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Economic costs of large public sector deficits and high inflation: The Argentine lesson

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Economic Costs of Large Public Sector
Deficits and High Inflation
- The Argentine Lesson -

by

Bernhard Fischer and Peter Trapp

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Introduction*

Governments faced with high inflation and large public sector deficits are generally more concerned with the recessionary consequences of restoring fiscal discipline and of adopting anti-inflationary monetary policies than with the economic costs in terms of weaker economic growth and undesirable distributional effects resulting from high budget deficits and inflation. Therefore, instead of fighting inflation, governments often try to make high inflation socially tolerable by selective price controls, indexation of minimum wages, and other interventions. At the same time budget deficits are increasingly financed by credits from the Central Bank in order to prevent private demand from being crowded out by higher interest rates.

Economic history provides some examples of the disastrous effects of persistently financing large budget deficits by printing money. In the 1920s several European countries experienced as a consequence a dramatic hyperinflation which could only be stopped by drastic monetary and fiscal reforms (Sargent, 1982). However, these events have not deterred other countries from pursuing inflationary policies either on the pretext of an emergency - e.g. when governments fear an overthrow if domestic demand were cut effectively - or in the belief that they can avoid the economic costs of inflation. An outstanding example provides the economic policy in Argentina, where inflation has deliberately been used as a means to finance the public sector deficit over the long term.

The objective of this paper is to analyse the Argentine experience of large public sector deficits and high inflation, to elaborate the collection and dynamics of the inflation tax used to public financing and to identify the economic costs of this policy. Strong references are made to the experiences of other countries during periods of high inflation. Finally, some policy options are dealt with.

The Public Sector Deficit and Inflation in Argentina

Over the past 20 years the public sector deficit in Argentina has grown considerably. According to Central Bank calculations the deficit of the non-fi-

* We thank Philippa Dee for helpful comments.

financial public sector has increased from an average of 3 p.c. of GDP in the second half of the 60s to about 16 p.c. of GDP in the early 80s (Table 1).¹ These numbers do not include those subsidies implicit in extensive credits to the private sector by state-owned banks at relatively low interest rates. Cavallo and Peña (1983) estimated that the deficit including public financial institutions has risen to more than 20 p.c. of GDP. The data problems are considerable because information on financial operations of the public financial sector (Central Bank and associated institutions), especially on interest subsidies and the costs of the large scale financial rescue operations in recent years, are sketchy or completely lacking. In part, the problem results from deficient accounting methods. For example, pension payments are credited to the accounts of the recipients at the beginning of each month, whereas the corresponding transfer of funds from the public sector to the banking system is carried out with a lag of several weeks or even months. Therefore registered expenditures lag behind actual payments. If pension payments had to be financed properly by bank credit, when they fall due, public expenditures on interest would be considerably higher. Assuming an interest rate of some 15 p.c. per month accrued interest would accumulate to the initial amount of the credit in less than 5 months. If, however, such expenditures were financed by the Central Bank, the circulation of high powered money would rise sharply. Notwithstanding the statistical deficiencies the numbers shown in Table 1 convey a notion of what has happened to the public sector deficit in Argentina over the last 20 years.

Inflation too, has increased since the mid-60s. In the second half of the 60s the average annual rate of inflation was about 20 p.c.; in 1983 it amounted to more than 400 p.c. (Table 1). The rate of inflation as well as the public sector deficit has not risen steadily. From a low point of 2 p.c. of GDP in 1969, the deficit started to expand in the 70s under the Peronist government and climbed to 14 p.c. of GDP in 1975. In the following years, when the Martinez de Hoz administration was in office, it was reduced to about 9 p.c. of GDP, whereas in 1980 it began to increase again and reached a new peak in 1983 (Figure 1). Inflation exhibits a similar pattern with relatively low rates in 1969 and 1980 and much higher rates in 1975/76 and since 1983 (Figure 1).

¹ The non-financial public sector comprises the central government, the non-financial state enterprises, and the provincial and municipal governments.

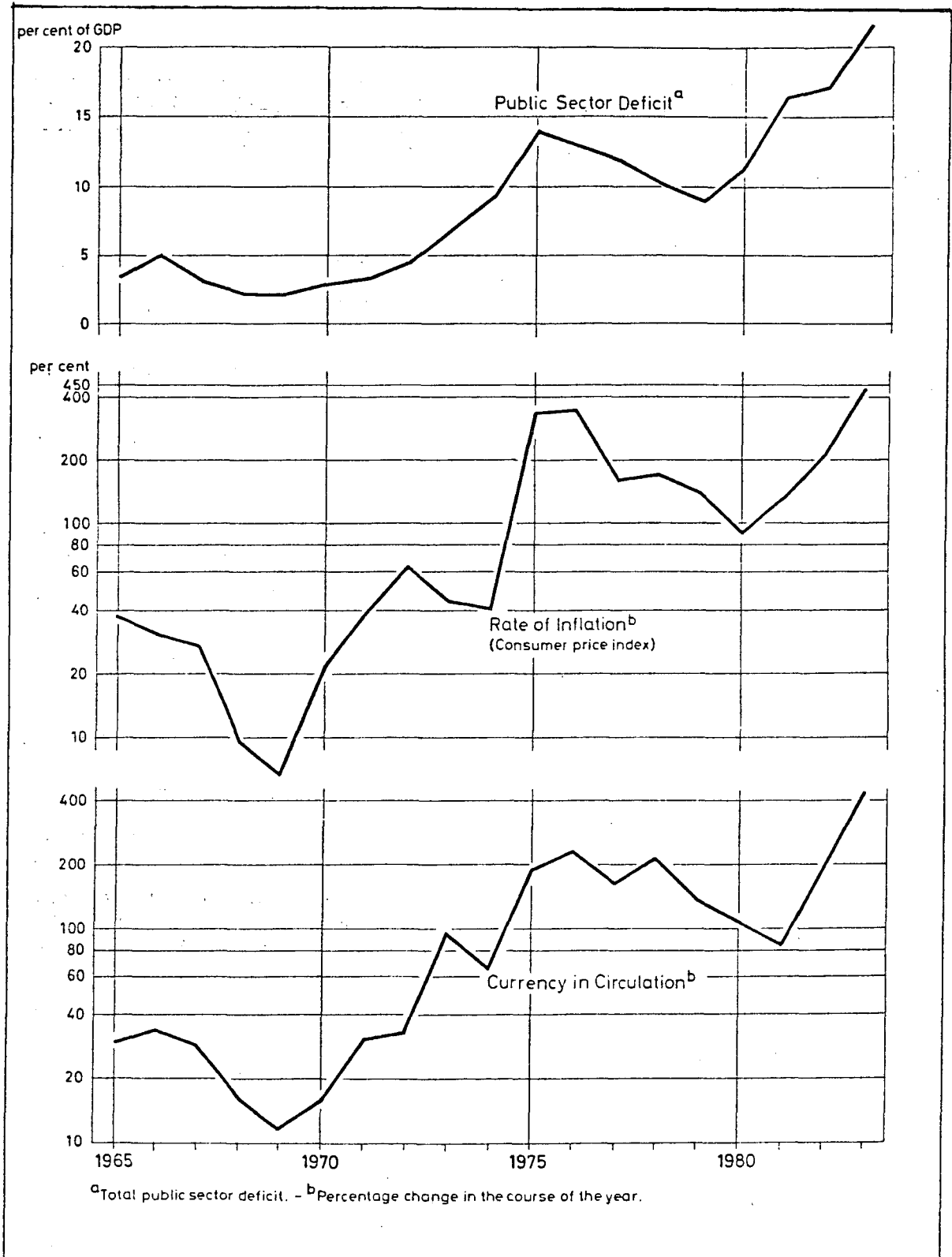
Table 1 - Argentina: Public Sector Deficit, Inflation, and Monetary Expansion, 1965-1983

