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STOPPING HYPERINFLATIONS  
PAST AND PRESENT

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Stopping Hyperinflations Past and Present

ABSTRACT

We examine four successful stabilizations from high inflation--Germany in 1923, Austria in 1922, Poland 1924-27, Italy 1947--and the two ongoing attempted stabilizations in Israel and Argentina, with the aim of identifying general lessons from those episodes.

The key issues in a stabilization are the budget, the exchange rate, and money. Budget deficits were significantly reduced in each case, but were not in all cases completely removed. The exchange rate was pegged in each case, though in all but the Italian case, each stabilization was also preceded by at least one episode in which attempted stabilization through exchange rate pegging was unsuccessful. As pointed out by Sargent and others, money growth rates were high after each stabilization, suggesting that any stabilization that strictly controls the growth of money will produce serious recession. A common feature of stabilizations is a period of extremely high real interest rates.

The modern attempts differ from earlier ones in using wage and price controls. They differ also in that the Argentinian and Israeli economies were in far better shape in 1985 than the classical hyperinflationary economies.

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STOPPING HYPERINFLATIONS PAST AND PRESENT.

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From Diocletian to Alfonsin, history is replete with attempts, some successful, to reduce the inflation rate and stabilize the currency. Each episode has been written about at length, the experiences of groups of countries at particular times--such as Europe after World War I, and Latin America between the World Wars--have been compared, but the general lessons have rarely been analyzed.<sup>2</sup> Our intention is to begin a systematic study with this prologue that sets out some lessons from well-known episodes, and that also examines the two major inflation stabilization programs of 1985, those of Argentina and Israel.

We start with a simple theoretical apparatus that develops the interactions of inflation, the budget and money growth, and the role of expectations. We then examine four historical inflation stabilizations, as well as the current Argentinian and Israeli attempts.

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<sup>1</sup>Department of Economics, MIT, and Research Associates, NBER. This paper was started during our visit to the Kiel Institut fur Weltwirtschaft, August 1985. Access to the outstanding collection of the library was invaluable; we would particularly like to thank Frau Gillam for her extraordinary helpfulness. Financial support from the National Science Foundation and a Guggenheim Fellowship to Fischer are gratefully acknowledged.

<sup>2</sup>The League of Nations' (1946) survey of post-World War I European experiences and Yeager et al (1981) do draw implications from their studies.

The 1923 stabilization of the German mark is surely the most famous of all stabilizations, and is certainly the economist's prototype. We start the descriptive section of the paper with an outline of the German stabilization, noting both the policy measures that were taken and the economic consequences of the stabilization. We then survey the Austrian and Polish stabilizations of the 1920's, and the Italian stabilization of 1947, before examining the ongoing modern attempts.

The type of issue with which we are concerned is whether success requires most or all of the following measures: an immediate reduction in the growth rate of money, fixing the exchange rate, fiscal reform, the prohibition of indexation, foreign loans, foreign supervision, a capital levy, the imposition or abandonment of price controls. We examine also whether currency reforms and stabilizations have typically been preceded by unsuccessful attempts, and followed by high real interest rates, real exchange appreciation, and recession.

Before proceeding to the review of individual experiences of inflation and stabilization it is worth spelling out some of the basic issues as they have been developed in the literature since at least the 1920s.

## 1. INFLATION, REAL BALANCES AND SEIGNORAGE

Cagan (1956) in his classical analysis of hyperinflations focussed on the interaction of money creation and expectations. In the Cagan model the demand for real balances depends on the expected rate of inflation,  $\pi^*$ . Using the Cagan demand function for money

$$(M/P) = e^{-\alpha\pi^*}, \quad \alpha > 0$$

where  $\pi^*$  is the expected rate of inflation and  $\alpha$  the semi-elasticity of money demand with respect to expected inflation, equilibrium in the money market over time requires that the growth in the supply of real balances equal the rate of growth in demand:

$$(1) \quad \theta - \pi = -\alpha(d\pi^*/dt).$$

Here  $\theta$  and  $\pi$  are nominal money growth and the actual inflation rate respectively. The model is completed by adaptive expectations

$$(2) \quad (d\pi^*/dt) = \beta(\pi - \pi^*)$$

Combining (1) and (2) yields an equation for the change in the expected rate of inflation:

$$(3) \quad (d\pi^*/dt) = (\theta - \pi^*) / (1 - \alpha\beta)$$

As is well-known, the stability of the inflationary process, given money growth, then depends on whether the coefficient  $(1 - \alpha\beta)$  is positive or negative. It will be positive and the inflationary process stable when  $\alpha\beta < 1$ , that is when money demand responds little to expected inflation and when expectations adjust sluggishly.

Black (1974) and Sargent and Wallace (1973) approached the money and inflation question from the point of view of rational expectations: when

expectations are rational and there is no uncertainty in the model,  $\pi = \pi^*$ . Therefore there should not be an independent expectations formation mechanism. Inflation dynamics would simply be given by (1) inverted to solve for inflation as a function of the money supply and its expected path.

$$(1a) \quad \pi = h(M/P)$$

Given a money supply process, for instance constant growth of money, there is typically an infinity of solutions for the price path, with only one of them not implying unstable price behavior.

Sargent and Wallace applied this model to the question of inflationary finance posed by Cagan. Equation (1a) is then supplemented by a model of the deficit. Let the real deficit be  $d$ .<sup>3</sup> The real revenue from money creation,  $(dM/dt)/P$  must equal the deficit, or the growth rate of nominal money equals the ratio of the real deficit to real balances

$$(4) \quad (dM/dt)/P = d$$

or

$$(4a) \quad \theta = d/(M/P) = d/m$$

where  $m = M/P$  is the level of real balances.

In the Sargent-Wallace model nominal money growth is endogenous since it is governed by the need to finance a given real deficit at whatever is the current level of prices. The model is completed by an equation specifying the evolution of real balances as the difference between nominal money growth and the rate of inflation

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<sup>3</sup>Both the demand for real balances and the deficit are expressed as a ratio to GNP.

$$(5) \quad \dot{m}/m = \theta - \pi = d/m - h(m) = f(m, d)$$

Bruno and Fischer (1985) have shown that there is typically a possibility of multiple equilibria because of the Laffer curve effect. Specifically, with the Cagan demand function they show the existence of two equilibria, the high inflation one being a stable solution under rational expectations. Figure 1 shows this result, using a slightly different graphical apparatus than theirs. The downward sloping LL schedule is the demand for real balances. The ( $m=0$ ) schedule is a rectangular hyperbola along which  $\pi(m) = d$ . There are two equilibria.

The stability of the two equilibria depends entirely on the nature of expectations formation, as Bruno-Fischer show. If expectations are rational, the high inflation equilibrium is stable, and the low inflation equilibrium unstable. If expectations are slowly adapting, the low inflation equilibrium is stable.

A further important implication of the model is immediately obvious from Figure 1. If the deficit is too large there will not be any steady state equilibrium. The ( $m=0$ ) locus moves to the right as the deficit increases, and eventually may not intersect the money demand equation at all. Hyperinflation would be a strong possibility.

We proceed from here with an extension to recognize some endogenous elements in the budget. Two points in particular matter institutionally. The first is that there is typically a given nominal debt that was issued as long-term debt at fixed nominal interest. The process of inflation will erode the debt and thereby erode the real value of debt service.<sup>4</sup> Inflation

<sup>4</sup>This was certainly the situation in the 1920's hyperinflations, and in the 1982 Argentinian debt wipe-out. It is more difficult when the debt is indexed or floating.

Inflation

P

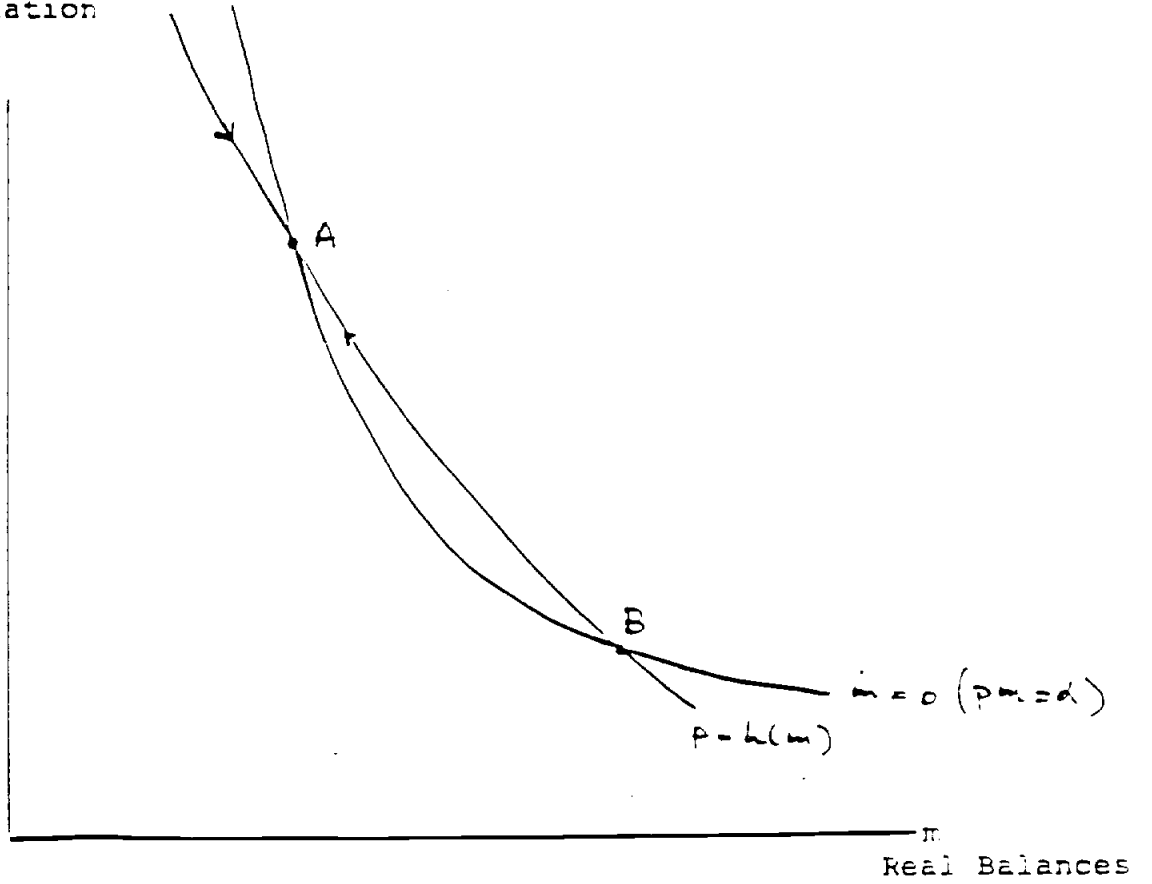


Figure 1



thus presents itself as a stabilizing force. On the other side inflation affects the real value of tax collection via collection lags. If there are fixed lags between accrual and payment of taxes, without indexation or interest payments, then a higher rate of inflation automatically means a reduction in the real value of tax collection. We formalize these two points by making the real budget deficit,  $d$ , a function of the real value of the debt,  $b=B/P$ , and of inflation:

$$(6) \quad d = d(b, \pi)$$

Under the assumption that the government is not borrowing, the dynamics of the real stock of debt are given by inflationary erosion of real debt:

$$(7) \quad \dot{b}/b = -\pi = -h(m)$$

Figure 2 is the phase diagram for this model, highlighting the interaction of inflationary money creation, debt erosion and the erosion of fiscal revenues. To the right of the  $(b=0)$  schedule there is inflation and hence a growing real debt, while to the left the debt is being eroded. The  $(m=0)$  schedule once again reflects the possibility of multiple equilibria. We assume here only two equilibria although now in terms of Figure 1 the budget constraint becomes more complicated since the real deficit that is to be financed by money creation depends both on the inflation rate and on the real value of debt. The tax erosion effect would reshape the budget deficit hyperbola in Figure 1 to a schedule lying further to the right of the hyperbola the higher the inflation rate. This creates the possibility that the high inflation equilibrium is removed. The existence of the debt shifts the budget deficit schedule, one schedule corresponding to each level of the real debt.

Figure 2 shows the case of two steady state equilibria each of which could be attained under rational expectations. One has a high rate of inflation and no debt, at A, the other has some residual debt outstanding and zero inflation.<sup>5</sup> Which equilibrium will be reached depends on the initial ratio of debt to money,  $b/m$ , and on the initial price level which can be thought of as a point on a ray through the origin. Of course, it is also possible that in the region to the left of JA an excessively high initial price level induces an ever-accelerating inflation.

The multiplicity of equilibria and paths in Figure 2 immediately poses the important theoretical issue of how hyperinflations originate. One view is that they simply represent transitory periods of debt liquidation and eventually self-correcting deficit finance. Another is that by some accident (or policy) the economy picks an unstable path. A particularly interesting possibility in this context comes from exchange rates which are not part of the model. Much of the literature, in particular the balance of payments theory of inflation, assigns a primary role to exchange rate collapse in bringing about hyperinflation. Whether or not the exchange rate is primary, there is no doubt that the dynamics of exchange rates affects price level dynamics. In terms of Figure 2, straining the model a bit, an exchange rate collapse could certainly throw the economy from a path heading toward B to another one leading to A or even to accelerating hyperinflation below JA.

A final point concerns deficits that are financed not only by money but also, in part, by debt. This introduces the distinction between fixed

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<sup>5</sup>Of course, there may be two zero debt equilibria, as in Figure 1.

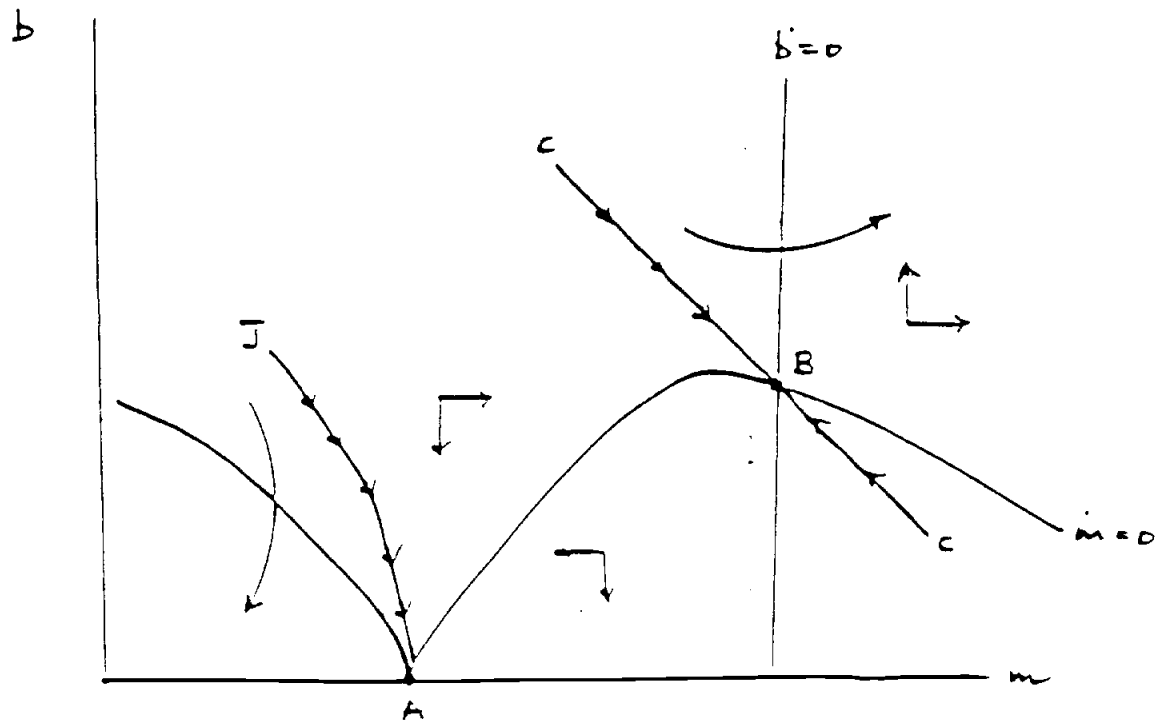


Figure 2

interest debt, issued (predominantly during wartime) before the inflationary episode got under way, and new debt that is issued at floating rates or in indexed form. With debt financing part of the deficit, the questions of debt dynamics arise, specifically whether the after tax real rate of interest exceeds the growth rate of real tax revenue.

