NOTES

Fiscal Policy and Inflationary Expectations: The Hungarian Tax Pengö Experiment of 1946

P. L. Siklos*
Wilfrid Laurier University, Waterloo, Canada
and Oxford Institute of Economics and Statistics

Introduction

The proponents of the rational expectations approach to understanding and assessing the role of discretionary policies (i.e. fiscal and monetary policies) generally view a successful stabilization of inflation as the result of the implementation of a credible change in government policy. Credibility is defined as the more or less simultaneous occurrence of a change in policy regimes along with the public's perception that such a shift actually took place (Cukierman 1986). Sargent (1986), in this connection, examined several historical episodes of hyperinflation this century in order to demonstrate the impact on inflationary expectations from the implementation of what he believed were credible monetary and fiscal reforms. Failed attemps were ascribed to policy makers' inability to convince individuals to alter their anticipations of future government behavior.

Hyperinflationary experiences this century are especially interesting because they present situations where the government is unable to maintain constant money growth in the face of mounting deficits. Hence, unless the public is convinced that future budget surpluses will be forthcoming, or that deficits may be financed by borrowing from the public,[1] inflationary expectations will be unaffected.

[1] When interest rates are higher than income growth, constant money growth cannot be maintained. Friedman (1987), in a review of Sargent's book, has noted that this phenomenon, while accurate in the Hungarian case, is nevertheless an historical aberration. Darby's (1984) criticism of the Sargent and Wallace view (as in Sargent 1986) follows a similar line though he also discusses the role of taxes in this context.

The view elaborated by Sargent is not without its critics. Eichengreen (1986) asks why successful reductions in inflation expectations must be the result of credible policies or, rather, why some policy changes are more credible than others. The hypothesis of rational expectations appears to assume that if economic agents acquire and process information efficiently, a credible regime change must occur simultaneously with a reduction in anticipated inflation whereas other attemps fail precisely because they have no such effect. Next, assume that a regime change is directly linked to the behaviour of the government deficit or debt and thence inflationary expectations, through its positive association with actual inflation. Thus, correlations between debt and inflation provide some evidence of the 'credibility' of a government's fiscal policy. This view, however, has been called into question by some (e.g. Barro 1984, 192-96, 385-85) because the suggested relation does not appear to consistently hold true throughout a variety of historical episodes. Others have made similar arguments. For example, Makinen (1984) argues that three reforms were necessary to produce price stability in the Greek hyperinflation of 1945-46. This despite attempts to balance state budgets and ensure that reforms would be carried out as planned. Makinen suggests that lags in the ability of individuals to evaluate policies may weaken the case for the scenario formulated by Sargent. More recently, Webb (1985) has argued that control over deficits was not sufficient to produce a permanent stabilization of the post-World War I German hyperinflation. Instead he documents four ends of the inflation in Germany and suggests that a credible policy change alone will not produce price stability. Hence, examining only successful stabilizations, as Sargent has done, may only explain permanent as opposed to temporary stabilizations. Instead, a "dramatic" reversal of inflationary expectations may be necessary to produce a permanent transition to price stability.

This paper presents additional evidence about the relatively lesser known example of the second Hungarian hyperinflation which took place in 1945 and 1946.[2] Specifically, I shall deal with one so-called attempt at reform, known as the tax pengö experiment. While the reform was fiscal in nature its failure inexorably influenced subsequent monetary policy. My objective is to explore the question of whether this attempt at reform which preceded the successful transition to price stability was temporarily successful in the sense of being for a time credible.[3] Credibility is viewed here as being directly linked to inflationary expectations. Hence, a credible reform should result is lower anticipated inflation. The Hungarian case is particularly interesting because of the nature of the failed policy and because of the availability of data not used previously to analyze this episode in economic history.

[2] Recent analyses of the Hungarian hyperinflation include Bomberger and Makinen (1980, 1983a; BM hereafter), and Siklos (1990, 1989, 1987).

[3] The end of the Hungarian hyperinflation is analyzed in Siklos (1989). An earlier paper on the end of the Hungarian hyperinflation is BM (1983).