	1965-69	1970-74	1975-79	1980	1981	1982	1983
Non-financial public sector ^a (In per cent of GDP)							
Outlays	33.8	34.3	40.5	44.2	51.6	48.6	49.7
Revenues	30.8	28.8	31.5	36.6	36.0	32.1	33.9
Borrowing requirements	3.0	5.5	9.0	7.6	15.6	16.5	15.8
Total public sector deficit ^b	3.1	5.3	11.6	11.3	16.4	17.2	21.5
Inflation (Percentage change)							
Consumer price index ^c	20.1	55.4	198.9	87.6	131.3	209.7	433.7
Money supply (Percentage change)							
Currency in circulation	23.7	45.6	183.5	108.6	84.0	189.2	430.5
M ₁	25.5	48.4	174.3	97.8	68.5	222.5	307.6

^a Central government, non-financial state enterprises, provincial and municipal governments. - ^b Non-financial public sector plus Central Bank and public financial institutions. - ^c Annual rate of change in the course of the period. -

Source: BCRA, Cavallo and Peña (1983), Dornbusch (1984).

Figure 1: Argentine: Public Sector Deficits, Inflation, and Money, 1965-1983



Source: See Table 1

An increase in the public sector deficit does not necessarily lead to an acceleration of inflation. The experience in the USA in the first half of the 80s has shown that a substantial increase of the deficit (in that case from 2 to 6 p.c. of GDP) can even be accompanied by a declining rate of inflation, as long as monetary policy sticks to a money stock target consistent with a reduction of inflation rather than to an interest rate target. The coincidence of large deficits and galloping inflation in Argentina indicates that the Central Bank has pursued an accommodating policy or has even directly financed the budget deficit.

Estimates of the sources of financing the deficit by Cavallo and Peña (1983) are given in Table 2. The numbers show that Central Bank credit has always been heavily used to cover the financing needs of the government. On average about 60 p.c. of the deficit was financed directly by the Central Bank during 1970-1983. From 1975 to 1982 some 15 p.c. of total public expenditures were paid for by issue of new money. In 1983 and 1984 this share rose to more than 45 p.c., coming close to the ratios which were observed immediately before or during the hyperinflations in some European countries in the 1920s (Table 3).

During the late 70s and the early 80s - under the Martinez de Hoz and the Sigaut administrations - a substantial part of the deficit was financed in the domestic credit market (bank credit and bond sales) and in the international capital market. This policy helped to reduce inflation from over 400 p.c. in 1976 to about 100 p.c. in 1980. However, "the disinflation was only borrowed by overvaluation, not earned by a thorough going domestic disinflation" (Dornbusch, 1984, p. 8). No progress was made in reducing expenditures or improving tax collection in order to reduce the budget deficit and the funds borrowed were not invested in such a way as to earn the money (or the foreign exchange when credits were denominated in foreign currency) required to service the public sector debt.¹ Public expenditures labelled as investment

¹ In view of the experience in many countries with fiscal policy in the post-war period it appears hard to imagine such investment behavior of the public sector. This was different in the 19th century. In Prussia, for instance, the railway which was run by the government contributed strongly to public revenues (Laaser, 1983, p. 10).

Table 2 - Argentina - Financing of the Public Sector Deficit,
1965-83 (In per cent of GDP)

Year	Total public sector deficit	Financing of the deficit		
		Central bank	Domestic credit market	International credit market
	(1)	(2)	(3)	(4)
1965	3.4	1.9	1.8	-0.3
1966	5.0	2.8	2.1	0.1
1967	3.1	3.5	1.8	-2.2
1968	2.1	1.4	1.4	-0.7
1969	2.0	-0.2	0.6	1.6
1970	2.8	1.9	0.7	0.2
1971	3.2	1.2	0.0	2.0
1972	4.4	2.2	1.4	0.8
1973	6.9	5.6	2.8	-1.5
1974	9.3	6.4	2.8	0.1
1975	14.1	7.7	6.2	0.2
1976	12.9	10.4	7.6	-5.1
1977	11.9	12.2	4.3	-4.6
1978	10.1	7.0	5.6	-2.5
1979	9.0	4.5	6.4	-1.9
1980	11.3	3.2	2.8	5.3
1981	16.4	2.9	6.5	7.0
1982	17.2	4.1	7.2	5.9
1983	21.5	21.5	0.0	0.0

Source: Cavallo and Peña (1983, p. 39-78) - Dornbusch (1984).

Table 3 - Inflationary Public Finance in Selected Countries in Periods of Hyperinflation

Country	Period	Percentage of Expenditures Covered by New Issues of Paper Money
Austria	1919-1922	55.6
Hungary	1920-1924	31.8
Poland	1921-1923	54.1
Germany	1920-1924	66.0
Argentina	June 82-June 1985	45.0

Sources: Austria, Hungary, Poland and Germany: Sargent (1982); Argentina: Cavallo and Peña (1983), BCRA (1983). Own estimates.

in real assets dropped from about 11 p.c. of GDP in the Martinez de Hoz period to less than 8 p.c. in the period from 1982-1984.¹

Since the budget deficit remained persistently high, public sector interest payments increased from about 2 p.c. of GDP in 1977 to about 12 p.c. in 1982. As a proportion of total public sector outlays, expenditures on interest amounted to 25 p.c. in 1982; some 70 p.c. of this was related to domestic public debt. Obviously the interest burden itself was a factor contributing to the persistence of the budget deficit. In addition, real per capita income in Argentina had fallen between 1977 and 1982 by some 15 per cent; thus the income out of which interest and amortization could be paid was much smaller in 1982 than in 1977. Therefore, the Bignone Government, which took office in mid-1982, decided to refrain from further expanding its domestic debt. However, instead of cutting expenditures in order to reduce the deficit the government relied more heavily on the central bank in financing its deficit

¹ What is worse, a great deal of these outlays were spent in an inefficient way as is evidenced by the high losses of public enterprises.