## 2. THE GERMAN HYPERINFLATION OF 1923.

The German stabilization of November 15th 1923 is certainly the best known of them all. It brings up all the problems that could possibly arise in the stabilization context: budget balance and constraints on central bank monetization of deficits, the role of the exchange rate, external stabilization loans, interest rate policy. "The" lessons to be learnt from history are the lessons drawn from the German experience: that hyperinflation results from a collapse of the exchange rate for some; for others that deficit finance is the source of the trouble. The policy lessons follow: for some that exchange rate pegging is the key to stabilization; for others that it is budget balancing, brought about by legal restrictions on the stock of money, or the appointment of a strong central banker.

The German stabilization involved monetary and exchange rate policy decisions as well as balancing the budget, strongly suggesting that budget balancing is not the only consideration. It is true that all the successful inflation stabilizations involved budget correction. But so did some unsuccessful stabilizations where, even with budget movement in the right direction, early attempts at stabilization failed and only on the second or third try was there success.

The background for the German hyperinflation is, of course, World War I. During the War the level of prices had increased significantly for all major countries. The price increase was greater in Germany, by a factor of four, compared with 2.5 in the United States and the United Kingdom or 3.4 in France. More significantly, the budget deteriorated sharply, for four reasons:

- . reduced tax base and increased extraordinary expenses
- . increased debt service
- . reparation payments
- . inflationary erosion of tax revenues

The combined impact of these factors was to create a budget deficit which by 1920/21 was already 65% of total spending, not counting reparations. During 1922/23 the budget deteriorated further for two reasons. The French occupation of the Ruhr cut tax revenues and created large outlays associated with "passive resistance". At the same time accelerating exchange depreciation fed inflation and hence tax erosion. Taxes as a fraction of total expenditures fell to only 1.3 percent at the peak of the hyperinflation in November 1923.

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 Table 1. THE GOVERNMENT BUDGET, GERMANY.  
 (Million Gold Marks, fiscal year April-March)

	1920	1921	1922	1923		1924	1925
				April-Oct. Total			
Revenue	3275	2975	1508	588	2619	7757	7334
Outlays	9329	6651	3951	5278	9158	7220	7444
Deficit/ Outlays (%)	64.9	55.3	61.8	88.9	71.4	-0.7	1.5

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 Source: Baumgartner, Graham, Wirtschaft und Statistik

The German hyperinflation shows the clear pattern of massive deficits continuing for several years, leading to increasing inflation, increasing velocity and falling real tax revenue until some event leads to exchange rate collapse and hence a completely uncontrolled inflation. In Germany the critical event was the January 1923 French occupation of the Ruhr and the resulting charges on the budget.

Two stabilizations were attempted. The first took place in February-April 1923. The government simply fixed the exchange rate and used reserves, which were still significant, to sustain the rate. The policy was dramatically successful in the sense that exchange rate stability brought with it price stability. As is to be expected from the models of speculative attack the central bank in fact accumulated reserves as speculative inflows for a while sustained the exchange support.<sup>6</sup> But because the budget drain via the Ruhr expenses continued unabated, indeed increased, the exchange rate was ultimately unsustainable. The reserve drain became too large and the Reichsbank decided to save the remaining reserves. From May through November there ensued an ever-increasing inflation and depreciation. The monthly rates of exchange depreciation show this pattern:

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 Table 2: EXCHANGE DEPRECIATION, GERMANY 1923 (Percent per month)  
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May	June	July	August	September	October
95%	131%	221%	1307%	2035%	25957%

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Source: Wirtschaft und Statistik

The legal basis for the successful stabilization was an authority

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<sup>6</sup> See Krugman (1979) and Flood and Garber (1984) for models of speculative attack on a fixed exchange rate regime.

for emergency legislation. Under the authority the government created a new currency--the Rentenmark--and provided for restrictions on the monetization of deficits, increases in tax collection and cuts in outlays. The legislation for the Rentenmark was passed on October 15, 1923 and the new currency came into existence on November 15th 1923. From November 20th the exchange rate was fixed.

The details of the reform were:

. The Rentenbank was set up as a new bank of issue. Its total issue was to be limited, and covered by claims on industry and agriculture. Only part of the issue was to accrue to the government as a once and for all allocation, in part earmarked to retire the floating debt and thus to improve the budget directly. Note here an important feature of stabilizations, the potential use of a once and for all issue of the new money to retire public debt and to cover the government's deficit until fiscal reform takes hold.

. The Reichsbank had until November discounted government debt and thus financed the deficit. It had also discounted private debt at well below market rates, thus avoiding crowding out and aggravating the external deficit. The new legislation provided that the Reichsbank could no longer discount government paper and that note issue had to be backed by a 30% gold cover.

. After currency issue had ceased, the currency, subject to exchange control, was depreciated from 1.26 billion marks/\$ on November 14 to 4.2 billion marks/\$ on November 20, thereby reducing the real money supply massively and raising the gold cover of the remaining stock of money toward 100%.

. Issue of Notgeld (scrip) was restricted and the existing stocks were to be phased out over time.

. Taxes were anticipated (to be paid in advance) and valorized (fixed in real terms) and regulations were passed to achieve economies in government enterprises. Payments for relief of the unemployed in the Ruhr were reduced.

The reform took hold immediately. Prices stopped rising virtually at once.

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 Table 3: PRICES AFTER THE STABILIZATION, GERMANY.  
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	1923		1924					
	Nov.	Dec.	Jan	Feb	March	April	May	June
WPI	100	89	85	84	87	90	89	84
Mark/\$*	270	140	137	142	141	141	136	132

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 \*November 15th, 1923 = 100.  
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The halt to the increase in prices meant increasing real tax revenues. The anticipation of taxes, economies in government and the payments of taxes arranged in August and September all combined to turn around the budget virtually immediately. (See Table 1 above).

The monetary reform shows up in the changed picture of the money supply. Whereas in the pre-reform phase paper money was predominant, significantly more of the means of payment in the post/November period were of the constant purchasing power variety



Table 4: COMPOSITION OF THE MONEY SUPPLY, GERMANY 1923/1924  
(Millions of goldmarks)

	1923			1924	
	10	11	12	6	12
Paper	176	518	608	1097	
Wertbest.	124	1066	1666	1837	
Total	300	1585	2274	3129	4274
Index 1913=100	5.0	26.1	37.5	51.5	70.3

Source: Wirtschaft und Statistik See also p.67, 1925 for annual comparison 1913 to 1924 on total money stock. "Wertbest(aendig)" indicates indexed money, mainly to gold.

The exchange rate was effectively sustained by extremely high interest rates. In the month of December, in the face of price stability, interest rates reached 10 to 20% per day. Even by the end of December the interest rate was still more than one half percent per day. The average annual rate for January 1925 was still as high as 88 percent.

An interesting episode occurred in April 1924. The Central Bank had allowed its discount of private bills to expand significantly. As a result the exchange rate came under pressure in foreign markets and the discount started to reduce confidence in the stabilization. The Reichsbank responded with a dramatic rise in interest rates and curtailment of credit. The exchange rate was sustained at the cost of a rise in unemployment.

The interest rate pattern in 1923, using the monthly rate, confirms the role of tight money in coping with the confidence crisis. The rates ~~shown~~ are monthly, the rate being indexed (wertbestaendig)

1923,I	1923,II	1923,III	1923,IV
26.9	40.5	19.5	11.5

How was the stabilization achieved? Clearly the budget was turned around, but that means a shift in the form of taxation from seignorage to outright taxation. It is not even clear, distribution effects aside, whether the increased open taxation would have any adverse effects on aggregate demand. High real interest rates clearly helped both in suppressing demand, and sustaining the exchange rate. So without any question did the political stabilization which meant less conflict in the Ruhr and, later in the year, access to foreign loans.

The unemployment effects associated with the stabilization can be seen in Table 5. The data refer to the fraction of union members unemployed.

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Table 5: UNEMPLOYMENT IN GERMANY, 1923-1924.  
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Sept. 1923	Nov. 1923	Jan. 1924	April 1924	Oct. 1924
9.9%	23.4%	26.5%	10.4%	8.4%

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The other interesting feature is the behavior of real wages. It is definitely not the case that the stabilization was achieved by a cut in the real wage. While real wages in 1923-24 were significantly below their pre-war levels they did rise after the stabilization as the accompanying data show.

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Table 6: GERMAN REAL WAGES  
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	1913	Aug. 1922	Oct. 1923	Dec. 1923	June 1924
Skilled	35.0	25.2	18.2	24.5	31.3
Unskilled	24.3	22.7	15.7	20.7	23.9

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Source: Wirtschaft und Statistik

The recovery of real wages in the period after the stabilization of course reflects a real appreciation. A significant fact in the German stabilization is the real appreciation of the exchange rate that resulted once the lag of wages and prices behind the exchange depreciation stopped. That process got under way in November 1923 and lasted well into 1924.

Of the puzzling questions about the German experience the most interesting surely is how the economy could withstand such extremely high real interest rates in the post-stabilization phase without a much larger collapse of economic activity. That point is reinforced when we recognize the effect of reduced inflation on corporate finance. Firms that were collecting taxes and benefitting from the delay in making payments were in fact receiving subsidized loans from the Treasury. This would apply, for example, to withholding taxes. With the end of inflation this subsidized form of credit vanished, thus raising the average cost of capital. The failure of the extremely high real rates to cause a depression may be due to the virtual vanishing of external financing in the hyperinflation. This must be the case for bank credit since banks (along with money) had shrunk dramatically.

The other question is how to think of the high interest rates. One view is to link them via international capital mobility to rates abroad. In that approach the high rate denotes expected collapse of the reform. The alternative deemphasizes international capital flows and sees the high rate as a reflection of the disappearance of real balances. The high exchange rate, relative to the stock of money would keep real balances low and hence

interest rates high. The two mechanisms might also be linked. The issue is of interest because it comes up in the same way in many countries, including at the present time Argentina and Israel.

## 2. THE AUSTRIAN STABILIZATION, 1922.

The Austro-Hungarian empire was broken up in the aftermath of World War I and Austria emerged with much of the public debt and few of the productive assets.<sup>7</sup> Among the unproductive assets was most of the bureaucracy that had run the Austro-Hungarian empire, and that was still on the public payroll. With food production in the former empire down, each successor state sought to prevent the export of food, and even within Austria the provinces tried to prevent the shipment of food to Vienna. Hunger and economic disruption during and after the War led to governmental instability, with the example of soviet republics in Budapest and Munich making budget balance a low priority.<sup>8</sup>

The budget deficit, shown in Table 7, was increasingly financed by credit creation and thus brought about inflation and currency depreciation.

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<sup>7</sup>See "Die Sanierung Oesterreichs" in Wirtschaft und Statistik, 1923, pp.155-159.

<sup>8</sup>Van Walre de Bordes (1924), Chapter 1, describes the political and economic background of the hyperinflation. See also Yeager (1981) pp.45-52.

Table 7: THE AUSTRIAN BUDGET, 1919-1923.  
(Millions of Gold Crowns)

	1919	1920	1921	1922	1923*	
					3 Qtrs	Year
<u>Deficit:</u>	676.4	922.7	462.9	616.8	111.4	
Tax Receipts	632.3	166.0	197.0	116.0	255.1	401.9
Expenditure	1308.9	1088.7	659.9	732.8	366.5	
<u>Financing:</u>						
External	118.1	454.6	63.4	331.8	111.4	
Domestic	558.4	468.1	399.5	285.0	-	

Source: Wirtschaft und Statistik

Note: Calculated via the dollar exchange rate, 14.4 Paper Crowns=1 Gold Crown. \*3 Qtrs are first 9 months.

The stages of the inflation and stabilization can be seen in Table 8 and Figures 3 and 4. With tax receipts financing less than 20% of spending in 1920, money growth and inflation in that year were rapid. The price level increased by 80%, the stock of bank notes increased three fold, and the exchange rate depreciated to a similar extent despite a period of appreciation in the middle of the year. But it was in 1921 that the inflation began to reach hyperinflationary levels, with prices rising sixfold in the second half of the year, and the exchange rate by a factor of 5 over the same period. Inflation increased in 1921 even though the budget deficit was reduced by cutting expenditure. The increase in inflation eroded tax collection and led to rapid rates of increase of the stock of notes.

Figure 3  
PRICES AND THE EXCHANGE RATE IN AUSTRIA  
(Logarithms)

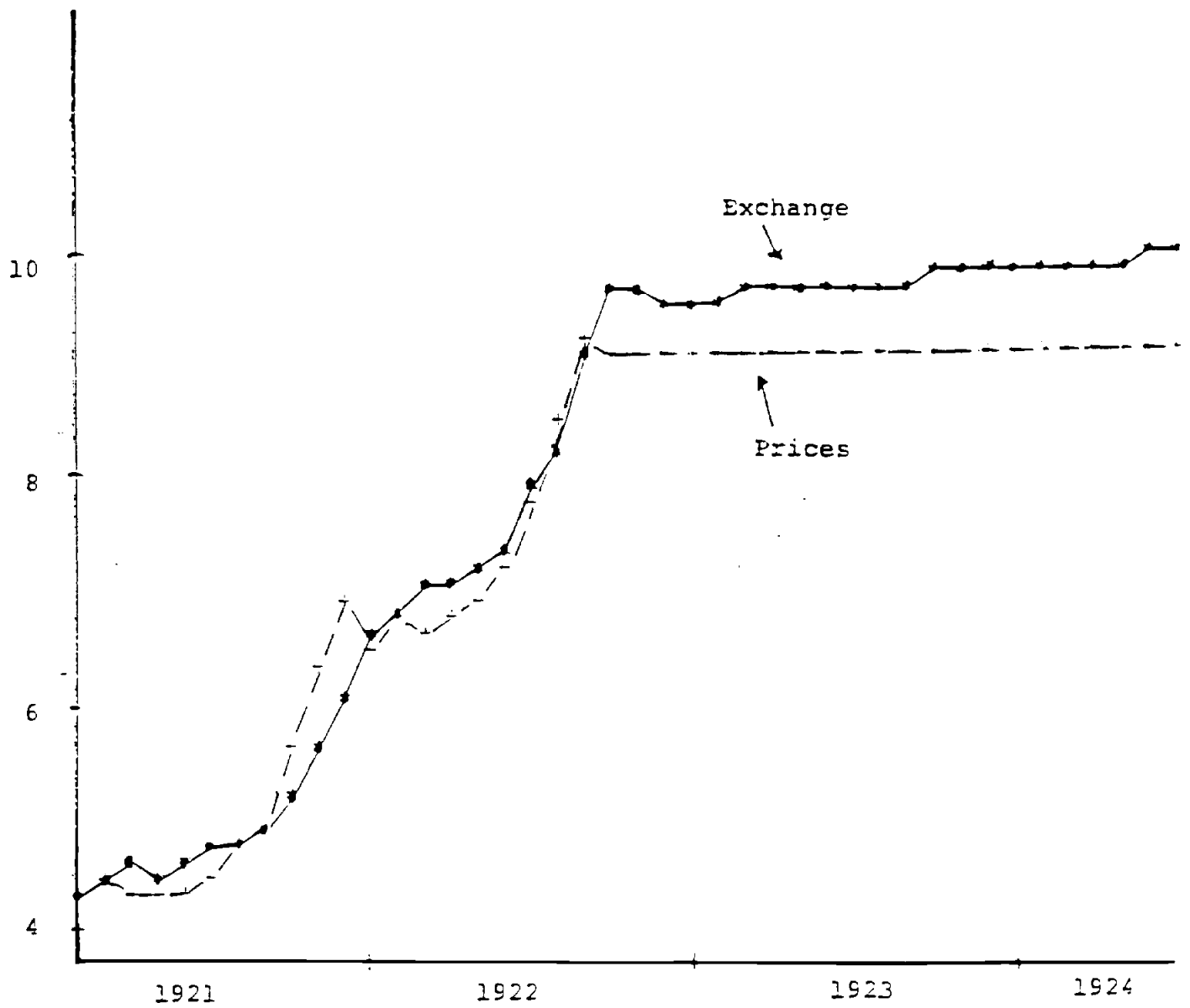


Table 8: THE AUSTRIAN INFLATION AND STABILIZATION.  
(Percentage change over previous 3 month at monthly rates)

	Depreciation	Inflation	Money Growth	
			Notes	Deposits
<u>1921</u>				
June	9.1	7.1	6.6	
September	26.0	12.8	12.2	
December	35.7	63.6	35.4	
<u>1922</u>				
March	38.7	15.6	20.4	
June	30.8	31.9	21.8	9.4
September	68.5	81.8	60.6	21.3
December	0	-4.7	21.4	51.6
<u>1923</u>				
March	0	1.5	3.0	26.9
June	0	4.0	6.8	14.6
September	0	0.8	4.6	11.1
December	0	1.4	4.6	10.4

Source: Young(1925)

Note: Deposits at the end of 1923 were equal to one tenth of note circulation.