The paper is organized as follows. The next section presents a brief overview of the events in Hungary following the second World War up to shortly after the final stabilization implemented in August 1946. Section 3 assesses the extent to which the failure of the tax pengo experiment, introduced in January 1946, may be associated with the Hungarian government's attempt at fiscal reform. It is shown that the economic indicators available generally do not reflect a reduction in inflationary expectations. Since there is no independent test of credibility it is suggested that the evidence is consistent with the notion that the success of the indexation scheme was quickly discounted by the public. If, however, the tax pengo experiment was temporarily successful, in the sense of moderating actual inflation, it was only because the policy for a time essentially amounted to a transfer of part of the inflation tax to the private sector. In so doing, the results of this paper extend the work by Bomberger and Makinen (1980; B-M hereafter) who discussed only the eventual failure of the Hungarian experiment with indexation. Finally, the fact that hyperinflations exhibit drastic movements in nominal variables, which may have "immunized" agents against temporary responses to policy actions, may also be relevant in the Hungarian case. Witte (1984) suggested such immunity limits the lessons to be learned from episodes of high inflation. The paper ends with a summary and lists some conclusions.

2. A Brief Survey of Events in Hungary in 1945-46

The physical damage caused by the war came late to Hungary — in fact not until late 1944 — although it was the most extensive in Europe next, perhaps, to Germany and Belgium.[4]

As an economic advisor in the American legation in Budapest observed (Mark 1947, 1982), the extent of war damages and the political instability during the immediate post-war era prevented the organization of an effective tax collection system. Essentially, state owned enterprises contributed the bulk of government revenues which, in turn, represented only a small fraction of expenditures. These expenditures rose very quickly in view of sizeable reparation payments[5] as well as being due to large reconstruction costs. Table 1 shows the percent of total expenditures covered by government revenues.[6] Despite government promises to control inflation in late 1945 and early 1946,

[4] According to a United Nations Relief and Rehabilitation Agency report, total war damages were estimated at 40.2 p.c. of 1944 non-human wealth (Petö and Szakacs 1985). Since 1944 National Income figures were at an historical high (Siklos 1989) the figure quoted understates perhaps the true extent of war damages.

[5] These were set at $ 300 million U.S. to be paid largely in kind.

[6] The figures in Table 1 do not always coincide with those in BM (1983, Table 1, p. 805). Since their reference is confidential (correspondence with Makinen, May 19, 1986) I have been unable to reconcile existing differences.

Table 1
REVENUES AS A PERCENT OF GOVERNMENT EXPENDITURES

Year	Month	Percent	Year	Month	Percent
1945	July	7.7	1946	Jan.	14.5
	Aug.	5.3		Feb.	15.0
	Sept.	7.3		Mar.	14.1
	Oct.	5.7		Apr.	8.6
	Nov.	6.6		May	3.4
	Dec.	7.1		June	6.3
				July	6.2

Source: Ausch (1958), Magyar Nemzeti Bank Havi Közlemeny [Monthly Bulletins of the National Bank of Hungary], 1945-46-47, and BM (1983).

tax revenues never exceeded 15 p.c. of expenditures. Since so much wealth had been destroyed during the war, no foreign loans were forthcoming, and the government was unable to borrow from the public,[7] the only remaining option was to embark on a classic policy of inflationary finance. It did not take long before prices rose consistent with hyperinflation. In fact, as shown in Figure 1, and based on Cagan's (1956, p. 25) definition, the period of hyperinflation began in August 1945. Yet there appear to have been some downturns in inflation. First, during the November 1945 to January 1946 period, and then again in March of 1946. Could some of these reductions in inflations be accompanied by reductions in inflationary expectations? If not, can we associate such a failure with the type of fiscal policy implemented at the time? These questions are explored in the next section where I analyze a (fiscal) policy introduced by the Hungarian government in January 1946, and known as the tax pengö experiment.