(Table 2). As regards the external debt, it became increasingly difficult to make due interest payments in the course of 1982 because of insufficient export earnings, rising international interest rates, and the appreciation of the US dollar. In addition, the term structure of foreign debt had seriously deteriorated. About 50 p.c. of external loans to Argentina were scheduled for repayment in 1983. Since lenders were reluctant to renew the debt, Argentina was threatened with external insolvency. Needless to say, that under such circumstances the country was barred from any further access to the international capital market.

Thus, from mid-1982, the problem of the budget deficit had to be handled more or less by a closed economy. The governments had to rely totally on domestic sources in financing the excess of expenditures over revenues. As ex-ante (planned) private savings were not sufficient to provide the funds needed to finance both private investment and the public sector deficit, and as a reduction of the deficit did not seem to be opportune for political reasons, the deficit was financed by issuing new money (Table 2). Indeed the Bignone Government ruled out an increase in public debt with the private sector in order to prevent any further increase of public interest payments. The Alfonsín administration, which came into office at the end of 1983, continued to finance the public sector deficit by printing new money.

The Collection of the Inflation Tax

From 1970 to 1983 the total public sector deficit amounted to an average of 10.5 p.c. of GDP. That part of the deficit financed directly by the Central Bank, was in the order of 6 p.c. of GDP. On average this produced an increase of the monetary base by about 60 p.c. per annum¹. In 1983, when the deficit was totally financed by the Central Bank, the increase in high powered money was about twice as large as the monetary base at the beginning of the year.

¹ It should be noted that the monetary base has not been adjusted for the introduction of 100 p.c. reserve requirement ratios under the Peronist government and in 1982. In spite of this restrictive measure monetary expansion accelerated strongly because of the deficit induced increase in the monetary base and ample rediscount facilities provided by the Central Bank.

Large scale financing of public expenditures by issuing money has led to a persistently high rate of inflation in Argentina. As long as the deficit-induced increase of the monetary base was unexpected this had an expansionary effect on the economy. Private non-banks found themselves holding higher money balances than they wanted given the volume of planned transactions, the expected change of the price level, and the cost of holding money. Consequently, they expanded their demand for interest-bearing financial assets as well as for goods and services. For a time, thus additional demand led to an acceleration of inflation and a decline in real interest rates.

However, in a country with a long history of inflation such as Argentina, people can be expected to adjust their expectations to higher rates of inflation after a time. The predominance of short term contracts, frequent price changes and large-scale indexation gives evidence of this adjustment. In such an environment, any increase in the money supply which is consistent with the expected rate of inflation is not likely to have a noticeable impact on real demand and output. As the excess of public expenditures over ordinary (tax) revenues does not have an expansionary effect on output in the longer run, and since the increase in domestic demand cannot be satisfied by higher imports indefinitely, real absorption of the private sector has to be restricted.

The way to achieve this is inflation; the fall of the purchasing power of money diminishes the spending capacity of the private sector, while at the same time private net real wealth is reduced and the government's liabilities in real terms decline. Therefore, inflation operates like a tax on money holdings; for non-interest bearing financial assets (currency and demand deposits) the tax rate is equivalent to the rate of inflation. For deposits which earn an interest rate less than the rate of inflation, the tax corresponds to the negative real rate of return. The peculiarity of the inflation tax is that the revenues are determined in real terms, i.e. by the heap of goods and services which the government acquires by spending newly issued money, and that the wealth transfer is realized before tax payments in terms of purchasing power losses are made. Since notes and coins are a liability of the public sector, the tax on private sector holdings of such assets is directly collected by the government via a capital gain. The distribution of revenues from the taxing non-interest bearing demand deposits and deposits with a negative real rate of return depends on institutional arrangements. With a private banking sector and a fractional reserve system, the revenues of the

government are determined by the reserve ratios. Part of the wealth transfer may remain in the banking sector or, when lending rates are fixed below market rates, may go to debtors. The latter two cases imply a non-budgetary subsidization of the banking sector or of debtors which in principle should be added to public expenditures.

In Argentina, in order to channel inflation tax revenues fully to the government, reserve ratios have been kept at or close at 100 p.c. most of the time. In 1977 during the Martinez de Hoz tenure the Central Bank started to install a fractional reserve system and introduced the Monetary Regulation Account¹. Under this regulation the Central Bank imposed a charge on banks' demand deposit liabilities by which inflation-induced capital gains were transferred from the banking sector to the Government. In mid-1982 reserve ratios of 100 p.c. were reestablished and there has been little change since then.

Thus on the whole, inflation tax revenues have been fully collected by the government in Argentina. If we assume that there are no negative real rates of return on interest bearing deposits the inflation tax is determined by