Inflation fell to 15% per month in the first quarter of 1922 but then accelerated until in the third quarter it was at an annual rate of 130,000%. The exchange rate likewise depreciated rapidly in the third quarter of 1922. A key point in the inflationary acceleration was the June 1922 decision to accord monthly wage indexation on the basis of the previous month's inflation.

Contemporary accounts emphasized the role of the exchange rate in the inflation process.

E- "The foreign exchange rates were a guide to the probable movement of prices. The first question which the Austrian population asked every afternoon was 'How are the foreign exchanges moving?' or more exactly 'What does Zurich say about the crown?' ('Wie kommt die Krone aus Zurich?')"<sup>9</sup>

<sup>9</sup> Van Walre de Bordes (1924), p. 197.

The argument was that the exchange depreciation drove domestic prices, which in turn drove the money supply. Whether this was the case or whether instead or in addition future price developments first moved the exchange rate we cannot say at this stage, but the question remains an important one for future research.

Stabilization came suddenly and decisively in August 1922. A new government under Seipel had taken office in May 1922. Monsignor Seipel, an accomplished politician, soon began negotiations for a foreign loan. The stabilization occurred when the success of the negotiations became expected, and before an agreement on the loan--to be guaranteed by Britain, France, Czechoslovakia, and Italy--was complete. It was known though that there would be foreign supervision of the terms of any agreements.

Key steps toward stabilization occurred before late 1922. The most important was the elimination in late 1921 of food subsidies, which had been a major drain on the budget. In 1920, the Austrian Section of the Reparation Commission produced the "Goode Scheme", proposing that Austria receive a loan as it reformed its public finances, but the Allied governments refused. In June 1921 the League of Nations Financial Committee had recommended a stabilization loan for Austria. But complications, including United States Congressional delay in dealing with the issue and Austrian unwillingness to accept foreign supervision, made the negotiations collapse. In March 1922 the exchange rate was stabilized for a month with the help of a British loan, but this was not enough to stabilize prices and the inflation and exchange depreciation went into their final spiral.



At this stage the Austrian government threatened to give up. In August 1922 in appealing to the Supreme Council of the Allied Powers for aid the Austrian Minister in London wrote

If against all expectations this last hope were also to prove chimerical the Austrian Government ... would have to call together specially the Austrian Parliament and to declare ... that neither the present nor any other Government is in a position to continue the administration of the State.<sup>10</sup>

After an initial rejection of the appeal, negotiations for a loan began in August and were completed in October. A loan of 650 million Gold Crown became available, first as collateral, and in 1923 in fact. The conditionality that went with the loan was tight indeed: the government was to be given emergency powers to implement budget reform and was to set up a new and independent central bank. A League of Nations commissioner was appointed to monitor the implementation of the reform.

The statutes of the new central bank excluded financing of the government except against deposit of an equal amount in gold. Note issue was to be covered by a 20 percent reserve ratio for the first five years, rising later to one-third.

Just the prospect of the loan was sufficient to stabilize the exchange rate on August 25; prices reached their highest level on September 15. Stabilization was complete, to the extent that the crown appreciated more than 16% by the end of 1922.

The Austrian stabilization is interesting because it took place without the budget coming into immediate balance (see Table 10). On the

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<sup>10</sup> Van Walre de Bordes, p.27.

strength of the forthcoming League of Nations loans and after legislation to implement the terms of the loans, the government raised a domestic gold crown denominated loan. Since the external resources were expressly designed to bridge the budget gap in the first two years it is not surprising that the government was able to continue running a deficit, albeit a sharply reduced one. The central bank issued money backed until November by government paper, later by monetisation of government gold (Table 9), received from the liquidation of the Austro-Hungarian Bank and foreign exchange inflows.<sup>11</sup>

Table 9 THE CENTRAL BANK BALANCE SHEET, AUSTRIA.  
(Millions of Gold Crowns, end of month)

	Notes	Gov't Paper	Private Credit	Gold
<u>1922</u>				
September	150.6	65.9	51.8	50.5
October	199.8	93.1	58.9	30.6
November	231.9	173.7	48.9	32.1
December	285.3	178.9	54.7	25.0
<u>1923</u>				
March	309.7	177.0	57.4	110.8
June	383.4	177.0	51.0	203.0
September	435.5	177.0	60.3	249.3
December	498.3	177.0	92.5	305.1

Source: Wirtschaft und Statistik and Young(1925)

Even though the government deficit was not corrected immediately the budget correction proceeded rapidly and indeed ahead of schedule. For the

<sup>11</sup> It is obvious ex post that the stabilization was a success. It was not obvious at the time: van Walre de Bordes writing in 1924 describes episodes of loss of confidence in October 1922 and early 1923. Confidence was secured when the gold reserves of the Central Bank began to increase from the beginning of March 1923.

first 9 months of 1923 tax receipts ran 24 percent above the targets agreed with the League and expenditures remained 2 percent below the agreed ceiling. As a result the deficit reached only 61 percent of the level that had been anticipated.<sup>12</sup> A major reason for the extremely good performance was the rapid increase in real tax collection resulting from price stability.

Strong private speculative support developed for the program once the fiscal correction was under way and especially when the external loans were received. As a result the Central Bank was soon supporting the exchange rate against appreciation. The strong private support was, no doubt, in part due to the fact that other countries were undergoing increasing instability. Certainly Germany and Poland were well into their hyperinflations at the time Austria had established stability.

As in other countries, the stabilization was followed by a rapid rate of increase of the money stock. The supply of banknotes increased by 287% over the year starting September 7 1922, and by 75% during 1923. The 1923 increase was based almost entirely on an increase in the Central Bank's gold holdings.

Unemployment rose sharply from September 1922 to March 1923, and thereafter fell steadily.<sup>13</sup> The stock market boomed from early 1923 as both repatriated and foreign capital came into the economy.

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<sup>12</sup> See Wirtschaft und Statistik, 1923 p.156

<sup>13</sup> Van Walre de Bordes (p.218) shows unemployment rising from 31,000 in August 1922 to 167,000 in March 1923. The coverage of these data is not indicated; the population of Austria was 6 million, indicating a labor force in the vicinity of 2 million. The unemployment data are presumably only partial, perhaps in Vienna.

#### 4. THE POLISH STABILIZATIONS, 1924-1927.

Poland was set up in the aftermath of World War I in the intersection of four monetary areas. The occupying Germans had instituted a Polish mark; in western Poland the German mark circulated, in Galicia the Austrian crown, and in eastern Poland the Russian ruble. Each of these four currencies was about to suffer a hyperinflation.

The new government succeeded by 1920 in replacing the foreign currencies and instituting the Polish mark as the medium of exchange and sole legal tender. The Polish mark was issued by the Polish State Loan Bank, which operated under the authority of the Finance Minister. Poland was at war with Soviet Russia until 1920. Tax collection was small, and the printing of marks the main method of financing.

Table 10 shows monthly rates of increase of the wholesale price index, the exchange rate and the currency stock over three-month periods from 1921 to 1924.<sup>14</sup> A hyperinflation was already under way by the beginning of 1920: the mark had depreciated against the dollar by a factor of 30 from the middle of 1919 to the end of 1920, while the currency stock had risen over the same period by a factor of 40.<sup>15</sup>

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<sup>14</sup>The use of monthly rates conceals the extremes to which annual rates had risen. A monthly rate of increase of 40% compounds to 5570% per annum; the 169% per month inflation of the last quarter of 1923 is above 14 million % per annum.

<sup>15</sup>The data in Table 10 do not imply a decline in real balances over the period 1921 to early 1924. With real note holdings equal to 100 in January 1921, they were 40 in December 1923, but 112 in April 1924, where the calculation is based on data reported in Sargent (1982), pp 67-70.

The First Attempt: Despite rapid depreciation of the mark, the inflation rate was lower in 1921 than in 1920. In September the Finance Minister was given extraordinary powers to deal with the economy. His plan was to work on both the supply and the demand sides, providing assistance to industry on the supply side, reducing government spending and imposing a capital levy on the demand side. The ensuing budget surplus would be used to withdraw half the currency in circulation.

The stabilization attempt reduced the price level, and produced a 20% real appreciation of the Polish mark<sup>16</sup> in the last quarter of 1921. The stabilization attempt was followed by unemployment<sup>17</sup> and by strikes as employers tried to cut wages. The real wage in industry increased in the last quarter of 1921, never again to fall to the low levels it had reached in the third quarter of 1921.

The government maintained a small budget deficit through the first quarter of 1922, but then did not carry through on its budget plans, and as Figure 5 shows the deficit increased from the second quarter of 1922. Currency growth stayed remarkably low relative to earlier levels, and up to the middle of the year was entirely consistent with the increase in the demand for money that would have occurred had stabilization been achieved.

<sup>16</sup>Yeager et al (1981) p.68 imply that the mark continued appreciating through June 1922. The underlying data show a sharp appreciation at the end of 1921 followed by (mostly) depreciation. The monthly data in Young (1925) p.351 for the dollar exchange rate in New York and International Abstract p.170 for the rate in Warsaw show substantially different patterns. In both though, the May 1922 exchange rate is higher (more appreciated) than its fall 1921 peak.

<sup>17</sup>Unemployment data from the Statistisches Jahrbuch fur das Deutsche Reich reported in Sargent (1982) p.72 indicate a tripling of unemployment from September 1921 to February 1922, but the total numbers unemployed are so small that the data must refer to only part of the labor force.



But from the middle of 1922 the deficit increased sharply, and the rates of inflation, currency growth and depreciation returned to the 20% per month range.

For the remainder of the hyperinflationary period, the exchange rate and the price level moved very closely together. There is a broad, though not precise, correspondence between the rate of currency growth and inflation or depreciation over the period.

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Table 10: CURRENCY GROWTH, INFLATION, AND DEPRECIATION, POLAND, 1921-1924.  
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	Currency growth	WPI inflation	Exchange depreciation
June 1921	11.5	2.5	40.0
Sep. 1921	14.2	19.4	44.8
Dec. 1921	14.5	-1.8	-22.3
Mar. 1922	3.0	8.8	10.6
June 1922	6.2	6.1	4.4
Sep. 1922	15.6	20.2	23.8
Dec. 1922	19.6	31.5	27.4
Mar. 1923	32.4	41.8	33.3
June 1923	24.7	23.9	33.9
Sept 1923	46.4	33.5	46.4
Dec. 1923	123.7	169.1	170.6
Mar. 1924	68.2	19.9	13.9

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Sources and Notes: 1. Data are monthly rates of change over the three months preceding month shown. 2. WPI is from Young (1925); other columns are from International Abstract of Economic Statistics 1919-1930, International Conference of Economic Services, London, 1934 (henceforth International Abstract.) 3. Currency column is based on data described as "Money in circulation" in International Abstract, and as "Note circulation" by Sargent (1982).  
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Expansion in the note issue in the period to early 1924 was caused by the budget deficit.<sup>18</sup> The large increase in the deficit in 1923, seen

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<sup>18</sup>Young (1925), Vol. II, p165 shows advances to the government and notes in circulation increasing essentially in lockstep from mid-1919 to early in 1924.

in Figure 5, led to the rapid money growth that triggered the final hyperinflationary outburst<sup>19</sup>, further labor trouble, and the reform program.

The Second Attempt: The Grabski government of experts took office in December 1923, with Grabski also holding the Finance Minister post. Parliament again ceded power to deal with the economic situation to the government. Grabski first restored order to the tax system by raising and "valorizing" taxes, that is indexing them to the price of gold.<sup>20</sup> There was to be an extraordinary property tax (a capital levy) for the years 1924-1926. The effect on the budget deficit was immediate, to the extent of creating a small surplus in April 1924. The improvement came from increased taxes rather than reduced spending.

The mark exchange rate was stabilized from January 1924, even though rapid money supply growth continued. The stabilization was achieved by devaluing drastically, and by intervention in the foreign exchange market. With the budget deficit under control, the government was able to announce in February that it would not issue bank notes to cover its spending. The notes that were issued were used to acquire foreign exchange and to make loans to industry. The government early in 1924 floated a small domestic loan, and borrowed in Italy<sup>21</sup>, success in the latter effort being regarded as a sign of foreign confidence.

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<sup>19</sup> We do not have a GNP estimate for this period; the 1923 deficit was 996 million zlotys (the zloty will be introduced below) which crude calculations suggest was above 20% of GNP.

<sup>20</sup> This account draws on Yeager et al.

<sup>21</sup> The Italian loan was for 400 million lire, less than \$20 million, and less than the value of one month's exports.



A new currency, the zloty, had been announced at the end of January, with a gold value equal to that of a gold franc, equivalent to an exchange rate of 5.18 to the dollar. The zloty would be issued by a new central bank, the Bank of Poland, the 100 million zloty capital of which was raised by public subscription paid in early 1924 in gold or stable foreign currencies. It was to hold gold and stable foreign exchange reserves to the value of at least 30% of its note issue. The government was allowed to borrow interest free up to 50 million zlotys.<sup>22</sup>

The Bank of Poland began issuing zloty notes in May 1924. E. Hilton Young, English adviser to the government, questioned the advisability of currency reform before budget balance had been definitely established.<sup>23</sup> Figures 5 and 6 show that the criticism was prescient. The budget deficit increased to its 1922 levels by the middle of 1924. Exports fell, as a result both of a poor harvest and in 1925 a dispute with Germany on coal exports.

Domestic inflation resumed in the third quarter of 1924, but the exchange rate was held fixed despite the worsening trade balance and the onset of domestic inflation. Foreign exchange reserves fell from 270 million zlotys in January 1925 to 120 million in June, despite the raising of American loans worth 120 million zlotys at the then exchange rate. Wholesale prices rose 28% in the first quarter of 1925. Data for the 1924-1927 period are presented in Table 11.

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<sup>22</sup>Government expenditure at this time was at an annual rate of close to 3 billion zlotys.

<sup>23</sup>Smith (1936) describes contemporary discussions that argued the reform was premature.

Table 11: CURRENCY GROWTH, INFLATION AND DEPRECIATION, POLAND, 1924-1927.

