cagan,P. (1956) "The Monetary Dynamics of Hyperinflation", in M.Friedman (ed), Studies in the Quantity Theory of Money. Chicago: University of Chicago Press.

Calvo,G. (1983a) "Staggered Contracts and Exchange Rate Policy." in J.Frenkel (ed.) Exchange Rates and International Macroeconomics. Chicago: University of Chicago Press.

----------(1983b) "Staggered Contracts in a Utility-Maximizing Framework" Journal of Monetary Economics 12,3, September 383-398.

Cardoso, E. and A. Fishlow (1990) "The Macroeconomics of the Brazilian External Debt" in J.Sachs (ed.) Developing Country Debt and Economic Performance Vol. 2. Chicago: University of Chicago Press.

Clavijo, S. (1990). "Stabilization Policies in Latin America 1984-88: Some Lessons for the New Decade", Central Bank of Colombia, mimeo.

Cole, D.C. and Y.C. Park (1983). Financial Development in Korea, 1945-1978. Cambridge, MA: Harvard University Press.

Corbo,V.(1985) "International Prices, Wages and Inflation in the Open Economy." Review of Economics and Statistics, Vol. 67,(November) 564-573.

------- and Sang-Woo Nam (1991). "Controlling Inflation: The Recent Experience of the Republic of Korea", Chapter V in V. Corbo and Sang-mok Suh (eds), Structural Adjustment in a Newly Inudstrialized Country: The Korean Experience, manuscript, World Bank.

------- and A.Solimano (1991) "Chile's Experience with Stabilization Revisited." World Bank, WPS 579.

Coricelli,F. (1990) "Industrial Relations and Macroeconomic Performance. An Application to Spain." WP/90/93, International Monetary Fund.

Dornbusch, R. (1989). "Credibility, Debt and Unemployment. Ireland's Failed Stabilization." Economic Policy April, 174-209.

--------- and S.Fischer (1986) "Stopping Hyperinflation: Past and Present" Weltwirtschaftliches Archiv, April.

-------- (1990). Macroeconomics (fifth edition). New York: McGraw Hill.

Dornbusch,R. F.Sturzenegger and H.Wolf (1990) "Extreme Inflation: Dynamics and Stabilization." Brookings Papers on Economic Activity, 2, 2-84.

Driffill,J. (1989) "Macroeconomic Policy Games With Incomplete Information." European Economic Review Vol. 32, 533-541.

Edwards, A. and S. Edwards (1987) Monetarism and Liberalization Cambridge: Ballinger

Fellner,W. (1982) "Shock Therapy or Gradualism." in W.Fellner et al. Shock Therapy or Gradualism? A Comparative Approach to Anti-Inflation Policies. New York: Group of Thirty.

Fender,J. (1990) Inflation. Ann Arbor: University of Michigan Press.

Fischer,S. (1977) "Long-Term Contracts, Rational Expectations, and the Optimal Money Supply Rule", Journal of Political Economy, 85, 1, 191-205.

--------- (1982) "Seigniorage and Fixed Exchange Rates: An Optimal Inflation Tax Analysis", in R.Dornbusch and M.Obstfeld (eds), Developing Countries in the World Financal Markets. Chicago, IL: University of Chicago Press.

--------- (1986) "Contracts, Credibility, and Disinflation", Chapter 7 in Indexing, Inflation and Economic Policy Cambridge,Ma: MIT Press.

--------- (1988) "Real Balances, the Exchange Rate, and Indexation: Real Variables in Disinflation", Quarterly Journal of Economics, 103, 1, 27-50.

Fishlow,A. (1974) "Indexing Brazilian Style: Inflatrion Without Tears." Brookings Papers on Economic Activity 1,pp.261-280.

Foxley,A. (1983) Latin American Experiments in Neo-Conservative Economics Berkeley: university of California Press.

Friedman,M. (1971) "Government Revenue from Inflation." Journal of Political Economy Vol. 79, No.4 (July/August), 846-856.

Fuhrer,J. and G.Moore (1990) "Monetary Policy Rules and the Indicator Properties of Asset Prices" in R.Porter (ed.) Asset Prices and the Conduct of Monetary Policy. Washington DC: Board of Governors of the Federal Reserve.