3. Fiscal Policy and Inflationary Expectations: The Tax Pengö Experiment

On January 1, 1946 the Hungarian government decreed that financial obligations to the government (e.g. taxes) would be indexed to prices prevailing in Budapest.[8] In actual fact the system covered a broader category of financial obligations. Thus, for example, bank deposits would, by January 10, 1946 also become indexed to the tax pengö price index. The price index was to be announced daily based on lagged prices. Prior to 1 March, there was a two-day delay; thereafter, a one-day delay existed (Varga 1964).

[7] Real balances (including current and savings account deposits) after the end of the war were approximately 6 p.c. of the pre-war figure.

[8] The text of the decree in English is in Banyai (1976, Appendix I). Other descriptions of the tax pengö denominated deposits.

Table 2
ESTIMATES OF THE VELOCITY OF CIRCULATION

Year	Month	Velocity	Year	Month	Velocity
1945	Aug.	1.4	1946	Jan.	6.0
	Sept.	1.5		Feb.	16.0
	Oct.	3.3		Mar.	83.7
	Nov.	5.3		Apr.	130.4
	Dec.	7.9		May	192.0
				June	315.2

Source: Ausch (1958, P. 124). 1945 july = 1.0. Estimates were derived by using a Quantity Theory formula where M (money supply) = notes in circulation, P (price) = prices of foodstuffs in Budapest, and y (real income) = volume of foodstuffs delivered to Budapest. V (velocity) is therefore found from the formula MV = Py.

The objectives of the policy were threefold. First, to protect tax revenues from erosion due to inflation. Second, to provide a substitute for gold and foreign currencies thereby making pengö deposits, in particular, more attractive to hold. Third, since pengö notes in circulation were not themselves indexed, to raise the deposit to note ratio.[9] Government officials hoped that the substitution toward deposits would make available more bank funds to help finance the deficit and thereby reduce the need to resort to the printing press. Because the tax pengö scheme was intended to be more than a scheme to protect tax revenues, it is reasonable to label this experiment as an example of an attempt at a true shift in policy.

Table 1 shows that, in the first three months of 1946, tax revenues as a proportion of expenditures doubled. Inflation, too, moderated in January relative to December but was slightly above the level usually associated with hyperinflation (average of 2 p.c. per day; see Figure 1). By February, however, inflation was at its highest level since the end of the war.

Velocity of circulation, as revealed in Table 2, was lower in January than in December but higher than the November figure.[10] Real balances (see Table 4) also rose in January compared to the previous month's figure since pengö accounts became relatively more attractive to hold than before. Based in Cagan's (1956) model of money demand, and assuming output is constant, inflationary expectations would appear to have moderated somewhat in Ja-

[9] Siklos (1987) and BM (1983) show, not surprisingly, the rapid substitution away from regular pengö denominated deposits.

[10] Since industry was still recovering from the effects of the war, and given the agrarian nature of the Hungarian economy, the income measure used in Table 1 reasonably accurately proxies income generated in Hungary at the time. Industry, finance, government, and population, were all highly centralized in Budapest.

Table 3
REAL BALANCES [1]

Year	Month	Real Balances[2]	Year	Month	Real Balances
1945	June	2.41	1946	Jan.	.32
	July	2.08		Feb.	.15
	Aug.	1.88		Mar.	.24
	Sept.	1.51		Apr.	.18
	Oct.	.58		May	.09
	Nov.	.33		June	0.2
	Dec.	.28		July	.0002

Source: Magyar Nemzeti Bank Havi Közlemeny [Monthly Bulletins of the National Bank of Hungay], 1945-46.

Notes: [1] Currency in Circulation was used for the money supply and an index of Consumer Prices (including rent). A broader measure of the money supply did not affect the pattern of real balances.

[2] In millions of 1939 aug. pengö.

nuary which suggestes at least temporary credibility of the reform.[11] Figure 2, however, provides little evidence that the tax pengö policy had much of an effect on inflationary expectations as the real deficit/debt plots generally continued to decline throughout January and during the rest of the hyperinflation.