	Currency growth	WPI inflation	Exchange depreciation
Sept 1924	6.5	3.8	0.0
Dec. 1924	4.6	1.7	0.0
Mar. 1925	3.8	0.9	0.0
June 1925	-0.3	-0.6	0.0
Sept 1925	-0.3	2.2	4.1
Dec. 1925	3.3	6.8	15.9
Mar. 1926	0.0	-2.0	-5.0
June 1926	3.7	6.3	9.0
Sept 1926	3.6	0.5	-3.7
Dec. 1926	0.4	0.6	0.0
Mar. 1927	2.2	1.1	0.0
June 1927	0.9	1.4	0.0
Sept 1927	3.8	-0.3	0.0
Dec. 1927	1.6	0.0	0.0

Note: Data are rates of change, at a monthly rate, over the three month period ending in specified month.

In July 1925 the fixed exchange rate gave way, after the Bank of Poland refused to continue support at the 5.18 exchange rate. The Bank continued to intervene, obtaining a loan from the Federal Reserve in August to moderate the depreciation. With its stabilization a failure, domestic output falling, and further labor troubles, the Grabski government resigned in November 1925. After a short-lived appreciation, the zloty early in 1926 resumed its depreciation, peaking at 11 zlotys to the dollar in June, then appreciating until it reached the level of 8.90 to the dollar at which it was stabilized.

There are two main questions. First, why did the inflation resume? And second, how did it stop, this time definitively? The worsening of the budget situation and renewed money growth, together with the need to depreciate following the deterioration of foreign trade, account for the resumption of inflation. The inflation was significantly fuelled by rapid growth in bank deposits (Table 12). In January 1925, the currency/deposit ratio was 1.68; two years later it was 0.81. Correspondingly the stock of currency grew at an average annual rate of 19.5% over the two years to January 1927, while bank deposits increased at an annual rate of 69.7%, M1 increasing by 41.5%.

A more picturesque complementary description is that this was a "small-change inflation". The Bank of Poland had the monopoly on the issue of large notes and was not permitted to create notes to finance the deficit. The Treasury was however permitted to mint coins and small notes. Table 12 presents data. During 1925 the stock of small change, issued by the Treasury, increased by over 250 million zlotys, an amount close to the budget deficit for that year of 330 million zlotys. Although Bank of Poland notes were removed from circulation in consequence of the foreign exchange reserve outflow, the total stock of currency increased in 1925. Over the two years of the renewed inflation, 1925-1926, the increase in monetary base was accounted for almost entirely by the increase in small-change.<sup>24</sup> The lesson is that a government determined to circumvent restrictions on deficit financing will find a way.

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<sup>24</sup> Gunther (1931) examines the period in detail. See also Landau and Tomaszewski (1984) and Heilperin (1931).

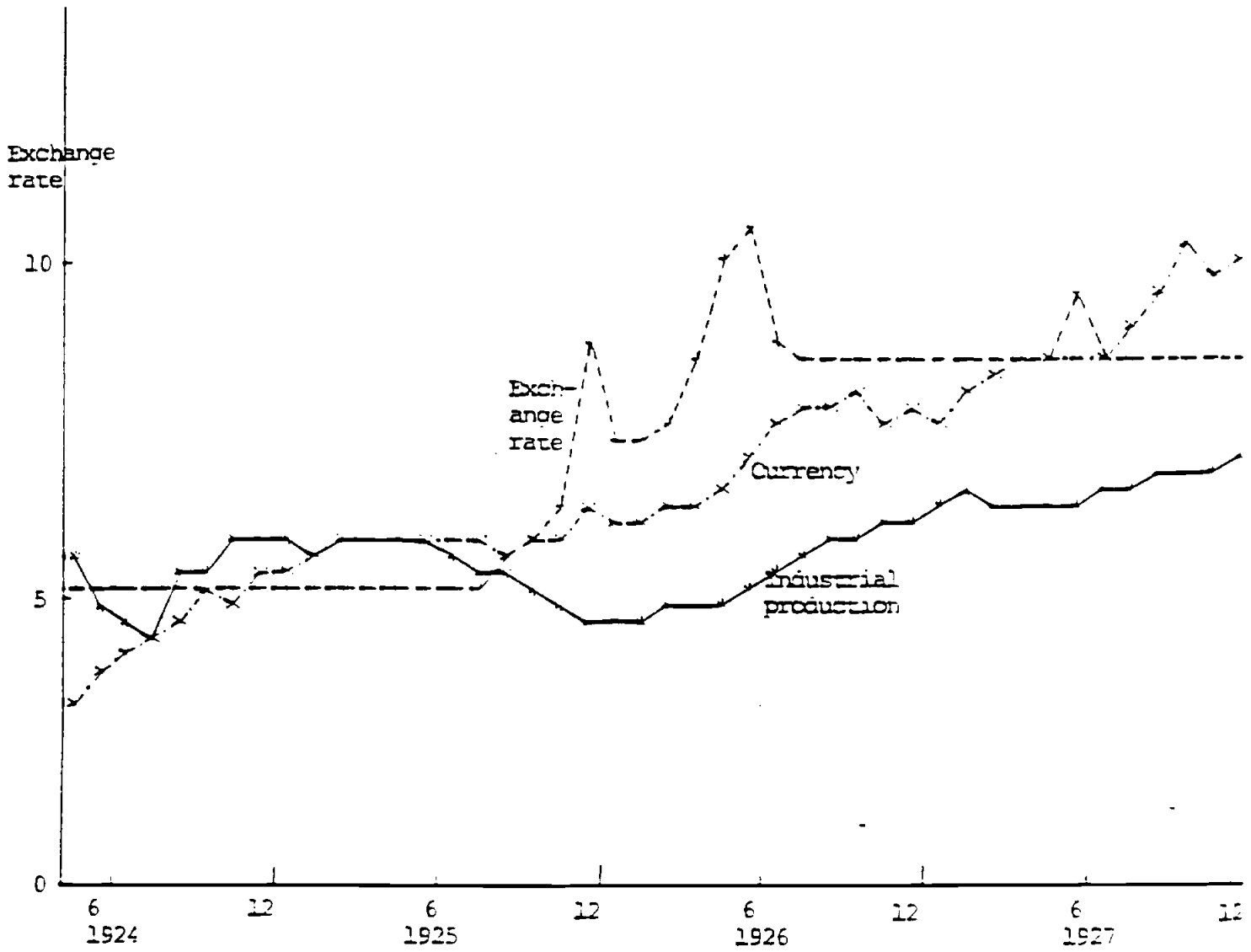


Figure 6 : Money, Output and the Exchange Rate, Poland, 1924-1927.

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 Table 12: MONEY AND MONETARY GROWTH IN POLAND, 1925-1928.
 

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	Currency	Bank of Poland notes	Small change	Deposits
Jan. 1925	694.3	553.2	141.1	413.0
Jan. 1926	781.0	362.0	419.0	690.5
Jan. 1927	992.1	584.8	407.3	1224.4
Jan. 1928	1288.6	1003.3	285.3	1823.5
Annual growth rate, 1927/1925 (%)	19.5	2.8	69.9	72.2

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Source: International Abstract, pp.167-168. First four rows are in millions of zlotys.

At the end of 1925 the government tried again to stabilize the budget, cutting expenditures. It raised taxes and other revenues in early 1926. At the same time exports, particularly of coal to strike-bound Britain, rose rapidly. Despite the improving budget and balance of trade, the zloty continued to depreciate through the middle of the year.

The Third Attempt: In May 1926 the government changed in a coup by Pilsudski. Circumstances were already favorable to a stabilization. A budget surplus was created through valorization and higher taxes, growth aided by exports resumed, and the currency was stabilized de facto.

The money doctor, E.W. Kemmerer was called in to advise how to cement the improvement. He recommended that the government not be allowed to issue treasury notes and be required to balance the budget. More important was the recommendation of full convertibility, secured by a foreign loan, with foreign supervision. In October 1927 the Polish

government signed a loan agreement for \$62 million and 2 million pounds sterling. Free convertibility was instituted and an American adviser to the Polish government supervised implementation of the terms of the loan.

The Polish government agreed to foreign supervision in the belief that foreign confidence would be enhanced and foreign investment flow in. This did not happen, but budget balance, monetary discipline and a strong trade performance maintained price level and exchange rate stability.

#### 5. THE ITALIAN STABILIZATION, 1947.

In the fall of 1947 Italy achieved a rapid disinflation from triple digit inflation. Wartime inflation was followed by a year of price stability that ended in the middle of 1946. Figure 7 shows consumer and wholesale price indexes and the money supply for the period from the middle of 1946 to the end of 1948. With money continuing to grow after the inflation rate was stabilized, real balances grew fast from the end of 1947.

The fall in the inflation rate was rapid and decisive. In the second quarter of 1947 both wholesale and consumer price indexes were rising at more than 100% per year; by the end of the year both indexes were falling. There was no significant inflation again in Italy until the Korean War, and after that until the 1960's. The stabilization is noteworthy both because it took place from a triple digit rate, before the economy approached the disintegration of hyperinflation, and because of its speed.

The money supply grew at an annual rate of 60% in the fifteen months before September 1947. Table 13 gives quarterly data on macroeconomic variables. The money supply continued to grow at 50% per annum immediately

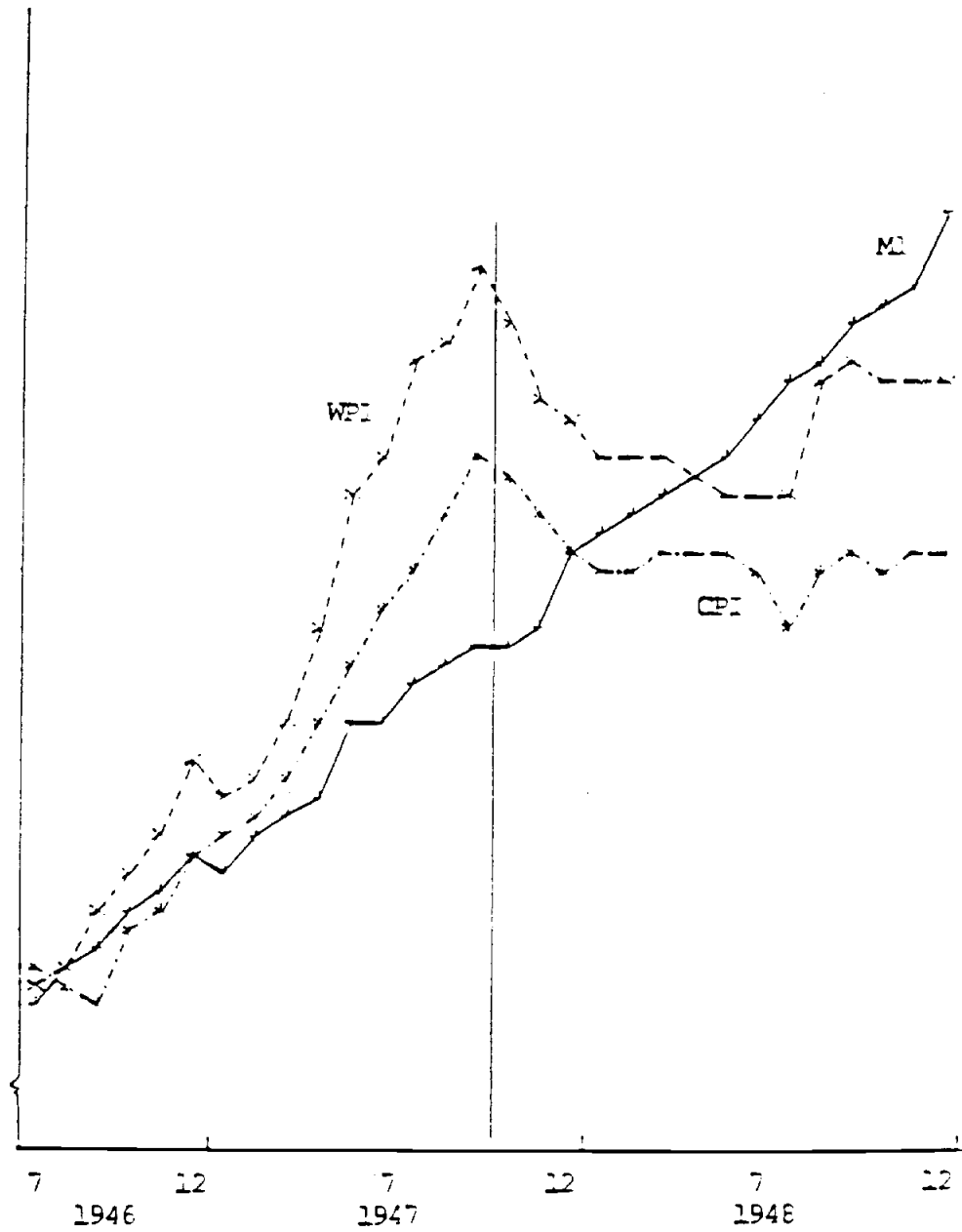


Figure 7: Prices and Money, Italy, 1946 to 1948.

(Source: International Financial Statistics)

after the stabilization; the annual rate of growth for 1948 was however below that for the year ending before the stabilization. To put the money growth rates in perspective, note that GNP was rising very rapidly over this period, by 31% from 1945 to 1946, and 18% from 1946 to 1947.



Table 13: THE ITALIAN STABILIZATION, 1946-1948.

	CPI infl.	Money growth	Dem.dep. growth	Unemp. (mil.)	Ind. prod.
Sept 46	30.9	92.0	217.5	1.86	60
Dec. 46	118.4	86.7	99.4	2.10	48
Mar. 47	56.9	10.4	12.2	2.18	47
June 47	119.8	71.2	113.6	2.00	68
Sept. 47	72.0	50.3	32.8	1.87	73
Dec. 47	-26.9	51.3	10.5	1.80	64
Mar. 48	-0.8	20.4	42.7	2.25	66
June 48	-6.7	31.1	74.9	2.28	70
Sept 48	6.4	34.5	39.1	2.12	76
Dec. 48	0.6	43.2	37.1		72
	e/P	Prem.	S/P	W/P	Int. rate
Sept 46	100	26.8	100	100	3.89
Dec. 46	78.5	50.3	134.5	121.7	4.21
Mar. 47	75.2	55.2	224.4	128.5	4.12
June 47	79.3	38.3	177.9	136.7	4.50
Sept 47	66.1	30.9	135.7	135.2	4.65
Dec. 47	82.8	-1.1	94.1	159.8	4.67
Mar. 48	80.8	15.5	109.9	160.7	4.31
June 48	82.2	1.7	94.4	163.5	4.36
Sept 48	81.1	8.0	117.2	169.9	4.40
Dec. 48	80.9	14.8	120.6	169.6	4.53

Sources and Notes: 1. All growth rates are calculated for given month (t) relative to three months before (t-3) at annual rate. 2. Columns 1 and the wage index (W, in column 9) are from Lutz and Lutz (1950), p. 5. 3. Columns 2 and 3 are from Hildebrand (1965), p. 21. Column 2 is an M1 measure, comprising currency and demand deposits at banks and the post office. Growth rate of demand deposits is calculated from "Total demand deposit" column in Hildebrand. 4. Columns 4 and 5 are from Simpson (1949/50), p.215 through March 1948, column 5 thereafter linked through International Financial Statistics data; industrial production index was 100 in 1938. 5. Column 6 is the "average" exchange rate (average of free and controlled rates) divided by CPI; column 7 is the premium of the curb rate over the average rate; column 8 is a stock market index relative to CPI; column 9 is the wage relative to CPI; column 10 is the government bond yield. Except for the wage, these data are from International Financial Statistics.

The data in Table 13 do not establish the extent to which the stabilization had real effects. Unemployment had risen by 400,000 within six months of the policy change; industrial production fell by over 10% in the three months following the stabilization program. But because the data are not seasonally adjusted, it is difficult to identify the direct effect of the stabilization program on output.<sup>25</sup> For example, suppose that the pattern for Sept 1946-March 1947 is taken as the seasonal in industrial production. Then industrial production in December 1947 and March 1948 would have been high rather than low. Although industrial output was above the September 1947 level within a year, unemployment stayed high through the end of 1948 and was widely blamed on the stabilization program.