$$M1 \cdot \dot{p} = FM$$

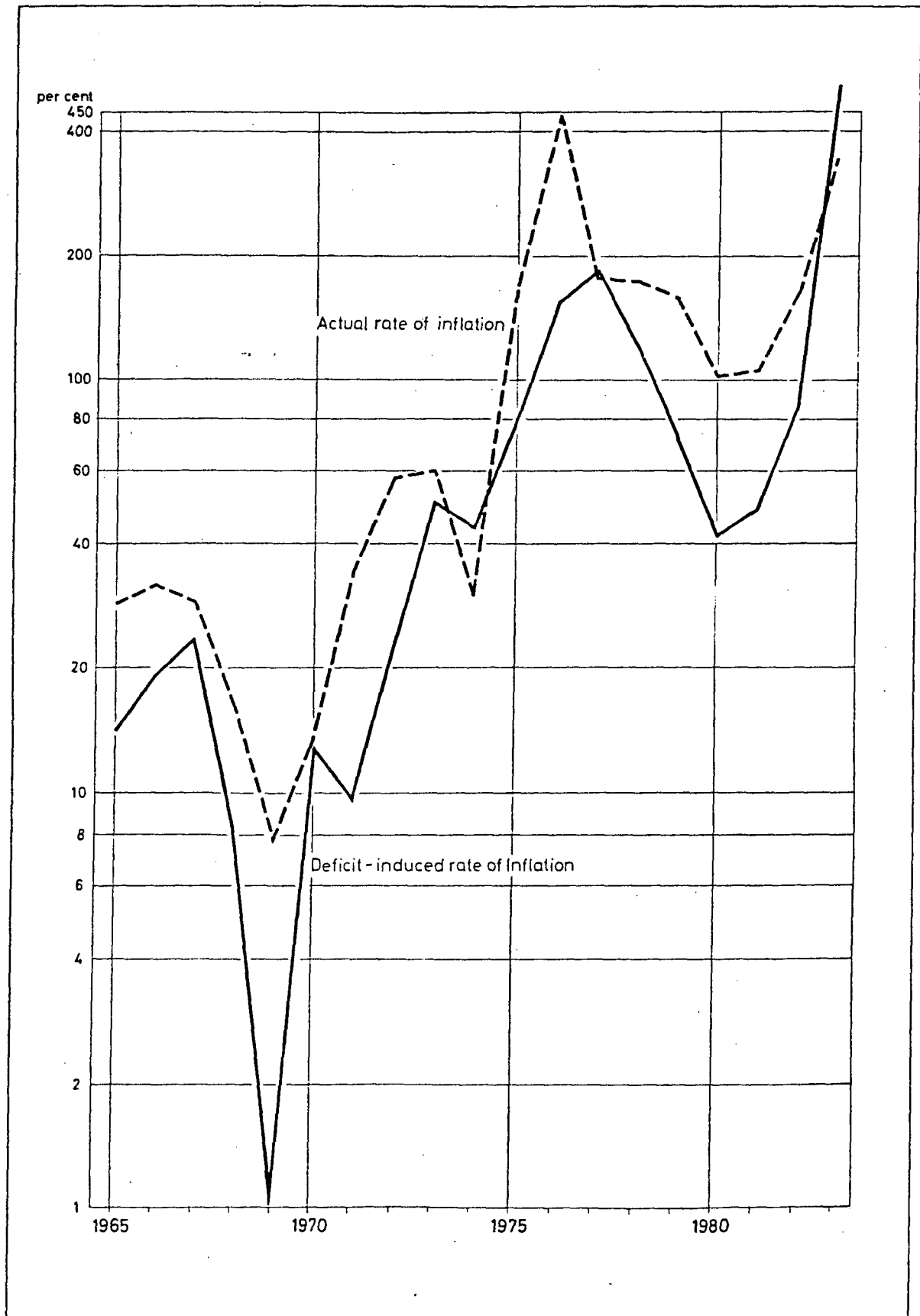
where \dot{p} is the rate of inflation and FM is the part of the public sector deficit which is financed by issuing new money. Accordingly, the rate of inflation originating from the budget deficit can be expressed as

$$\dot{p} = \frac{FM}{M1}$$

A comparison of the actual rate of inflation and the deficit-induced rate of inflation suggests that inflationary public finance has been the main cause of inflation in Argentina (Figure 2).

¹ For a detailed description and analysis of the Monetary Regulation Account see Fischer, Trapp (1985b).

Figure 2: Argentina: Actual and Deficit-Induced Inflation, 1965-1983



Source: See Table 1. - Own calculations.

The Dynamics of the Inflation Tax

In view of the poor state of the regular tax collection system in Argentina, taxation of those who hold money by means of inflation may appear to the government to be a convenient and efficient way to finance the budget deficit: convenient because the tax can be imposed without any kind of parliamentary procedure and efficient because tax revenues accrue automatically and have not to be collected. Heavy reliance on the inflation tax, however, will lead to tax evasion, as with any tax whose burden becomes excessive.¹ The problem arises in this case because the tax base - i.e. the real stock of money - cannot be controlled by the government. There is ample empirical evidence that the demand for real money balances declines when the cost of holding money, i.e. the rate of inflation, increases (Laidler, 1969). Demand for real money balances would only rise if the public expenditures financed by newly issued money were expected to promote the growth of aggregate supply and thus raise income expectations rather than inflation². Experience, however, gives scant reason to expect such an outcome. In Argentina, public expenditures have primarily been used for consumption purposes and hardly for expanding production capacity. An increase of the budget deficit is therefore more likely to lead to higher costs of holding money. Consequently firms and households will reduce their desired balances of currency and demand deposits (in real terms) for a given volume of transaction. Thus, although the nominal stock of money continues to rise, money balances in relation to nominal GDP decline when the rate of inflation increases.

In Argentina, the ratio of M1 in real terms to real GDP has dropped from about 12 p.c. in the early 70s to 7.7 p.c. in 1980 and to some 4 p.c. in 1983 (Table 4) close to levels experienced elsewhere during the hyperinflations of the 1920s. The adjustment of money balances to the increase in the cost of holding money has also lead to marked changes in the composition of monetary aggregates. During the first half of the 70s demand deposits were higher than currency holdings. Since 1976, however, there has been a steady decline

¹ This fundamental but often ignored point is illustrated by the Laffer-curve (Canto, Joines and Laffer, 1981).

² In this unlikely case the government behaves similar to an honest money producer (Sjaastad, 1982). The difference, however, is that the income from public investment is not earned by the government but enhances private revenues.

Table 4 - Argentina: Liquidity Coefficients^a, Currency-Deposit Ratios and Money Multiplier, 1970-1984

Year	Monetary base/GDP	M ₁ /GDP	M ₂ /GDP	Demand deposit currency ratio	Time deposit currency ratio	Money multiplier ^b
1970	10.5	14.7	25.1	1,052	1,451	1,395
1971	8.4	12.6	21.9	1,136	1,569	1,497
1972	6.3	9.7	17.1	1,290	1,729	1,536
1973	8.0	11.0	19.0	1,371	1,746	1,372
1974	12.3	14.8	26.3	1,289	1,787	1,197
1975	8.3	10.0	14.8	1,244	1,105	1,192
1976	7.3	6.7	9.6	1,517	1,075	0,922
1977	9.3	6.5	13.6	1,311	2,537	0,720
1978	10.6	6.4	17.9	0,986	3,562	0,604
1979	7.7	6.2	19.5	0,942	4,179	0,804
1980	7.1	7.7	25.4	0,806	4,134	1,090
1981	7.1	6.0	22.9	0,629	4,568	0,845
1982	11.9	4.7	15.6	0,719	3,928	0,398
1983	12.8	4.1	12.4	0,699	3,016	0,321
1984 ^c	11.8	4.0	11.0	0,582	3,016	0,337

^aMonetary aggregates deflated by the index of wholesale prices (1970 = 100) and divided by real GDP at market prices. - ^bM1/Monetary base. - ^c1st. Quarter.