Since there are some doubts about the significance of a link between a government's fiscal performance, as measured in Figure 2 for example, and inflation expectations, additional evidence was brought to bear on the issue. Figure 3 plots the daily technical depreciation of the tax pengō price index. This series represents the ratio of two prices: prices (based on the official price of gold) prevailing at time t, as a percent of prices two days previous (t-2), until February 28, and, thereafter, the preceding day (t-1), until July 17, 1946. The reason I have called it a measure of technical deprecation is that this ratio shows the erosion in the real value of pengö denominated assets as a result of the delay between the price level used to revalorize, say, bank deposits, and the actual price level prevailing on a particular day. The delay existed owing to the time necessary to survey prices, compute the index, and publish it in newspapers. Gold prices are used instead of the actual tax pengö index because they may more accurately reflect the true movement of prices between January and July 1946.

If the index exceeds 100, actual prices are rising faster than the index used to revalorize bank deposits and so the indexation property of the tax pengö suffers. For example, on January 7th prices were approximately 9.4 p.c. hi-

[11] Since money supply is defined as notes in circulation the rise in real balances would not have been caused by the indexation feature of the tax pengö system.

Table 4

ECONOMETRIC TEST OF THE TAX PENGÖ PERIOD*

Dependent Variable Real Balances	Independent Variable		Coeff. (s.e.) [1]	F-stat [2]
Sample: Jan. 7 - July 17, 1946				
Inflation[3]	Tech. Dep'n[4]	lag [5]	0.002(3.35)*	9.58*
		lead	0.001(2.17)*	4.07*
Number of observations = 25				

Notes: [1] Absolute value of standard error.
[2] Null hypothesis that all coefficients are jointly equal to zero.
[3] Average daily inflation rate where inflation was calculated as the log first difference in consumer prices.
[4] Price index of 1 gr. of fine gold at time t divided by the price index at time t-i; i = 2 days until February 28 1946; thereafter, i = 1.
[5] Sum of coefficients. Four lead and lag coefficients were estimated. Conteporaneous coefficient is included in the lag terms.
* Sources of data (weekly) are listed in preceding Tables. Gold prices are from Magyar Nemzeti Bank Havi Kozlemeny [Monthly Bulletins of the National Bank of Hungary], 1946.
* Signifies statistically significant at the 10 p.c. level.

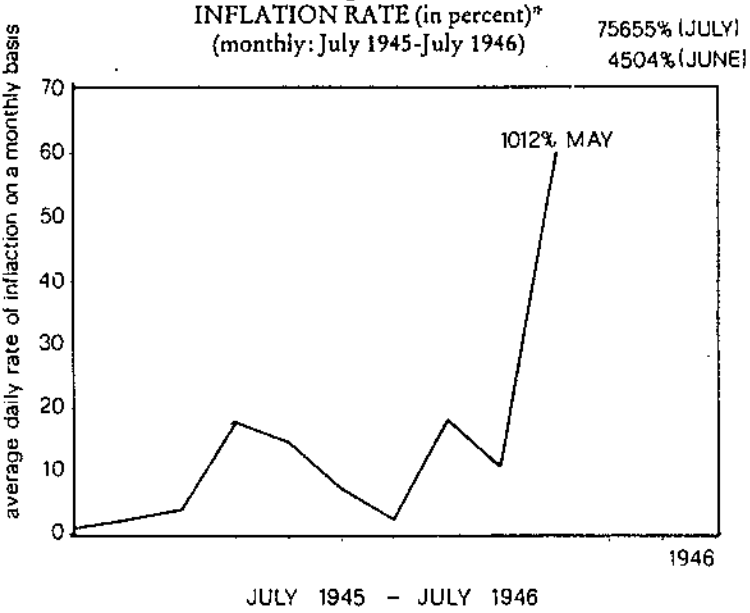
gher than they had been on 5 January. Obviously then, from the beginning, tax pengö denominated deposits did not provide complete protection against inflation. During the first three months of the tax pengö system the index depreciated by an average of roughly 4.9 p.c. per day.[12] Sometime in late April, the rate of depreciation in the tax pengö was accelerated when a secret decision was taken to undermine the extent to which the tax pengö index followed actual price movements (Varga 1964). The reason, as confirmed by all the indicators, such as real balances, velocity, and real deficit/debt data, is that the public was rapidly losing confidence in the indexation scheme.[13] While the technical depreciation in the tax pengö did not deviate much from 100 during most of January, and then again in late February, it should have become increasingly evident to individuals that the tax pengö system was generating permanent losses of puchasing power.