The success of the stabilization is commonly attributed to a squeeze on private credit caused by the finely-tuned introduction of reserve requirements for the commercial banks that went into effect in September 1947.<sup>25</sup> This was the key economic measure of the stabilization program put into effect by the De Gasperi government that took office at the end of May, 1947, the first post-War government to exclude the Communists. Luigi Einaudi, who moved from the governorship of the Bank of Italy to become Deputy Premier and Budget Minister, is regarded as the architect of the program.

About 40% of the M1 money stock consisted of demand deposits, which were typically increasing more rapidly than currency in the pre-

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<sup>25</sup> This interpretation is offered by Foa (1949), Lutz and Lutz (1950), Baffi (1958), and with some reservations, Simpson (1949/50), and Hildebrand (1965). Reserve requirements did exist before September 1947 but were totally inconsequential, amounting to less than 0.5% of deposits.

stabilization period (Table 13). Deposit growth was virtually unconstrained by reserve requirements. Table 14 shows free and required reserves. Prior to September 1947 there was essentially no check--beyond prudence--on the banks' ability to expand credit. At the end of August the commercial banks were informed of the new reserve requirements, to go into effect at the end of September. The reserve requirements were set at a level that wiped out excess

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 Table 14: COMMERCIAL BANK RESERVE RATIOS  
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	Total	Required	Free
Dec. 1946	25.7	0.4	25.3
June 1947	17.3	0.3	17.0
Sept 1947	15.1	14.7	0.4
Dec. 1947	21.9	16.5	5.4
Mar. 1948	23.6	19.0	4.6
June 1948	27.5	20.7	6.8
Sept 1948	28.6	22.3	6.3
Dec. 1948	25.1	23.4	1.7
1949 (av.)	26.3	24.1	2.2

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 Source: Hildebrand (1965), p.31.

reserves and made further increases in bank credit unsupported by an increase in holdings of high-powered money impossible.

Bank credit to the private sector grew at an annual rate of 30.5% in the last quarter of 1947; from March to December 1948 it grew at an annual rate in excess of 60%.<sup>26</sup> The contraction of the rate of growth of credit to

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<sup>26</sup> Data are from International Financial Statistics, line 41, for January and July 1949. Because the data for 1947 and 1948 do not appear comparable, we cannot compare data for March 1948 with December 1947.

the private sector caused by the increase in reserve requirements was neither sharp nor prolonged.

In addition to raising reserve requirements, the stabilization program raised the discount rate from 4% to 5.5%. Nominal market interest rates rose temporarily; the real rate of interest became significantly positive in the last quarter of 1947 as the price level fell.

New laws sought to limit direct financing of the Treasury by the Banca d'Italia.<sup>27</sup> The Treasury was however entitled to overdraft facilities at the Bank, equal to 15% of current expenditures. The budget deficit was at this time continuing to fall. The cash deficit had been 13% of GNP in 1946 but was down to less than 10% of GNP in 1947.<sup>28</sup> The reduction in the deficit was accomplished in part through the imposition of three capital levies in 1947.<sup>29</sup>

With further attacks on the deficit infeasible, the stabilization program concentrated its efforts on controlling credit granted to the private sector. By raising reserve requirements it also ensured commercial bank financing of part of the budget deficit: in 1948 58% of the budget deficit was financed by private banks, as compared with 27% in 1947. The budget deficit was though mainly responsible for the increase in the money base.

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<sup>27</sup> See Hildebrand (1965) pp28-30 for a fuller description of the stabilization program.

<sup>28</sup> Simpson (1949/50) p.212 shows the deficit higher in 1948 than in 1947; Baffi (1958) p.423 has a monotonic fall in the deficit as a percentage of GNP from the end of the War to fiscal year 1950/51.

<sup>29</sup> Hirschman (1948) p.600 refers to these levies, the first installment of which was paid in May 1947.

Despite the standard accounts, the extraordinary success of the stabilization is somewhat mysterious. Although monetary and fiscal policy were becoming more restrictive over the period 1947-48, there is no decisive change in policy visible in the data in Table 13 or in the budget deficit that suggests a clean break with the past in late 1947.

Indeed, the co-incidence of timing between the break in the inflation rate and the reserve requirement change is suspicious, given that no price controls were imposed: normally a change in monetary policy operating through aggregate demand takes time to affect prices. Nor do the changes in nominal interest rates and the rate of money growth support the view that a strong credit squeeze caused the stabilization--though once deflation was under way, the real interest rate reached very high levels that did indeed squeeze borrowers.

There is a strong argument in the Italian case that expectations of reform and of a foreign loan played a significant part in the stabilization.<sup>30</sup> Figure 8 shows the stock market index, the curb exchange rate and the CPI for the period from mid-1946 to the end of 1948. The De Gasperi government took office at the end of May 1947. The stock price index peaked in April 1947. The curb exchange rate peaked in May 1947. Both these events point to expectations of reduced inflation at that time. The Marshall Plan speech was at the beginning of June 1947. From that point on both the curb and the average exchange rate fell, until the free and the official exchange rates were unified at the end of the year.

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<sup>30</sup> Most authors discussing the period mention these factors, but nonetheless emphasize the change in reserve requirements.

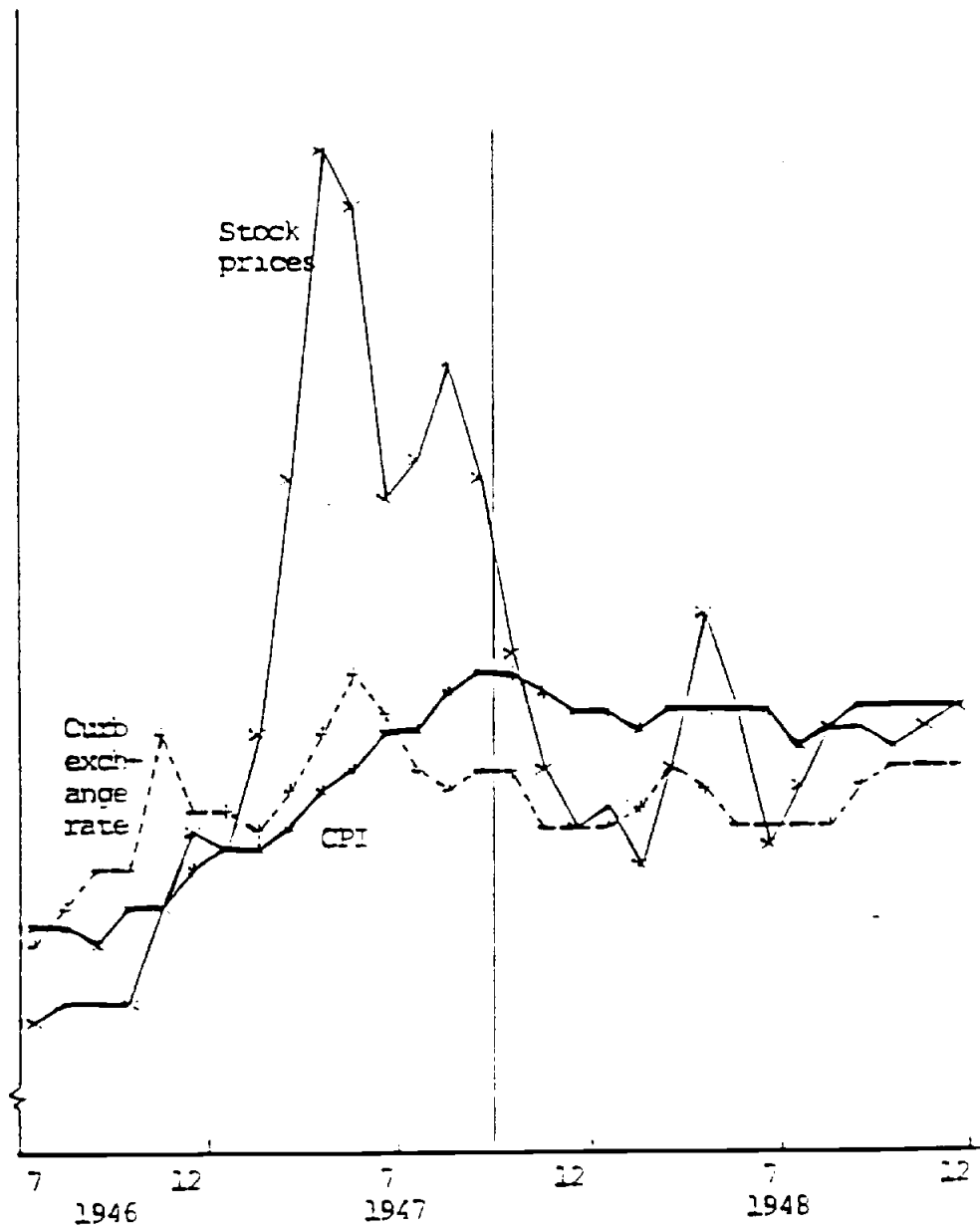


Figure 8: Speculative Prices and the CPI, Italy, 1946-1948.

(Source: International Financial Statistics)

Our interpretation of the Italian stabilization is that it was an event waiting for an excuse to happen. With the balance of payments and exchange rate problems solved by the Marshall plan, with a strong government in office, with the budget deficit coming down steadily, with real balances squeezed, there was no good reason for the inflation to continue. The falling average exchange rate and dishoarding of stocks<sup>31</sup> set disinflationary forces in motion by the middle of 1947. It took a policy change to stop the inflation, but the form of the change was less significant than the fact that it took place; the change in reserve requirements put only a temporary pause in the rapid growth of both money and private credit.

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<sup>31</sup>We do not have inventory data, though several sources claim there was hoarding through the middle of 1947 and that dishoarding helped force the inflation rate down.

## 6. THE ISRAELI STABILIZATION, 1985?

The Israeli inflation rate rose by stages from 2% per annum in 1967-70 to the 1000% per annum range at the end of 1984.<sup>32</sup> The stages can be seen in Figure 9: the inflation rate hit 50% per annum in 1975 after the 1973 Yom Kippur War; was reduced to 30-40% by 1977; by the end of 1979 it was around 130% where it remained until the end of 1983; at the end of 1984 the price level was 5.5 times its level a year earlier. A policy package put into action at the beginning of July 1985 stabilized the dollar exchange rate and succeeded in reducing the inflation rate for the three months from July to October 1985 to an annual rate of 58%.

Underlying the Israeli inflation were massive budget deficits and rapid monetary growth. Money growth is seen in Figure 9, with quasi-money keeping pace with prices throughout<sup>33</sup> and M1 growth substantially below inflation for much of the period as the level of real balances fell.

Table 15 presents budget deficit and defense spending data. The deficit from the mid-seventies to the early eighties is significantly affected by the subsidization of loans to the private sector given at fixed nominal interest rates while the inflation rate was accelerating. At its peak this subsidy was equal to nearly 7% of GNP. Interest costs in the budget data in Table 15 are appropriately calculated on a real basis. The shift from a net foreign deficit to net foreign receipts after 1980 results from the change in United States aid from loans to grants.

<sup>32</sup> This account draws on Fischer (1982, 1984a, 1984b) and Bruno and Fischer (1986).

<sup>33</sup> The return on most of the quasi-money aggregate is indexed to either the price level or the exchange rate, so that the accommodation of that aggregate to inflation is automatic.



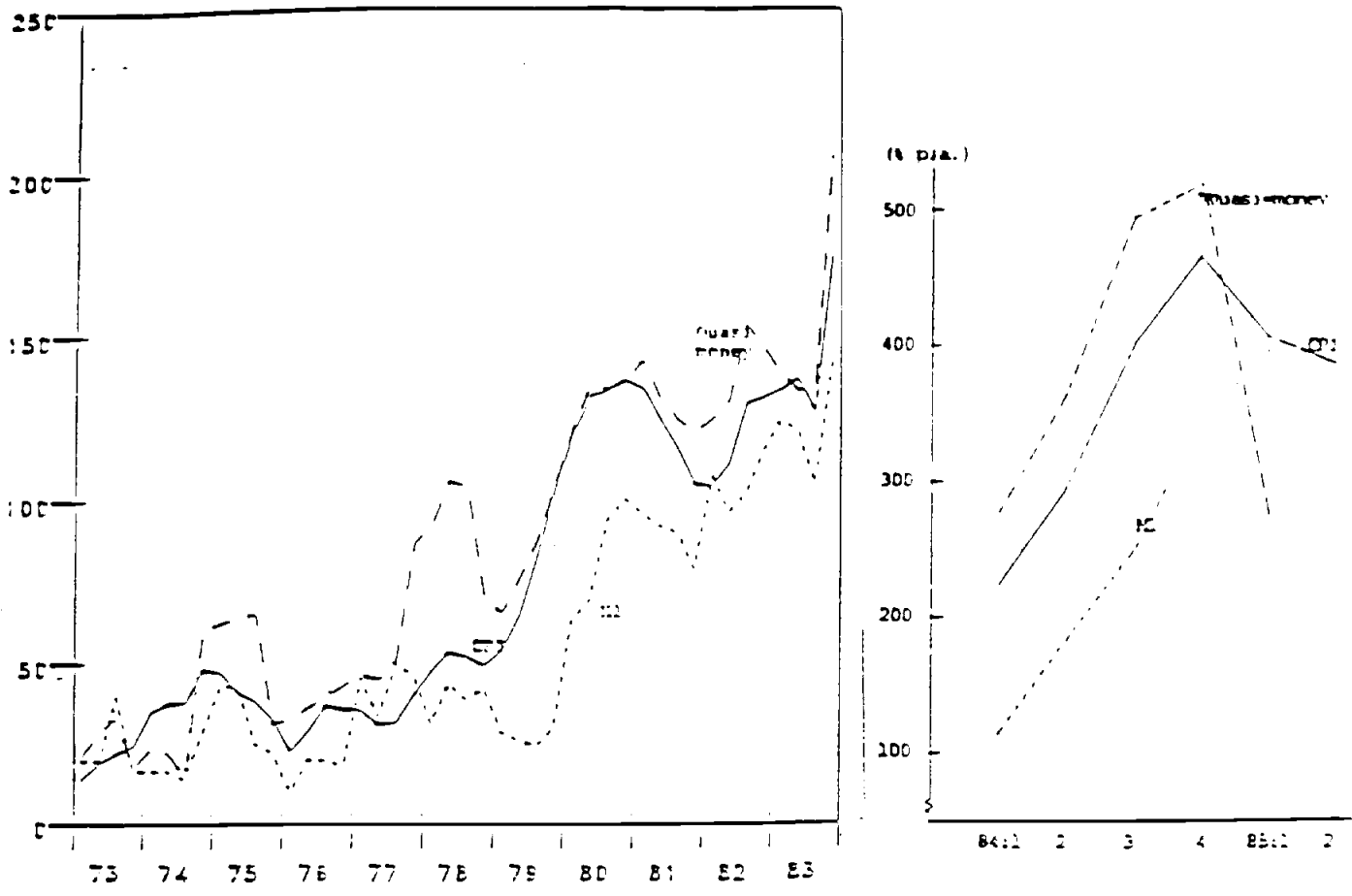


Figure 4: Inflation and Money Growth, 1973-1985.

Source: International Financial Statistics.

Table 15: THE ISRAELI BUDGET, 1960-84.  
(Percent of GNP)

	Domes- tic spend- ing	Net foreign spend- ing	Domes- tic rev- enue	Domes- tic def- icit	Total def- icit	Defense spend- ing	Base money creat- ion
1960-64	27.0	1.2	28.8	-1.8	-0.6	9.4	2.5
1965-67	32.0	2.8	29.6	2.4	2.4	12.5	2.2
1968-73	41.0	6.6	34.4	6.6	13.2	23.6	3.2
1974-77	56.4	3.3	42.1	14.3	17.6	29.3	2.6
1978-80	60.7	2.0	45.5	15.2	17.2	23.9	2.0
1981-83	61.0	-0.3	46.5	14.4	14.1	23.8	2.1
1984	62.9	-4.0	46.0	16.9	12.9	24.0	3.2

Source: Updated from Bruno and Fischer (1986)

Note in Table 15 that government revenue from base money creation has shown no consistent trend. The concurrent rise in the growth rate of base and reduction in demand for base have maintained constant the revenue from money printing (as a share of GNP). With the government at the same time borrowing indexed and lending nominal, it can be argued that the total effect of a money-caused increase in the inflation rate is to increase rather than decrease the budget deficit. (Sokoler, 1985).