Source: BCRA. - FIEL.

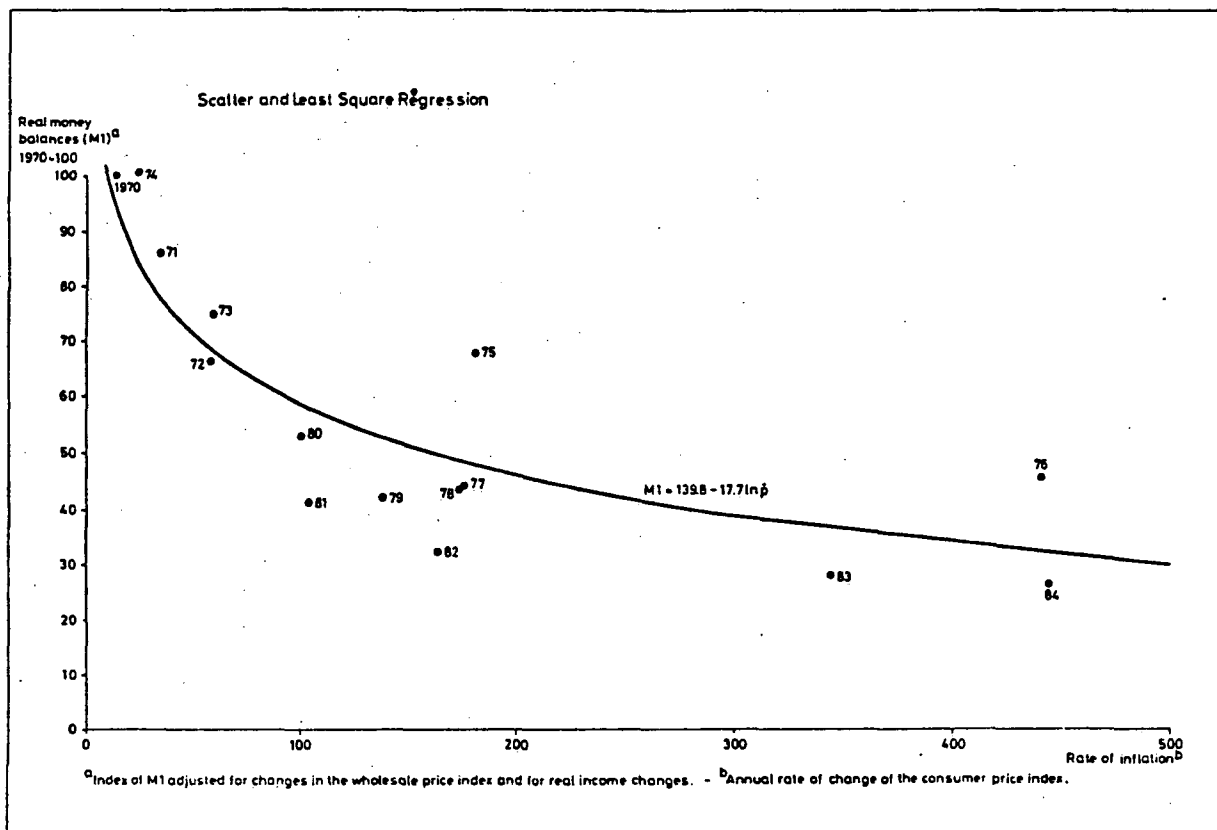
of those deposits relative to currency. The demand deposit-currency ratio fell from 1.5 in 1976 to 0.8 in 1980 and 0.5 in 1984. At the same time, the time deposit-currency ratio has increased, probably partly owing to the shift of funds from demand deposits to time deposits in order to avoid the inflation tax. The expansion of time deposits was particularly strong when real interest rates - on average - were positive, i.e. from 1976 to 1981. However, when the deposit rates were fixed below the rate of inflation holdings of time deposits declined quickly. This has been the case since 1981. In 1984 the time deposit-currency ratio was about one third lower than in 1981, indicating that private households and firms have invested their savings in other kinds of assets.

A similar reduction of real monetary aggregates could be observed during the hyperinflations of the 1920s (Sargent, 1982). Both then and now some commentators have argued that the increased note issue of the Central Bank could not be regarded as the main cause of inflation because of the decline of the real money stock (Schvarzer, 1983). That argument, however, is fallacious; it is turning things upside down. In fact, inflation is the consequence of expanding the nominal money stock persistently in excess of the growth of nominal potential output. The attempt to economize on the holdings of a rapidly depreciating money is the result of inflation, but at the same time this behaviour contributes to the acceleration of inflation because it implies a shrinking of the tax base. Once inflation rates are very high, the influence of other determinants of the demand for real money balances, i.e. changes of real income and interest rates, is comparatively small and can be neglected.¹ The demand for money simply becomes a function of the inflation rate.

The scatter diagram and the curve in Figure 3 illustrate this relationship for Argentina.

¹ For a thorough analysis of the inflation tax issue in more theoretical terms see Sjaastad (1982).

Figure 3 - Argentina: Real Money Balances and Inflation, 1970-1984



Source: BCRA. - Own calculations.

Assuming a linear semi-logarithmic relation between M1 (in real terms)¹ and the rate of inflation \dot{p} , a regression over the annual data from 1970 to 1984 yields the following equation:

$$M1 = 139,8 - 17,7 \ln \dot{p}. \quad R^2 = 0,84$$

$$(9,98) \quad (-6,52) \quad DW = 1,60$$

Then inflation tax revenues T are:

$$T = M1 \cdot \dot{p} = 139,8 \dot{p} - 17,7 \ln \dot{p} \cdot \dot{p}.$$

According to this equation tax revenues are maximized at a rate of inflation (compounded daily rate) of 24.5 p.c. per month. Fernández and Rodríguez (1984) alternatively estimate that revenues are maximized at a rate of inflation

¹ From 1970 to 1974 when inflation was relatively moderate real income changes may have influenced the demand for money noticeably. Therefore, M1 has been adjusted for real income changes.

of 30.8 p.c. The different results are probably due to differences concerning the test period and the specification of the demand for money function. We will discuss this question later on. In this context, the main purpose of the calculations is to demonstrate how inflation tax revenues depend on private non-banks behaviour, not to produce a policy guideline.