Figure 4 shows a plot of the ratio of the tax pengö price index, at time t, relative to consumer prices, again at time t. Although the tax pengö experiment suffered from technical depreciation of the kind noted above this could conceivably be offset somewhat if the tax pengö price index rose faster than consumer prices. In fact, Figure 4 reveals that the price index used to revalo-

[12] The conclusions are unaffected whether the U.S. dollar or a Consumer Price index is used to compute the technical depreciation measure.

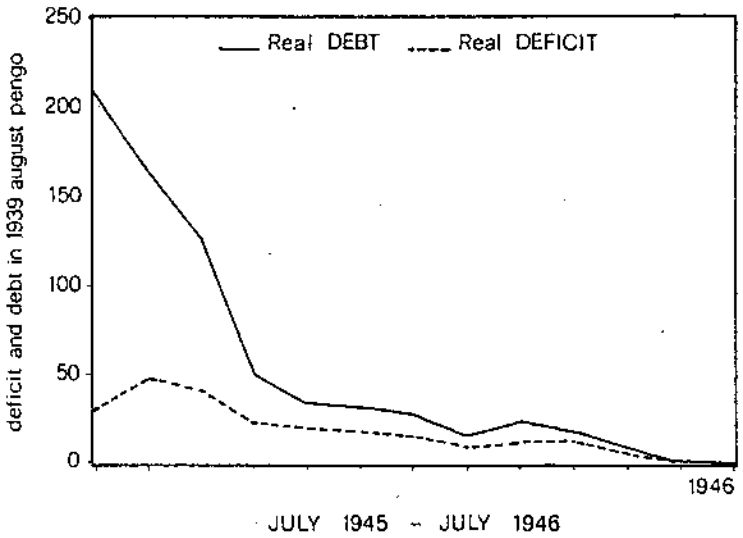
[13] Velocity increases accelerated in the months of February and March. After falling in January, velocity increased 270 p.c. in February and 523 p.c. in March. Real balances fell by 54 p.c. in February and 25 p.c. in April.

Figure 1
INFLATION RATE (in percent)*
(monthly: July 1945-July 1946)



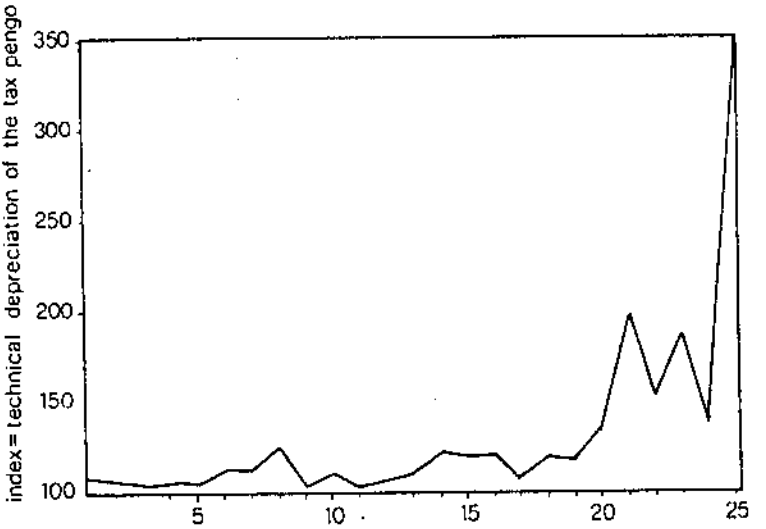
* from Peto and Szakacs (1985, p. 61)

Figure 2
REAL GOVERNMENT DEFICIT AND DEBT*
(monthly: July 1945-July 1946)