Economic Structure: We briefly describe special features of the economic system before turning to macroeconomic policy. The most persistent structural feature of the Israeli economy has been a trade deficit of about 20% of GNP, which extends back even to the 1920's. The trade deficit increased to above 30% of GNP after 1973, but was reduced over the next few years. The deficit has been financed by unilateral transfers from both private and governmental sources, and increasingly in the period after 1973

by borrowing, with the result that the net external debt increased from 35% to 65% of GNP between 1973 and 1979. Grants as opposed to loans from the United States played an increasingly important part after 1980. Net external debt at the end of 1984 was about 80% of GNP.<sup>34</sup>

Indexation was widespread in the Israeli economy well before the acceleration of inflation. Wage indexation had been introduced in World War II, and indexation of government bond yields in the mid-50's after a period of high inflation. Indexation was fully consistent with low inflation rates in the sixties.

Wage setting is dominated by the presence of a national trade union organization, the Histadrut, which is also the owner of 25% of industry. Wage setting takes the form of a negotiation on real wages and, separately, an agreement on the cost of living adjustments that will apply over the duration of the contract. The highly centralized process of wage setting has several times been used to make economy-wide changes in wages.

A major change in the structure of the asset markets occurred in 1977 when the first non Labor Party government took office. The finance minister was from the Liberal Party, whose belief in free markets was immediately and virtually exclusively implemented in a liberalization of foreign exchange holdings. Israelis were permitted to hold foreign exchange directly and dollar-linked interest bearing domestic bank accounts. These (PATAM) accounts were not initially used as medium of exchange but over the next two years there was a shift into PATAM from local-currency denominated assets, leading to the pattern seen in Figure 9 where the inflation rate

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<sup>34</sup>With exports at about 40% of GNP, the debt/export ratio is below that of leading Latin American debtors.

climbed rapidly as the growth rate of M1 fell.<sup>35</sup> The monetary base fell as a percentage of GNP from 15% at the beginning of the seventies to 2.5% in 1984.

The exchange rate was an adjustable peg until 1975, when a discretionary crawl of 2% per month was introduced. After the liberalization in 1977 the exchange rate was ostensibly to be free-floating, but very soon became heavily managed. The exchange rate generally followed PPP except for an episode to be reviewed below.

#### Stabilization Attempts.

The post-1973 war inflation was attacked by restrictive fiscal policy, credit restraint, and in 1974 an agreement with the Histadrut to forego one round of wage indexation following a devaluation. The restrictive policy took effect slowly, but did succeed in bringing the inflation rate down to less than 30% per annum in 1976 without significantly raising unemployment.

Following the 1979 inflationary jump to above 100%, a new attempt was made to fight inflation, by attacking the budget deficit. The initial impulse of the policy, which devalued and cut subsidies radically, was heavily inflationary. The budget deficit and balance of payments deficit fell during 1980, but the inflation rate was slow to come down. With an election on line in the following year, the Finance Minister and his policy were replaced within a year of the start of the restrictive policy.

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<sup>35</sup>In September 1977 23% of the holdings of M5 (a broad financial asset aggregate) were nominal, in local currency, 26% foreign currency linked, and 51% price level linked; the average for 1979 was 11.5% local currency linked, 39.5% foreign currency linked, and 49% price level linked.

The new Finance Minister, Aridor, provided an innovative and expensive policy experiment over the next two years. Before the 1981 election the inflation rate was reduced by cutting tariffs, especially on consumer durables, in what was claimed to be a local version of supply side economics.<sup>36</sup>

In 1981 the argument that the Israeli inflation was merely a bubble gained ground, partly because there had been no simple link between either the growth rate of M1 or the budget deficit and inflation. Budget deficits had if anything been reduced during the seventies as the inflation rate increased, and as can be seen from Figure 9, the growth rate of M1 had declined just at the time the inflation rate jumped.

In accordance with the bubble diagnosis, a new policy was introduced whereby both the exchange rate and controlled prices would rise at 5% per month. Expectations would then, it was argued, crystallize around the 5% per month rate, and the annual inflation rate would accordingly fall from 130% to 80%. This could have worked had the inflation been a pure bubble, but the size of the budget deficit at the time makes that diagnosis doubtful. As Figure 10 shows, the real exchange rate appreciated, even against the appreciating dollar, throughout 1982 and into the first half of 1983. Correspondingly the current account deficit increased from under \$1 billion in 1980 to over \$2 billion by 1983. The inflation rate never fell below 100%, and by mid-1983 was back to the 130% level.

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<sup>36</sup> Total receipts from the tariff obligingly rose as the tariff was cut, not a great surprise when the cut was widely expected to be temporary.

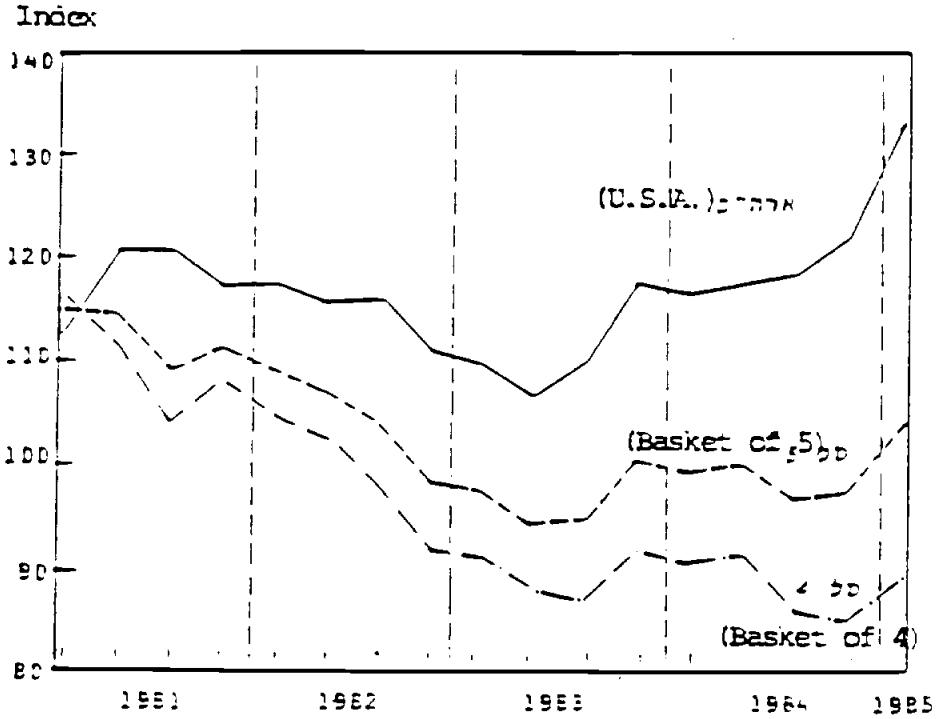


Figure 1.0 The Real Exchange Rate.

Source: Bank of Israel Report, 1984.

Whether or not the bubble diagnosis had been correct, it was obvious by the middle of 1982 that the policy of attempting to stabilize inflation through the exchange rate and controlled prices was an expensive failure. But it was only at the end of 1983 that Aridor was forced to resign, after a collapse of the prices of bank shares.<sup>37</sup> A large devaluation followed, and the inflation rate for 1984 was kicked up above 400%.

The new finance minister gave a higher priority to reducing the balance of payments deficit than to controlling inflation, but nonetheless promised strict budgetary austerity. Whatever austerity there might have been vanished when an election campaign got under way in the spring of 1984 with the real wage rising more than 15% in the first half of the year.

The National Unity Government: Despite the 400% inflation, and the war in Lebanon, the opposition Labor Party did not win the July election,<sup>38</sup> and had to form a coalition government. Tough anti-inflationary policy was widely expected, but failed to materialize.

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<sup>37</sup> The banks had been "regulating" (a term used by the banks to the Commission of Inquiry into the bank share collapse) the prices of their shares, causing them to produce a real rate of return of over 15% per annum. However the worsening balance of payments created the expectation of a devaluation and a move out of bank shares on a scale that the banks could not stem (despite their large foreign borrowings in 1983). Eventually the market collapsed, with the government stepping in to stabilize the price of the shares by essentially turning them into indexed bonds. At the time of writing the Commission of Inquiry has not yet reported its findings.

<sup>38</sup> The lack of money illusion by Israelis no doubt played a role in reducing the electoral cost of inflation. Despite slow real GNP growth, per capita consumption rose rapidly during the period from 1977 to 1984 in which the Likud Party was in power. From 1977 to 1983, real GNP grew at an annual rate of 2.5% while real consumption grew at 6.3%.

The first stabilization program of the new government was a package deal with the Histadrut and employers whereby wages and prices would be frozen for three months. However devaluation continued. The planned 1985/6 budget had sharply cut the deficit (to about 10% of GNP from 17%) but with the government spending increasing amounts to maintain the prices of subsidized goods, the deficit did not fall. Nor were other planned cuts in government spending implemented.

By April and May 1985 the package deal had fallen apart and inflation was back to the 1000% per annum range. The balance of payments deficit had been reduced from its 1983 level, but foreign exchange reserves were falling rapidly, the government budget deficit was at an unsustainable level (both domestic and foreign financing were difficult to obtain) and there was a clear need for action.

Before we examine the stabilization program of July 1985, we briefly take up the question of why the policy was so long delayed. Aside from a brief period during which the bubble inflation argument was popular, there was never much disagreement in Israel about the fundamental measures that would have to be taken to end inflation. There was however dispute about whether more than restrictive aggregate demand measures were needed. Some economists argued that the use of wage and price controls and agreements with the unions were doomed to failure and that attempts to use such measures only prolonged the adjustment period and made failure more likely. Their scepticism of the end of 1984 package deal, reflected in a telegram from economists at Tel Aviv University to the government at the time the deal was struck, turned out to be justified.



Others argued that heavy unemployment following cuts in demand could be avoided if wages and prices could be moved immediately to close to new equilibrium levels rather than forcing changes through the Phillips curve tradeoff. The jury is still out on the 1985 stabilization, but as of the time of writing (November 1985) the latter view looks right.

The lack of action was a result of the evaluation that the costs of inflation, moderated by indexation, were less than those of the unemployment and emigration that a serious stabilization attempt would cause. The slogan was "Israel cannot afford unemployment", and by comparison with other countries Israel succeeded. The unemployment rate in Israel did not rise markedly in the seventies, in part because the government increased its share of employment from 23% of the labor force to 30%.

#### The July 1985 Stabilization Program.

The new program had three main components. First, the budget deficit was to be cut to below 10% of GNP, mainly by cutting subsidies. Second, there was a devaluation to be followed by a stable (though not formally fixed) exchange rate against the dollar. The subsidy cuts produced a jump in the price level of 28% in July. Third, wage and price controls were put in place and wage indexation and other elements of existing labor contracts were suspended by emergency decree. Wage earners were not compensated for most of the July inflation, with the result that the calculated real wage was expected to fall about 20%. In support of the program, monetary policy would control the growth of nominal credit. An element in the willingness of the government to implement the program was

the knowledge that a requested supplementary U.S. aid package of \$1.5 billion over the next two years was making progress through the Congress and was likely to be granted within a few months.

Table 16 shows the early results of the stabilization.

Table 16: THE IMMEDIATE POST-STABILIZATION PERIOD, ISRAEL, 1985.  
(Columns 1-4 are monthly rates of change.)

	CPI inflation	M2	PATAM	Nominal credit	Real wage	Unemployment rate	Nominal int. rate
June	14.9	7.2	18.6	16.8	111	6.6 <sup>1</sup>	20.5
July	27.8	56.6	0.8	0.4	92	8.0	20.3
Aug.	4.0	13.8	-1.8	6.0	--	8.0	15.7
Sept.	3.0	4.1	-3.5	3.5	--	--	12.2
Oct.	4.7	17.5	-3.1	1.5	--	--	5.5 <sup>2</sup>

Source: Bank of Israel.

1. This is the rate for the second quarter, not fully comparable with monthly rates.

2. Nominal interest rate is average rate per month on bank overdrafts; November figure is for November 18.

The inflation rate has fallen to around 4% per month.<sup>39</sup> There has been a shift back into shekel-denominated assets (M2) which have risen 52% in real terms since July. There has been a small shift out of dollar linked assets (PATAM) and strict control of credit. Real interest rates remained extremely high through October, but were sharply reduced in November. Unemployment has risen, and may rise further as government carries out dismissals that have been in process since July.

<sup>39</sup> The October figure is and was expected to be seasonally high as produce prices increased and new winter fashions were introduced; the data are not seasonally corrected.

The current exchange rate is being easily held, and with the arrival of close to \$2 billion in U.S. aid in September and October can continue to be held for some time: the continuing shift out of PATAM deposits indicates a lack of speculative pressure. The black market premium dropped from close to 20% at the beginning of the stabilization to 8% in November. The trade deficit in the third quarter of 1985 was 29% less than the deficit in the same quarter a year before.

Underlying the early success of the stabilization program are: first, the sharp cut in the budget deficit, which has fallen from 17% to 8% of GNP due both to reduced spending and to the familiar effect of a lower inflation rate on tax revenues; second the reduction in aggregate demand that results from the large cut in the real wage; and third the real devaluation and domestic contraction that has improved the current account leading to both higher exports and lower imports.

But stabilization is not yet assured. In the first instance, nominal and real wages are scheduled to increase starting at the end of November. The more than 4% monthly inflation in October triggered a COLA clause that will raise nominal wages by 3.7% at the end of November. Further, negotiations in July among the government, Histadrut and employers that ended protests and strikes against the stabilization package<sup>40</sup> fixed real wage increases of 4% per month for three months December 1985 to February 1986. These will bring the real wage back to within 10% of its mid-1985 level. There is an agreement with the Employers' Association that prices will not be adjusted in response to these wage changes, but such an

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<sup>40</sup> The Histadrut objected in particular to the use of emergency decrees to suspend the terms of labor contracts.

agreement is difficult to enforce. Further, price controls will have to be lifted at some stage, presumably before pressure on them makes it impossible to remove them without a significant jump in the price level.<sup>41</sup>

Second, further cuts in the deficit, to take effect in the fiscal year starting April 1986, are politically difficult. The Treasury and outside economists argue that a cut of \$500 million or 2% of GNP is needed to maintain the disinflationary momentum. This would still leave a deficit of 6% of GNP to be financed, which might be possible through monetary base growth at a low rate of inflation with the reliquification of the economy, and with only small increases in internal and external debt. But it is argued that the only place left to cut spending is on defense, which has already taken some cuts, and where resistance to further cuts is high. The structure of the 1986 budget will be crucial to the success of the plan. So too will a revival of the growth of per capita GNP, which is now at the same level as it was in 1980.

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<sup>41</sup>For the most part, price controls do not appear to have been binding in the early months of the stabilization program although isolated reports of shortages have appeared.