Sjaastad (1982) has shown that even under steady state conditions unstable inflation rates yield more revenues than a stable one. The concept of the revenue maximizing rate of inflation becomes more blurred when we allow for lags and take into account adjustment processes. What is crucial in the current context is that the government's capital gains from inflationary public finance are realized before the tax revenues accrue. If the process starts with a low rate of inflation the government may increase the rate of monetary expansion and consume an amount of goods and services that is larger than the inflation tax revenue during that period. Unless the change in money growth is fully anticipated by the public it will take some time until the rate of inflation has adjusted to the higher rate of monetary expansion. As long as the rate of inflation has not risen by the same amount as the rate of growth of the money stock both are better off, the government and the private sector. The government continues to realize capital gains, although at a declining rate. The private sector experiences income advances which are higher than the growth rate of potential output, due to high government demand. However, because of excess demand inflation will accelerate, real income gains will disappear and the real money balances will be adjusted to the increase in opportunity costs. Although inflation tax revenues now accrue at an accelerating rate, the realization of capital gains by the public sector decreases. At the same time, revenues from ordinary taxes tend to dry up because in view of high inflation, firms and private households try to delay tax payments as long as possible in order to realize a capital gain. While the budget deficit widens, it becomes more difficult for the government to obtain additional revenues by accelerating monetary expansion because the public learns to anticipate the increase of the money stock.

In this situation, the government will feel the need to launch a stabilization program. The plan has to include some drastic measures, e.g. a price and wage freeze or a cut of public expenditures, in order to achieve an immediate reduction in the public's inflation expectation. The stabilization measures will find public support because some inflation tax relief is urgently needed. Thus, if the government can establish some credibility with the public it may

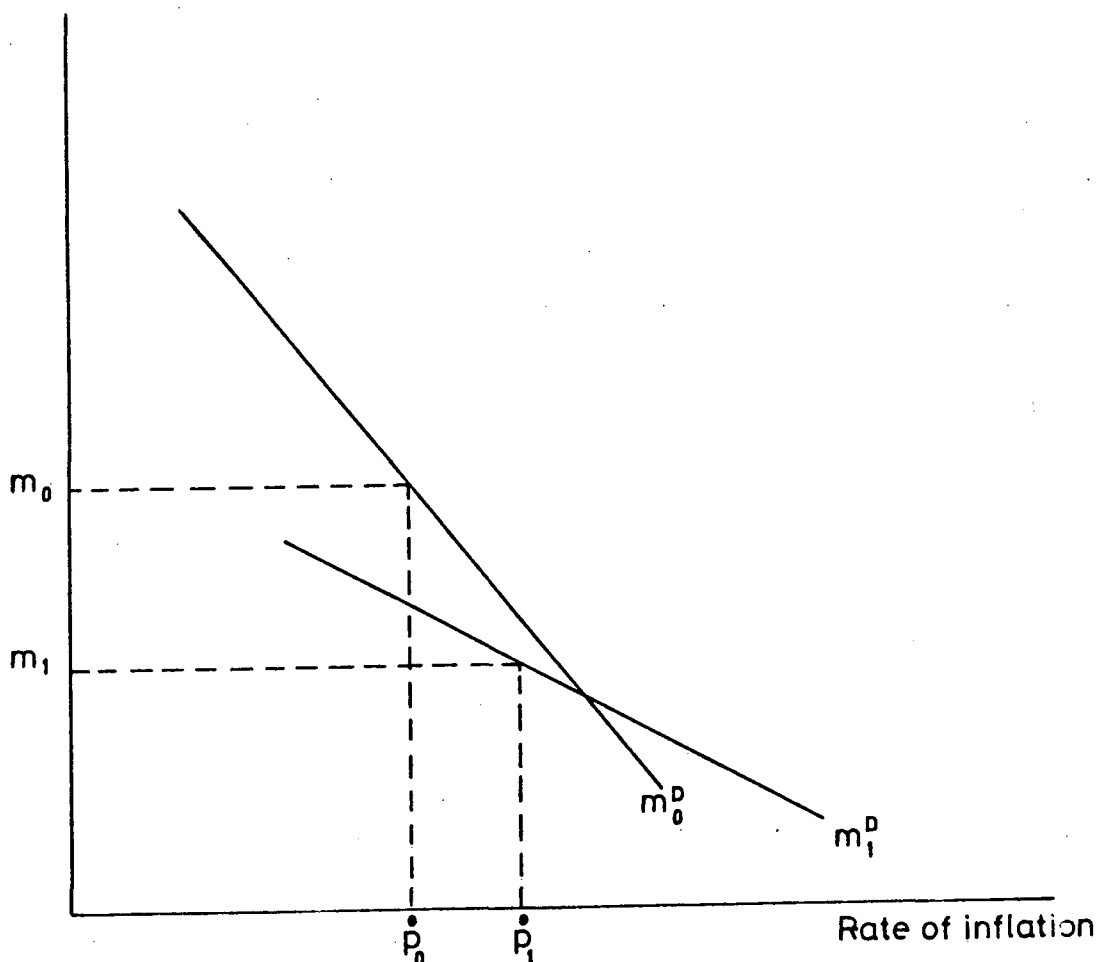
succeed in bringing about an exogeneous change in people's expectation concerning inflation. Whereas the success of the inflation tax in terms of high revenues hinges on the lagged adjustment of inflation, the success of the stabilization plan depends on a quick reduction of inflationary expectations. The demand for real money balances will increase only when the public can be convinced that considerably lower rates of inflation will prevail in the future. After some time, when the depressed state of the economy becomes a matter of concern there will be new scope for the government to increase expenditures. During the low inflation period the government may turn to the credit market at first to finance the deficit. But sooner or later it is likely to expand the money stock in excess of the actual rate of inflation in order to realize capital gains and to reduce the real debt by subsequent inflation.

A government may be able to fool all the people some of the time but one might question whether this is possible repeatedly or for longer periods. Experience suggests on the one hand that there is some scope for such policies, because by changing the government or the administration the credibility of stabilization plans may be enhanced and because intergenerational transfer of knowledge seems to be imperfect (Laidler, 1982). On the other hand, history has shown that the extensive and persistent use of inflationary public finance is a secure way to produce a flight from the domestic currency. Apart from the attempt to economize money balances people turn increasingly to barter trade and try to convert their financial assets into real goods, e.g. real estate, and into assets denominated in a currency which is considered to be more inflation-proof. These observations are not incompatible with the hypothesis that the demand for real money balances is a stable function of a few variables. However, they underline that the statement does not necessarily refer exclusively to the money issued by the domestic Central Bank. In an inflationary environment other currencies or currency substitutes will be used instead of domestic money. Money may be replaced by a great variety of goods. The use of cigarettes as money substitutes in Germany after World War II is an extreme example. Currency substitution occurs first of all in those cases where money is used as a store of value. In addition foreign currency is likely to be required for transactions in those goods which are held to shelter savings from inflation (real estate, gold, etc.). Thus, domestic money on which the inflation tax is levied is replaced by other kinds of money which are exempted from the inflation tax, i.e. the function representing the demand for domestic money is shifted to a position closer to the origin.