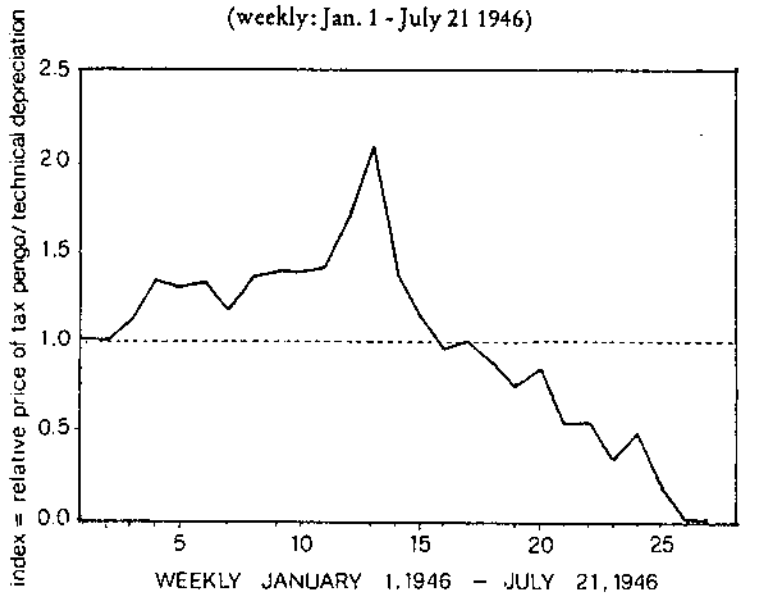
* For calculation and source, see Table 4 and text

Figure 3
TECHNICAL DEPRECIATION OF THE TAX PENGO*
(daily: Jan. 4 - July 17 1946)



* For computation and source, see Table 4

Figure 4
REAL TAX PENGO* PRICE INDEX
(weekly: Jan. 1 - July 21 1946)



* For computation and source, see Table 4

rize deposits rose faster than consumer prices until April 1946, that is, during a significant portion of the indexation era. In effect, then, the Hungarian government was sharing part of the inflation tax with the private sector or attempting to compensate for the technical depreciation inherent in the indexation scheme. This may be why inflation moderated although it appears anticipated inflation did not.

By March 1946, there were several indications in the press (see Szabad Nép [Free People], April 1946) that a currency reform would be planned for the middle of the summer, to coincide with the harvest of the most important crops. Together with failed attemps to persuade the Soviet Union to reduce the burden of war reparations, and the mounting costs of reconstruction, it is not surprising that newspaper accounts of the day (again, see Szabad Nép (Free People]) reported that the rising deficit (in nominal terms) could only be financed through the continued issue of paper money (Pëto and Szakacs, 1985). Hence, it was to be expected that the tax pengö would increasingly lose its usefulness as an instrument of indexation during the last four months of the hyperinflation.

Since the tax pëngo system was in force from January to July 1946, more formal tests of the effects of this attempt at modifying inflationary expectations are possible, thanks to weekly data. An econometric analysis of the tax pengö period is provided in Table 4. Since it was suggested that a positive correlation between debt and inflation expectations existed during the indexation episode, a better proxy of the potential influence of the Hungarian government's fiscal policy on inflation was sought.

Table 4 reports regression results where current weekly inflation is regressed against current, past and future technical depreciation in the tax pengö index. The above discussion suggests that a two-sided distributed lag model is appropriate.[14] The reason is that a lagged increase in the technical depreciation of the tax pengö index would produce more inflation as this would be an indication that the government was once again resorting to the use of the inflation tax. Moreover, if individuals did not expect the government to adequately protect against erosion of purchasing power through the indexation scheme, current increases in inflation would normally produce expectations of future rises in the technical depreciation of the tax pengö.[15]

Table 4 reveals that one cannot reject the hypothesis that the cumulative impact of both past and future (expected) increases in the rate of technical de-

[14] When investigating the effect of fiscal policy in the inflationary process it is preferable to use the change in government debt rather than the budget deficit. See Smith (1985, 1985a). The conclusions were, however, unaffected by the use of either the real or nominal debt or the real or nominal deficit.