## 7. ARGENTINA'S 1985 AUSTRAL PLAN

Inflation in Argentina has been on the increase over the past 40 years. In the period from 1944 to 1954 it averaged 20 percent per year, nearly 30 percent in each of the next two decades, and 218 percent per year in the period 1974-84. Figure 11 shows the monthly rate of inflation over this period. The more prominent episodes in inflation history are clearly visible. There is the inflation of 1959 with the subsequent decline in the Alsogaray stabilization; the famous Krieger-Vasena stabilization of the second part of the 1960s; the Peronist inflation of 1975-76; the Martinez de Hoz stabilization and then the accelerating inflation of the 1980s that led to the current stabilization called the "Austral Plan" of June 1985.<sup>42</sup>

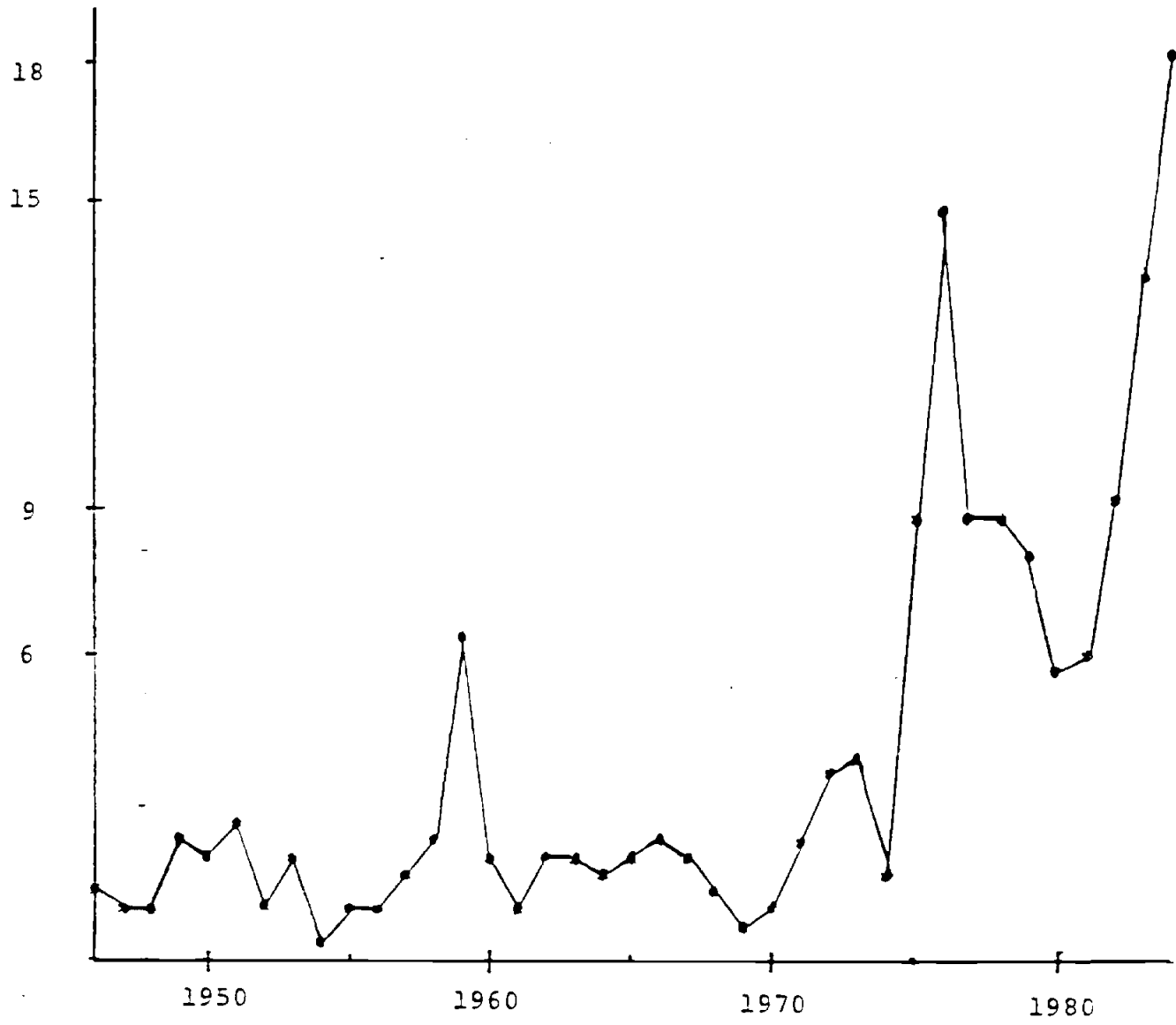
Even though there were only three sharp inflation blips in the past 40 years, Argentina managed over this period to have just as many central bankers: 40 Presidents of the Central Bank! And finance ministers outnumbered even military coups. The standing problems of the Argentine economy are budget deficits and real wage demands that lead to loss of competitiveness, payments crises, depreciation and inflation.

We start here with a brief discussion of the background for the inflation of the 1980s. Following Peronism in the early 1976 a military government seized power in early 1976. One of the objectives was economic stabilization, especially stabilization of inflation which ran at over 600 percent per year at the time of the military take-over.

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<sup>42</sup>On the Argentine experience see de Pablo (1982) and Williamson (1985). The Martinez de Hoz period and beyond is covered in Dornbusch (1984).

Figure 11  
INFLATION IN ARGENTINA  
(Percent per Month)



From 1976 to 1981 Economics Minister Martinez de Hoz tried to stabilize inflation. Over the period, all his attempts notwithstanding, inflation still averaged 141 percent. The continuing budget deficits were certainly one important reason why inflation could not be brought under control.

The Martinez de Hoz episode forms an important prelude to the present stabilization for two reasons. First it was in this period that use of the exchange rates as a tool of inflation stabilization was first attempted. Second, and related to the exchange rate policy, in this period a large external debt was built up which now renders stabilization and budget correction all the more difficult.

Martinez de Hoz To Grinspun: The policy of pre-set exchange depreciation (the tablita) was initiated in 1978 and maintained until early 1981. During that period the government announced a time-table for exchange depreciation over the coming months, hoping that reduced rates of exchange depreciation would slow down the domestic rate of inflation through expectations channels and the "law of one price". The program was partially successful in that inflation did, indeed, come down from more than 170 percent to under 100 percent. But this occurred at the cost of a growing overvaluation. Domestic wage and price increases slowed down less rapidly than the exchange rate and overvaluation accordingly increased by the month.<sup>43</sup>

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<sup>43</sup> Those who are ignorant of history are doomed to repeat it: not only Aridor in Israel, who ignored the lessons of Argentina two years before, but also Martinez de Hoz, who ignored the failed exchange-rate based stabilization attempts of the German and Austrian hyperinflations. A period of real exchange rate appreciation consequent on attempted exchange rate based inflation stabilization is remarkably common in high inflation economies.

The cumulative real appreciation led to adverse speculation which was facilitated by a complete liberalization of capital flows. Increasingly banks and the government borrowed abroad to finance private capital outflows. The magnitude of the cumulative outflow in 1978-82 is difficult to assess but estimates range between 20 and 30 billion \$U.S.<sup>44</sup> In 1981, in the course of a change of military presidents the overvaluation ultimately forced a depreciation. In the period from early 1981 to the end of 1983, when Alfonsín took power, there followed a cumulative exchange depreciation of 2400 percent. Of course this depreciation was almost entirely nominal even though it eliminated a large part of the previous real appreciation. In this period various economics ministers tried to contain inflation in the face of large budget deficits, the debt shock, the Malvinas war and the elections.

Perhaps the most interesting episode in this period were the months of June to August 1982, right after the Malvinas war, when Dagnino Pastore and Domingo Cavallo attempted stabilization and growth by wiping out the real value of debts via sharply negative real interest rates and wage agreements. The wage discipline quickly broke down and a new economic team presided over the remainder of the term of the transition military government. The inflation rate rose from 187% in 1982 to 380 % in 1983. Table 17 shows that over the period real wages increased sharply while

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<sup>44</sup> The estimates are derived by comparing the increase in gross external debt, adjusted for changes in reserves, with the cumulative current account. The difference represents the increase in Argentinian assets abroad. Possible overestimation results if military expenditures and tourist spending abroad are underreported in the official statistics. See Dornbusch (1985) and World Bank (1985)



output recovered somewhat even though it did not return to the 1980 level. The budget deficit showed some improvement although it must be noted that the interpretation is complicated by the fact that losses on exchange guarantees of the central bank are part of the reported deficit.

The Alfonsin government got off on the wrong foot. Real wages were allowed to rise, even though they had already sharply increased at the end of the military government. No correction of the budget was undertaken and inflation jumped to nearly 700 percent. The relations with debtor banks became increasingly strained as arrears and rhetoric built up. A stand-by agreement with the IMF, entered into in January 1983 was cancelled in January 1984. All of 1984 represents a transition toward hyperinflation.

The Plan of June 1985: The sharply accelerating inflation and the difficulties in rescheduling the debt led in early 1985 to a change of management and of approach. Gradualism was tried under a new IMF program entered into in December 1984. The program involved budget cutting and real depreciation both of which got underway. But the deteriorating level of economic activity and the failure of inflation to respond led in April-May 1985 to a search for a new program.

Table 17: MACROECONOMIC INDICATORS FOR ARGENTINA

	1982	1983	1984	1985		
				I	II	III
Industrial Prod.	80	88	91	85	83	79
Real Wage	80	100	120	136	131	112
Budget Deficit		12	11	11	12.5	2.0*
Inflation	187	380	659	847	993	250
Real Interest Rate	0.2	3.1	1.1	1.7	-5.4	5.7

\*Target (For outcome, see Table 18 below)

Notes: Industrial production, 1980=100; real wage, index 1983 =100; budget deficit, including Central Bank, percent of GDP; inflation rate of the CPI, annual rate ; real effective interest rate, percent per month, using WPI as deflator.

The loss of confidence in gradualist policy, and an unwillingness to accept IMF austerity led to the conception of the Austral Plan. The plan strikes an ingenious balance between the fundamentals of monetary and fiscal austerity and pragmatism that is absent from IMF-style programs. The pragmatism resides in the adoption of wage-price controls as the central feature of the disinflation program. Here are the key features of the Austral plan which went into effect on June 14th 1985:

1. The implementation of the plan was preceded by an increase in public sector prices and a sharp devaluation. Export tariffs and import duties were imposed.

2. Wage-price controls are imposed until further notice.

3. The government undertook not to emit any money to finance the treasury. The budget deficit was to be cut by tax and spending measures.

4. A time table (tablita) was announced to adjust outstanding loan contracts for the immediate and unanticipated cessation of inflation. This was the first time this feature--which had earlier been discussed as a theoretical possibility--was used in a stabilization plan.

5. A new money--the Austral--was introduced and was fixed to the dollar at 0.8 Australs (also called Penguins) to the \$U.S. The old money continued circulating, some of it being stamped with the new Austral symbol.

6. The program was accepted by the IMF and rescheduling negotiations with the creditor banks started. Federal Reserve Chairman Paul Volcker was rumored to be the god father of the program.

It is worth asking at the outset where the ideas for the plan came from. There is little question that the economic team--economics minister Juan Sourrouille, finance minister Mario Brodersohn, and the two undersecretaries Adolpho Canitrot and Jose Luis Machinea--are the principal architects. But what is particularly interesting is the extraordinary care and attention to historical experience that went into the design of the plan. It is certainly the case that in April studies were well advanced to the point of being concerned with the precise measures that were taken in hyperinflation stabilization programs. The authors of the plan became intimately familiar with the experiences in Europe in the 1920s, especially the stabilization of the German hyperinflation.

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Not surprisingly most of the features of the plan can be traced to the successful German experiment, and much less to recent ideas from Latin

America or elsewhere.<sup>45</sup> In particular the idea of controlling the disinflation via exchange rate fixing had been a key feature of the German program. But the Argentinians went further and imposed, in addition controls on wages and prices. The wage-price controls were imposed because the team remembered the catastrophic experience under economic minister Martinez de Hoz when exchange rates were used for disinflation without an accompanying incomes policy thus leading to a massive overvaluation of the exchange rate, capital flight and ultimately collapse of the program. Even though the team opted for price controls there was concern and scepticism about their effectiveness because no formal control apparatus was available or could be set up at short notice. Perhaps that also was good luck because, as it turns out, the fact that prices have some possibility of adjustment removes the threat of shortages or a catch-up explosion once the control policy is abandoned.

In only three months the desperate outlook has changed completely. Most impressive, the opinion polls have been showing up to 80 percent approval rating for the policies. Even though the November 1985 elections did not give Alfonsin the landslide victory that he hoped for, he still received a solid mandate to move ahead and cement the stabilisation and to put Argentina back on her feet.

Of course, it is much too early to predict ultimate success. So far much of the stabilization remains provisional and the most difficult choices lie ahead. The budget stabilisation was achieved by sharply increasing all public sector prices and by raising tariffs on exports and imports. These

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<sup>45</sup>Despite the many similarities between the Argentinian and Israeli stabilizations, they were conceived independently.

measures raised revenues and the freeze on prices helped increase real tax collection by eliminating the inflationary erosion of the tax yield. Just as in the German experience of the 1920s this proved a critical ingredient in early success for Argentina. Real wages have been cut by more than 20 percent since last year. All these measures explain how the deficit in the public accounts that was about 12 percent of GDP in early 1985 is expected to decline to only 2.0 percent by next year.

Table 18 shows the budget data for 1983-4 and the 1985 projection.

Table 18: THE PUBLIC SECTOR BUDGET DEFICIT, ARGENTINA (Percent of GDP)					
	1983	1984	1985		
			Year	1st	2nd Half
<u>Public Sector:</u>					
Revenue	21.7	22.5	25.3	21.5	27.2
Expenditure	32.1	30.7	28.8	29.0	28.5
Deficit	10.4	8.2	3.5	7.5	1.3
<u>Consolidated Deficit*</u>	11.5	10.9	6.0	12.0	2.5

\*Including operations of the Central Bank

Export taxes on agricultural goods have long financed most of the budget, but they do so to the detriment of productivity, growth and foreign exchange revenue. Regular taxation, levied on a broad base such as wealth or comprehensive income or expenditure must replace the ad hoc taxes that now fill the big budget gap.

The second problem is the real interest rate. Because the government has undertaken to print money only as it appears through the balance of

payments the real money stock is still less than twice its hyperinflation low and hence interest rates are extremely high. The real lending rate is in the range of 40 to 60 percent per annum. That is a serious problem because the cost of credit exceeds the profitability of investments, thus leading to accumulation of debts that will become bad if high rates persist<sup>46</sup>, a deterioration of financial stability and a decline in activity. If high real rates do persist there will inevitably have to come a point where the government either explicitly writes down debts or else creates an inflationary burst, as in 1982, that wipes out the real value of the excessive indebtedness.

The high real interest rate poses an immensely difficult challenge for the authorities. Table 19 helps understand what is at issue. The Table shows the levels of the monetary aggregates and the cumulative percentage increase since June. Considering the fact of a fixed exchange rate and wage-price controls an increase in the money stock of 70 to 80 percent seems entirely out of line with a credible disinflation policy. One might be tempted to think that the program must collapse within a short time because money is growing so fast--except that similar and more rapid rates of growth of money occurred in all the stabilizations.

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<sup>46</sup>The inefficiency of the Argentinian banking system is a major issue: it is claimed that the average cost for the commercial banks of administering deposits is above 1.5% per month. With a stable price level and zero interest on deposits, this would still leave the minimum real interest rate at 18% per annum.