From Figure 4 it can be seen that the shift of the demand function from m_0^D to m_1^D has implications for the revenue-maximizing inflation rate and for the inflation tax revenues. For m_0^D the revenue-maximizing inflation rate is \dot{p}_0 and inflation tax revenues are $m_0 \cdot \dot{p}_0$. After the shift the revenue maximizing rate increases to \dot{p}_1 and the corresponding inflation tax revenues $m_1 \cdot \dot{p}_1$ are smaller than for m_0^D . This shows that after the adjustment of the demand for real cash balances to higher inflation the government has to accept more inflation than before to exploit the inflation tax, while in spite of this higher inflation tax revenues are lower.

Figure 4 - Demand for Money under Low and under High Inflation

Real money balances



Source: Figure 3.

The unwillingness to hold the domestic current intensifies inflationary pressures and accelerates the devaluation of the domestic currency. Therefore the government will intervene to stop this process. In order to maintain the basis for the inflation tax it will turn to capital controls and abolish the convertibility of the domestic currency. As the government is interested in preventing import price increases from accelerating domestic inflation it is likely to introduce steps designed to stabilize the exchange rate. Black markets emerge and unofficial foreign currency transactions are condemned as speculation and are blamed for the high rate of inflation. In fact, the process of substituting foreign money for domestic money contributes to the depreciation of the domestic currency. However, it is neither a cause of inflation nor an indication that inflation is self-generating but only a consequence of prohibitively high costs of holding domestic money.

Over the last 15 years Argentina seems to have been a laboratory for such policies.¹ Inflation has been high and has tended to be extremely unstable. Government administrations have been changed frequently - ministers of the economy have been in office for less than one year on average - in an attempt to obtain new credibility, and foreign exchange transactions have been severely regulated before and after the Martinez de Hoz period. A look at the scatter diagram in Figure 3 shows in more technical terms how the public has reacted to persistently high rates of inflation. The points in the diagram are combinations of real money balances and inflation for each year from 1970 to 1984. A closer inspection of the distribution of the points reveals that the combinations for the years from 1970 to 1974 are clustered around the upper, steeper part of the curve whereas the remaining points are distributed around the flat part of the curve. This indicates that during the inflation outburst in the mid-70s the demand for money function shifted closer to the origin and to a flatter position. Therefore the regression line in Figure 3 does not represent a "true" demand for money function but rather an average of two functions which can only yield an average of the revenue maximizing rates of inflation.

¹ Economic policy and economy performance of this period are reviewed in detail by Fischer, Hiemenz and Trapp (1984).

An estimation of demand for money functions for two subperiods yields the following results:

$$1970-1974: \quad M1 = 163,1 - 22,2 \ln \dot{p} \quad R^2 = 0,79 \\ \quad \quad \quad (8,52) \quad (-4,14) \quad \quad \quad DW = 1,36$$

$$1976-1984: \quad M1 = 110,2 - 13,7 \ln \dot{p} \quad R^2 = 0,74 \\ \quad \quad \quad (4,91) \quad (-3,21) \quad \quad \quad DW = 1,81$$

The coefficients differ in the expected way; the revenue-maximizing rate of inflation is 18.7 p.c. in the first period and 26.4 p.c. in the second period. Inflation tax revenues are higher in the second period. However this does not mean that the government is better off after the shift of the demand for money function. First, revenues would have been even higher if the function had shifted less, e.g., if the function in Figure 3 was valid. Second, the estimated relationship does not represent a long term position of the demand for money function. On the contrary, under persistently high inflation the function will stiff further to positions yielding less revenues at still higher rates of inflation.

Fernández and Rodríguez (1984) have compared the revenue maximizing rates of inflation and the respective amounts of revenues for hyperinflations in different countries (Table 5). Obviously there is a negative relation between the revenue-maximizing rate of inflation and the amount of revenues. This is not accidental but appears to have something to do with the inflation experience of the country. In Austria, Germany and Hungary (after World War I) hyperinflation was a new experience at that time, therefore relatively large inflation tax revenues could be mobilized at relatively low inflation rates. In countries, however, which have been plagued by high inflation for long periods, the revenue-maximizing rate of inflation is relatively high and the corresponding yield in terms of GDP is meagre. This indicates that in economies such as Argentina with a long history of high inflation, people have "successfully" learned to largely avoid the inflation tax. However, this does not mean that the economic costs of inflation are negligible.

Table 5 - Revenue-Maximizing Rates of Inflation and Revenues

Country	Revenue-maximizing rate of inflation	Revenues in per cent of GDP
Austria	12	26
Hungary (after World War I)	12	20
Germany	20	12
Greece	28	11
Argentina	30.8	8.3
Hungary (after World War II)	32	7
Poland	54	4
Russia	39	1

Source: Fernández and Rodríguez, 1984.

The Economic Costs of Inflationary Public Finance

Although the public might manage to reduce or to substitute the use of domestic money and thus be able to avoid the inflation tax, this does not mean that the detrimental effects of financial repression have been overcome; on the contrary, the adjustment to high inflation is costly and keeps real income at a lower level than otherwise would have been the case. Three kinds of economic costs may be distinguished.

First, the reduction of real cash balances implies a welfare loss for the economy in the form of the services of money foregone. More resources, i.e. real capital and labor, have to be employed to ensure a smooth execution of financial transactions. In addition, lower cash balances produced by the high cost of holding money mean less independence in short-run financial dispositions and a higher risk of being insolvent. Thus, the (net)utility that the public derives from holding highly liquid assets is reduced.

Second, high and unstable inflation rates discourage domestic savings and lead to a shortening of maturities in financial markets. In fact, the capital market has virtually disappeared in Argentina. Furthermore, the depth of the financial sector has suffered grossly from inflation. Compared to countries like Brazil and South Korea, which in per-capita income terms rank below Argentina, the deposit-income ratio is at a very low level (Fischer and Trapp, 1985a). One reason for the decline of financial markets may be that the risk of capital losses as a result of inflation rate variations is considered to be too high by savers as well as by lenders. If this were true a large scale indexation of financial contracts should bring about a recovery of financial markets and a lengthening of maturities. However, while indexation can eliminate the risk of changing inflation rates, it cannot neutralize the effect of those government interventions which are bound to occur when the government systematically exploits the inflation tax, e.g., severe restrictions on the use of foreign exchange or a partial or full-scale price freeze in an attempt to enhance the use of the domestic currency. The risk that the convertibility of financial assets will be reduced or abolished or that relative prices will be distorted makes investors prefer very short-term assets or projects. In Argentina, the acceleration of inflation from 1980 to 1984 was accompanied by a fall of gross investment by about 50 p.c.; the share of investment in GDP declined from more than 20 p.c. to less than 10 p.c. Thus, domestic capital formation has been severely impeded by the uncertainty produced by financial repression.