Gelb, Alan and Bruce Glassburner (1988). "Indonesia: Windfalls in a Poor Rural Economy", in A. Gelb (ed), Oil Windfalls Blessing or Curse?. New York: Oxford University Press, for the World Bank.

Gillis, Malcolm (1984). "Episodes in Indonesian Economic Growth", in A. Harberger (ed), World Economic Growth. San Francisco: Institute of Contemporary Studies.

Glassburner, Bruce (1971) (ed). The Economy of Indonesia. Ithaca: Cornell University Press.

Hommes, R. (1990) "Colombia", in J. Williamson (ed), Latin American Adjustment. Washington, DC: Institute for International Economics.

Jimeno,J. anmd L.Toharia (1991) "Spanish Labor Markets: Institutions and Outcomes." Mimeo, Universidad de Alcala de Henares, Madrid.

Keynes,J.M.(1923) A Tract on Monetary Reform, reprinted by the Royal Economic Society, 1971.

Kiguel,M. and N.Liviatan (1990) "Some Implications of Policy Games for High Inflation Economies." mimeo, World Bank, Country Economics Department, WPS 379.

Kremers,H. (1990) "Gaining policy Credibility for a Disinflation: Ireland Experience in the EMS." IMF Staff Papers Vol. 37, No.1 (March) 116-145.

Lipsey, R. (1990) (ed.) Zero Inflation. The Goal of Price Stability. Toronto: C.D. Howe Institute,

Lopez-Claros,A. (1988) The Search for Efficiency in the Adjustment Process. Spain in the 1980s. Occasional Paper No.57. Washington DC: International Monetarey Fund.

McCawley, Peter (1973). "Survey of Recent Developments", Bulletin of Indonesian Economic Studies, IX, 3 (Nov), 1-27.

Modigliani, F. and T. Padoa-Schioppa (1978) "The Management of an Open Economy with '100% Plus' Indexing", Princeton Studies in International Finance

Nam, Sang-woo (1984). "Korea's Stabilization Efforts since the Late 1970s", Korea Development Institute, Working Paper 8405 (March).

Papanek, Gustav F. (1980), (ed). The Indonesian Economy. New York: Praeger.

Persson,T.(1988) "Credibility of Macroeconomic Policy: An Introduction and a Broad Survey." European Economic Review, Vol. 32, 519-532.

--------- and G.Tabellini (1989) Macroeconomic Policy, Credibility and Politics Unpublished manuscript, UCLA.

Phelps,E. (1973) "Inflation in a Theory of Public Finance" Swedish Journal of Economics Vol. 75, 1, pp.67-82.

Ramos,J. (1986) Neo-conservative Economics in the Southern Cone of Latin America, 1973-83. Baltimore: Johns Hopkins Universirty Press.

Reserve Bank of New Zealand Monetary Policy Statement, various issues

Sargent,T. (1982) "The Ends of Four Big Inflations" in R.Hall (ed.) Inflation, NBER and University of Chicago Press.

Sargent,T. (1986) Rational Expectations and Inflation New York: Harper & Row.

Selody, J. (1990) "The Goal of Price Stability: A Review of the Issues." Technical Report No. 54, May Ottawa: Bank of Canada.

Simonsen,M. (1974) A Nova Economia Brasileira Rio de Janeiro: Jose Olympio

-------- (1986) "Indexation. Current Theory and the Brazilian Experience." in R.Dornbusch and M. Simonsen (eds.) Inflation, Debt and Indexation. Cambridge: MIT Press.

Taylor,J. (1980) "Aggregate Dynamics and Staggered Contracts." Journal of Political Economy 88, 1 (February) 1-23.

---------- (1982) "The Role of Expectations in the Choice of Monetary Policy." in Federal Reserve Bank of Kansas Monetary Policy Issues in the 1980s Kansas City.

---------- (1983) "Union Wage Settlements During a Disinflation", American Economic Review, 73, 5 (Dec), 981-993.

Tobin,J. (1980) "Stabilization Policy Ten Years Afterwards." Brookings Papers on Economic Activity 1, 18-71.

Urrutia, M. (1989) "The Politics of Fiscal Policy in Colombia", in M. Urrutia et al (eds), The Political Economy of Fiscal Policy. Tokyo: United Nations University.

World Bank (1984) Colombia: Economic Development and Policy under Changing Conditions. Washington, DC.