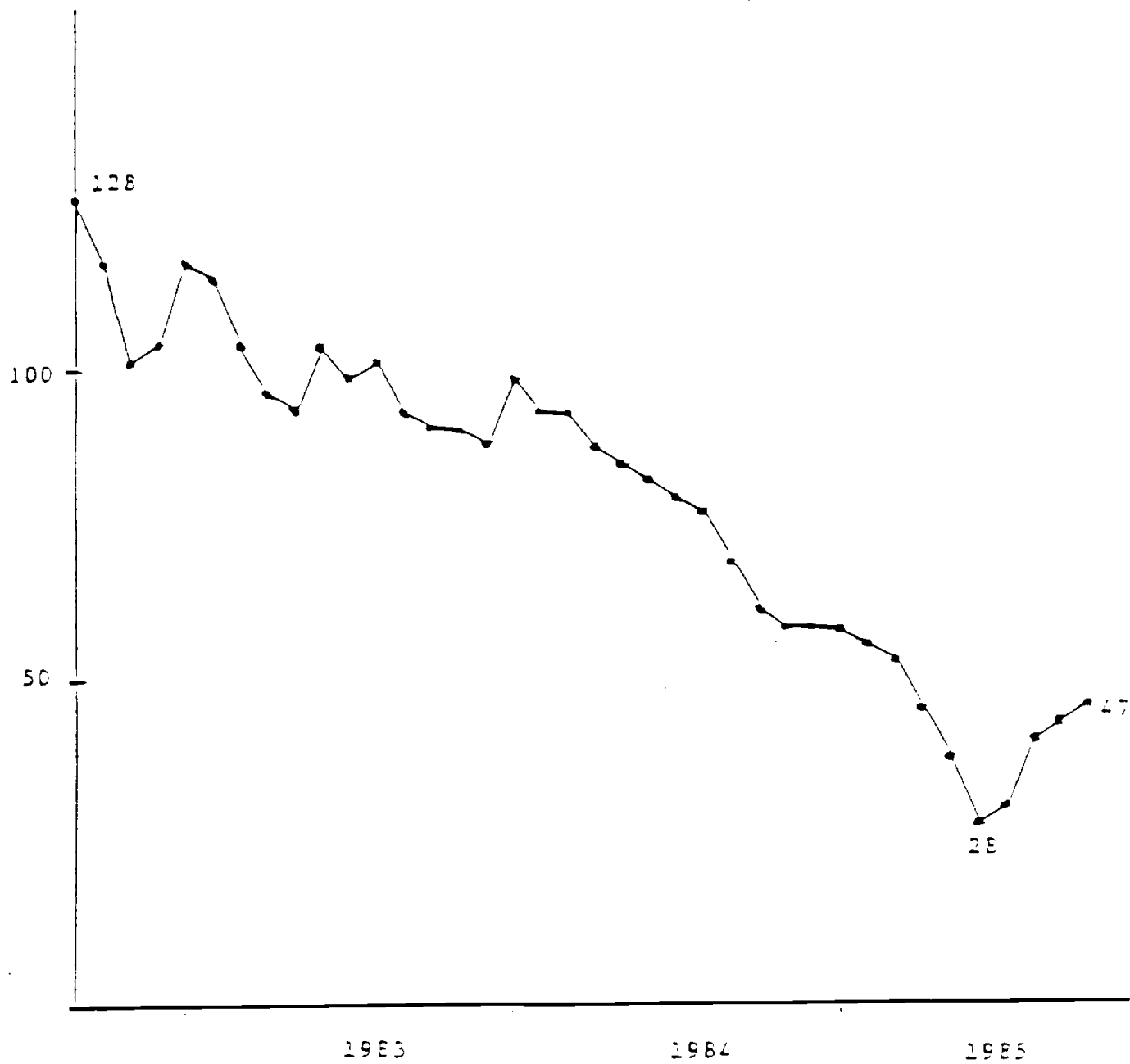
Table 19: THE BEHAVIOR OF THE MONETARY AGGREGATES, ARGENTINA.  
(Million Australes)

	Base	M <sub>1</sub>	M <sub>4</sub>
May	1355	927	3445
June	1950	1630	4877
July	2792	2589	6546
August	3070	2811	7393
September	3293	3010	8206
% Change			
June-Sept.	69%	85%	68%
Memo: Inflation June-Sept.		11 %	

Figure 12 shows why the interest rate can remain high despite the money growth rates of Table 19. The real monetary base declined during the period of escalating inflation. In that period rapid growth of money and credit was outpaced by even faster growth of prices. But when the stabilization took place the dynamics of money and prices changed: the fixed exchange rate, fixed public sector prices and wage-price controls substantially froze the level of prices. The commitment not to emit money froze the monetary base except for the possibility of foreign exchange inflows through foreign borrowing or repatriation of Argentine assets abroad--and there is little prospect that Argentinians will bring those assets home soon.

Under these conditions the real monetary base was the same the day before and the day after the reform and so was the nominal interest rate. But the disappearance of inflation implied that the real interest rate now was sky-high. Moreover it would remain at that level unless the government found a way of expanding the monetary base. But, as noted above, expanding

FIGURE 12  
THE REAL MONETARY BASE  
(Index 1983=100)





the base involves the risk of a loss in credibility. Any loss of credibility would immediately be visible in the parallel market for foreign exchange where all transactions occur that are not permitted at the official rate. The government would then face increasing difficulties of maintaining the official rate. A resurgence of inflation would be the likely effect within a quite short period. Credibility thus is a very serious issue. But the high real interest rates are equally threatening. The government therefore must find a middle course between the two ways of losing credibility--too much and too little credit expansion.

The policy prescription for Argentina would therefore seem to be the following: to pursue a policy that expands monetary aggregates by private credit, subject to the provision that if and when the parallel market turns markedly the expansion is immediately stopped. There is no irreparable harm that comes from trying to liquify the economy to the largest extent possible. Certainly there is still excess capacity in the Argentinian economy. But credibility is an issue. For that reason early fiscal reform, providing assurance that the underlying budgetary source of monetary expansion has been removed, would free the government's hands for reflation through private credit.

The third issue is how to abandon wage-price controls without a resurgence of inflation. If these controls are not relaxed before shortages become a major problem, they can inflict serious damage to the economy. But when prices are liberalized the problem is to prevent a price and then a wage explosion that will destroy the cut in real wages that has already been achieved. Perhaps the only chance is to liberalize imports and use effective import competition to

check price increases. That is a very risky strategy because it may cost employment and scarce foreign exchange. But a renewed burst of inflation and strikes to restore real wages are a much worse prospect.

Of course, import liberalization and a fixed exchange rate in the face of ongoing inflation--cumulatively 11 percent since June--are rightly a very touchy issue in Argentina. The experiment of disinflation under Martinez de Hoz left the country in a mess and no policymaker is eager to renew the experiment. But there is an important difference. The competitive position of Argentina has been improved over the last year. Especially the devaluation preceding the stabilization created room for some erosion during the period of stabilization. Such an appreciation after an initial real depreciation took place in most of the successful stabilizations reviewed in this paper.

But real appreciations took place also in the failed stabilizations--and hence the need to make budget reform the lynchpin of the stabilization. To prevent the renewal of inflationary momentum, the primary immediate objectives of policy should remain zero wage increases and zero currency depreciation. Removal of export taxes is a vehicle for improving competitiveness without the need to move the exchange rate. Selective liberalization of tariffs on imports of raw materials and other industrial inputs would help reduce costs without adverse effects on domestic employment, thus further moderating inflationary pressure.

## 8. CONCLUSIONS.

Table 20 provides a capsule comparative summary of features of the stabilizations. We start by drawing out a few major conclusions, and then compare the recent Israeli and Argentinian stabilizations with earlier attempts.

The key issues are the budget, the exchange rate, and money. Budget deficits were significantly reduced in each of the stabilizations, but were not in all cases completely removed. In the Austrian stabilization, foreign loans provided a two year period during which the budget was brought into balance after a sharp initial cut; in the Italian stabilization a large deficit of about 10% of GNP remained. However, with Italy growing fast and the national debt small, the government could easily finance itself without resorting to inflationary money base creation. In addition to spending cuts, there was in each case a significant budgetary gain to the government from the reduction in real tax losses due to inflation.

The exchange rate was pegged in each of the stabilizations except the Italian, where the lira was in principle left to float. Even here after effectively unifying free and official exchange rates, the authorities in practice intervened to keep the rate in a narrow band, and maintained exchange controls. Exchange rate pegging may be a necessary condition for stabilization, but it is certainly not sufficient--as failed attempts at stabilization through exchange rate pegging in Germany, Austria, Poland, Israel and Argentina establish. The successful stabilizations typically start with substantial real devaluation, followed during the early part of the program by real appreciation as prices rise while the exchange rate remains fixed. Without the initial over-devaluation, a balance of payments problem would result from the appreciation.

TABLE 20 SUMMARY OF THE CHARACTERISTICS OF DIFFERENT STABILIZATIONS

	GERMANY 1923	POLAND 1924	FRANCE 1926/27	AUSTRIA 1922	ITALY 1947	ISRAEL 1985	ARGENTINA 1985
BUDGET	Balance after a few months	Temporary Improvement	Surplus	Reduction, foreign borrowing	Large deficit remained	Deficit cut from 17% to 8%	Deficit cut from 12% to 3%
CURRENCY REFORM	Yes, Rentenmark in 1924 Goldmark	Yes	No	Later	No	No	Yes
EXCHANGE RATE	Initial Depreciation then fixed	Fixed for 1 year	Stabilized	Stabilized, some nominal appreciation	Stabilized de facto	Fixed	Fixed
EXCHANGE CONTROL	Yes	Yes	No	No	Yes	Yes	Yes
MONEY GROWTH	Currency up 700% in 2 months, then doubling over the next year	Rapid for 3 Quarters, then 0 for 6 months	2% per month over next year	5% per month over next year	Briefly lower	M2 up 75% in 2 months, nominal credit cut	M4 up 40% in 4 months, other Ms about 60%
INFLATION	Immediate stop, some initial deflation	Almost 0 within 6 months	Stopped immediately	Stopped immediately modest later	Deflation	Cut to 3% per month in 3 months	Cut to 2% in 4 months
WAGE-PRICE CONTROLS	Uncertain as to prices, no general controls on wages and prices	No	No	No	No	Yes	Yes
FOREIGN LOAN	Discussions started a few months after the stabilization; Dawes Loan a year later.	Yes	Yes, with foreign supervision	Yes, with League of Nations Supervision	Marshall Plan expected	Yes	IMF stand-by agreement, Baker Plan
RESTRICTIONS ON BUDGET OR MONEY ISSUE	No monetization of deficits, initial credit allocation to gov't of fixed amount; marginal reserve requirement on money issue	No money issue for Treasury (7)	No money issue to finance gov't, and reserve requirement	No money issue to finance gov't, and reserve requirement	Some	To become effective later	No money issue for gov't, tight credit ceilings under IMF Plan

	CERMANY 1923	POLAND 1926	POLAND 1926/27	AUSTRIA 1922	ITALY 1947	ISRAEL 1985	ARGENTINA 1985
REAL INTEREST RATES	11.5% a month one month later declining over next 6 months			Up	Up, falling	Very high for 3 months, then cut sharply	Up sharply, 6% per month after 6 months
PARALLEL EXCHANGE RATE	Collapsing over 1 month, down to official after 8 months				Premium disappears, rates unified	20% premium falls to 8% within 4 months	15-20% premium
REAL WAGE	Up sharply				Up	Cut sharply	Cut sharply, rising
UNEMPLOYMENT	Up sharply, then declined, rising once more in credit crunch	Up	Up		Up some	Up, rising	Up
REAL EXCHANGE RATE	Real Appreciation after initial real depreciation	Appreciated	Appreciated	Up	?	Real depreciation followed by some real appreciation	Real depreciation followed by some real appreciation
SUBSIDY CUTS							
PUBLIC ENTERRISE ISSUES	Correcting deficits in post office and State railroads, employment cuts						Major issue
PREVIOUS STABILIZATION FAILURES	1921, Feb-March 1923	1921	1924	Some attempts in 1922	No	Yes	Many

Perhaps the most overlooked lesson of the stabilizations is the need to print money after stabilizing. Ultimately, after the economy is reliquified, money growth will return to low levels. But as Sargent (1982) and others who have studied the stabilizations have pointed out, initial money supply growth is rapid. Thus any policy package that makes a fetish out of limits on money growth to secure credibility is heading for trouble. The trouble shows up in high real interest rates--which have been a feature in any case of all the stabilizations--that are prolonged to the point where either serious recession or a violation of the money growth limits result. One of the benefits of focussing on the exchange rate and the budget as intermediate targets of policy is to divert attention from money, where the path required for stabilization is not one that makes sense to believers in a simple quantity theory. And after a hyperinflation, the quantity theory looks good and may indeed lie behind private sector expectations.

Legal restrictions on money issue and/or budget deficits were introduced in several stabilizations. Their power cannot be judged without evaluating the political and legal situation in each country, but it is clear from the Polish case that they may be circumvented in unusual ways.

Foreign loans or their prospect, appear in all the stabilizations. In the pre-World War II cases, they were in some cases a signal rather than an inherent necessity--the Polish loan in 1927 is a good example. In general though the foreign loan provides reassurance that the exchange rate can be held, and certification that outside governments are sufficiently impressed by the stabilization plan to bet on it.

Stabilizations typically cause unemployment, followed as they are by a credit squeeze. Whether the unemployment is inevitable is equivalent to asking whether a credit squeeze and high real interest rates can be avoided. Given negative real rates in many of the inflations, an increase in the real rate is frequently unavoidable. It is less obvious that the rate has to be high. Because the successful stabilization is typically not the first attempt, high real rates may be needed for some time. The success of the 1947 Italian stabilization on the first try with relatively little disruption and low nominal interest rates supports the view that high real rates are the price paid for the effects of previous failures on expectations. The creation of unemployment following a stabilization does not mean that the previous hyperinflationary situation was better, but it does mean that it is not credible to promise painless disinflation even when it is a stabilization from economic disorder.

The two ongoing stabilization attempts, of Israel and Argentina, differ in several respects from the 1920's cases. The major difference is in their attempt to move the economy at once to a new low inflation equilibrium through wage and price controls implemented at the same time as macro policy measures--the cut in the budget, devaluation and subsequent exchange rate pegging, and monetary measures--that should make that low inflation equilibrium sustainable. They differ also in that the Argentinian and Israeli economies were in far better shape in 1985 than Germany, Austria and Poland in the 1920's.

We have not to this point touched on the credibility issue, which has received much attention particularly in the Argentinian stabilization.

The point of multiple rational expectations equilibria introduced in Section 1 is that the fundamentals are not necessarily sufficient to tie down the inflation rate. We do not want to exaggerate though. In both the Israeli and Argentinian cases the governments were not previously running policies that could have produced low as well as high inflation.

But once the fundamentals are in place, there is still a credibility problem. The credibility issue can be best understood by considering a government that initiates a stabilization program that will cause unemployment, but that will give it up if unemployment reaches a high enough level. Whether it carries through its program depends on whether prices and wages respond quickly, or whether rather inflation is ground down through the Phillips curve unemployment mechanism. And whether that happens may well depend on whether the private sector is convinced that this is a serious stabilization attempt.

In this view, the modern stabilization try to short-circuit the problem of private sector expectations by using controls to move wages and prices quickly to the low inflation equilibrium. This choice is made not in ignorance of the distortions caused by wage and price controls, but rather on the judgment that relative price distortions during temporary controls that end in stability are far less costly than the unemployment that would otherwise be needed to drive inflation down.

The use of wage and price controls does not remove the credibility dilemma--for the controls have ultimately to be lifted--but it does give the governments more time to demonstrate that they have made fundamental changes in policy. In the meantime, as we saw above, the fact of price stability



helps improve the budget immediately by removing the inflation erosion of tax receipts. But unless the Israeli and Argentinian governments quickly reach and maintain budget deficit levels that are sustainable without inflationary finance, their stabilizations will fail.<sup>47</sup> Failure can come not only from not cutting existing spending or raising revenues<sup>48</sup>, but also from maintaining recessionary pressure for too long.

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<sup>47</sup> Opponents of wage and price controls argue that the controls frequently substitute for rather than complement fundamental changes in policy. That is no doubt correct, but does not mean that they should not be used in conjunction with a serious stabilization package. Rockoff (1984, p246) concludes his book on United States wage and price controls: "They are a medicine to be used to dull the pain and tranquilize the patient while monetary restraint and reform of our fiscal affairs work the fundamental cure. ... [T]he extremists on both sides of the debate over controls are wrong. Controls are more than a mere placebo. But they will never be a wonder drug for an ailing, inflationary economy."

<sup>48</sup> The proportions in which these measures are applied depends on the details of the budget in each country.

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PUBLIC ENTERPRISE ISSUES	Correcting deficits in post office and State railroads, employment cuts						Major issue
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