Third, the distributional effects of the inflation tax produce considerable macroeconomic costs. High and medium income earners have more possibilities to evade the inflation tax than low income earners. Those who are able to save may exchange their Pesos in the black market. It is estimated that some 5 bill. \$ are hoarded in Argentina and that Argentine residents hold about 30 bill.\$ in US bank accounts. Since there is no incentive to repatriate part of the capital or capital earnings, domestic savings remain inadequate. The main tax burden is placed on low income families that are neither able to acquire US-\$ nor to deposit large amounts in interest bearing accounts. Therefore the inflation tax leads to greater inequality and reduces the opportunities for social advancement for poor families. As a consequence the potential for social unrest increases and more energies are spent in conflicts over income distribution.

It is difficult to quantify these costs of inflationary public finance in terms of income forgone. Many reasons have been brought forward to explain the poor performance of the Argentine economy over the last 15 years. The oil price hikes, high interest rates, the debt problem, and protectionism are only a few of them. However, other countries, often less well endowed with natural resources than Argentina, have fared much better although they were exposed to similar shocks. Compared to some other Latin American or Asian countries the economic situation in Argentina has deteriorated dramatically. Brazil and Mexico, e.g., with a per capita income half as high as in Argentina in 1970 have caught up with Argentina (Fischer, Hiemenz and Trapp 1984: 17 pp.). Thus, while one cannot exclude that other shocks have led to frictions and temporary income losses, it seems to be fairly obvious that the economy would have been able to digest these shocks had it not been for the detrimental impact of domestic policies which undermined the strength of the economy and are the prime cause for the dismal economic performance of Argentina over the last 15 years.

Policy Options

Any attempt to reestablish the functioning of the financial sector and to stop financial repression must include a strategy of disinflation and a deregulation at the same time.¹ For a credible anti-inflation policy it is first and above all necessary to cut the public sector deficit drastically in order to reduce the deficit-induced expansion of the monetary base.

In June 1985 the government announced a new stabilization plan. The measures include a wage and price freeze and the introduction of a new currency (Austral) with a fixed exchange rate vis-à-vis the US-\$. Furthermore the government intends to reduce the public sector deficit to 2.5 p.c. of GDP in the second half of 1985. Unfortunately as to the last measure, which should be the most important part of the whole plan, the announcements remain very vague. The lack of immediate expenditure cuts reduces the credibility of the plan as a whole, since without such action the introduction of a new money

¹ For a more detailed discussion of a stabilization cum restructuring plan and of the rationale of such a program see Fischer, Hiemenz and Trapp (1984: 35 pp.).

constitutes only a currency change but not a currency reform. Doubts seem also be warranted because interest rates have been fixed at a level which at present inflationary expectations implies a heavy subsidization of lenders. It is true there is a price freeze. However, this is by no means sufficient to unwind inflationary pressures. Indeed, before the plan was implemented inflation rates rose above 1000 p.c. per annum in spite of price controls. In addition, production and investment incentives have been further reduced by an increase of export taxes.

All in all, there is little evidence that the new stabilization plan will be more effective than previous ones. Indeed, given the measures taken so far the risk of a failure appears to be large. Therefore, one can only hope that the announced reduction of the budget deficit will follow soon and that by this the chances for a revitalization of the Argentine economy will be improved.

A b b r e v i a t i o n s

BCRA	- Banco Central de la Republica Argentina
FIEL	- Fundación de Investigaciones Económicas Latinoamericano
GDP	- Gross Domestic Product
IFS	- International Financial Statistics
IMF	- International Monetary Fund
INDEC	- Instituto Nacional de Estadísticas & Censos
\$a	- Argentine Peso

R e f e r e n c e s

- Canto, Victor A., Douglas H. Joines and Arthur B. Laffer, Tax Rates, Factor Employment, and Market Production. In: Lawrence H. Meyer (ed.), The Supply-Side Effects of Economic Policy, Federal Reserve Bank of St. Louis, May 1981, pp. 3-32.
- Cavallo, Domingo F. and Angel Peña, "Deficit Fiscal, Endeutamiento del Gobierno y Tasa de Inflación: Argentina 1940-1982". Estudios, Vol. 6, 1983, No. 26, pp. 39-78.
- Dornbusch, Rüdiger, "Argentina Since Martinez de Hoz", NBER Working Paper No. 1466, Cambridge Ma., 1984.
- Fernández, R.B. and C.A. Rodríguez, "Los Limites de Impuesto Inflacionario", La Nación, 7 May 1984.
- Fischer, Bernhard, Ulrich Hiemenz and Peter Trapp, "Economic Crisis in Argentina and No Way Out?", Kiel Working Paper, No. 210, Kiel 1984.
- Fischer, Bernhard and Peter Trapp (1985a), "The Argentine Financial Sector: Performance, Problems and Policies", Kiel Working Paper, No. 226, Kiel 1985.
- , -- (1985b), "Financial Markets and Monetary Control Under High Inflation - The Case of Argentina", Kiel Working Paper, No. 232, Kiel 1985.
- Laaser, Claus-Friedrich, "Rentseeking im deutschen Verkehrswesen", Kiel Working Paper, No. 177, Kiel 1983.

Laidler, David E.W., "The Demand for Money: Theories and Evidence". Scranton Pennsylvania, 1969.

--, Comment on a Paper by Larry Sjaastad: In: Michael Parkin and George Zis (eds.), Inflation in the World Economy, Toronto and Buffalo, 1976, pp. 86-87.

Sargent, Thomas J., The Ends of Four Big Inflations, In: R.E. Hall (ed.), Inflation: Causes and Effects, Chicago and London 1982, pp. 41-97.

Sjaastad, Larry A., Why Stable Inflation Rates Fail: An Essay in Political Economy. In: M. Parkin and G. Zis (eds.), Inflation in the World Economy, Toronto and Buffalo, 1976, pp. 73-86.

Schvarzer, Jorge, Martinez de Hoz: La Lógica Política de la Política Económica, CISEA, Buenos Aires, March 1983.