[15] Raj and Siklos (1986) provide a rationale for the use of a two-sided distributed lag model.

preciation of the tax pengö contributed to current rises in inflation.[16] This is not surprising since the government responded to inflation and the consequent erosion of real tax revenues (Table 1) by accelerating the technical depreciation of the tax pengö in its monetary policy.[17]

Despite the reduced form framework in which the above results were cast they indicate that the reform of January 1946 did not lead to a stabilization of inflation precisely because individuals did not anticipate the government to pursue a policy of stable inflation. Thus, it is not surprising that the Hungarian government attempted to stem the reduction in real tax revenues by eventually undermining the tax pengö system entirely.[18] To the extent that inflation moderated slightly during March 1946 may have been due to the sharing of the proceeds of the inflation tax with bank depositors, and not because inflationary expectations moderated.

4. Conclusions

Sargent (1986) presented historical illustrations of the link between the credibility of policy changes and their implications for inflationary expectations. Makinen (1984) and Webb (1985), among others (e.g. Eichengreen 1986), questioned Sargent's results by examining the Greek and German hyperinflations this century. They concluded that both these hyperinflations ended after previously credible but failed attempts at reform. This raises the issue of why some reforms are credible and others not and also whether some regime changes may be partially or temporarily credible. Assuming that credibility is linked to inflation expectations, this paper has added one more observation to the sample of analyses that address the above question based on the Hungarian experience with hyperinflation in 1945-46.

Using data not used previously, a fiscal reform, known as the pengö scheme, appears to have failed to alter rising inflationary expectations. Econome-

[16] The use of actual future observations to proxy expected values requires efficient estimation (Flood and Garber 1980). Accordingly, the results in Table 4 are Hannan efficient estimates (Maddala 1977) generated using the RATS programme of Doan and Litterman (1983).

[17] Sargent and Wallace (1981) also argue that current inflation may be linked to future rates of money creation under hyperinflationary conditions.

[18] By April 1946 the government was having difficulty in getting regular pengö notes accepted by the public (BM 1983a). Hence, circulating tax pengö notes made their appearance. Although these notes became legal tender only on July 9, 1946 regular pengö notes had largely disappeared from circulation by late May or early June. See Huszti (1986) and BM (1983, Table 4, p. 809). Siklos (1987) shows, using data on consumer prices, that the lack of acceptability of regular pengö notes occurred simultaneously with the sharp increases in the technical depreciation of the tax pengö which began in April and accelerated by May 1946.

tric estimates were also used to show that individual anticipated a reduction in the tax pengö denominated assets. Other indicators, such as the pattern of real balances and the velocity of circulation, also cast doubt about whether the tax pengö experiment was ever credible. Nevertheless, it is conceivable that, since the tax pengö was introduced at the beginning of the sixth month of the hyperinflation, individuals had been "immuned" against believing that a credible reform had taken place, and quickly discounted the possibility that inflation would be stabilized through indexation.

REFERENCES

Ausch S., *Az 1945-1946. Évi Inflació és Stabilizàciò* [The 1945-1946 Inflation and Stabilization], (Budapest(Kossuth, 1958).

Banyai, R.A., "The Legal and Monetary Aspects of the Hungarian Hyperinflation of 1945-46" unpubliished (1977).

Berend, T.I., *Ujjàépités és a Nagytöke Elleni Harc Magyarorszàgon 1945-48* [Reconstruction and the Battle Against the Capitalist in Hungary 1945-48] (Budapest: Kozgazdasagi es Jogi Konyvkiado, 1962).

Bomberger, W.A. and G.E. Makinen, "Indexation, Inflationary Finance, and Hyperinflation: The 1945-1946 Hungarian Experience" *Journal of Political Economy* 88 (June 1980): 550-60.

————"The Hungarian Hyperinflation and Stabilization of 1945-1946" *Journal of Political Economy* 91 (October 1983): 801-24.

————"Some Further Thoughts on the Hungarian Hyperinflation of 1945-46" *South African Journal of Economics* 51 (1983a): 564-66.

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

Cooley T.F. and S.F. LeRoy, "Atheoretical Econometrics: A Critique" *Journal of Monetary Economics* 16 (1985): 283-398.

Cukierman A., "Central Bank Behavior and Credibility: Some Recent Theoretical Developments" *Review*, Federal Reserve Bank of St. Louis, 68 (May 1986): 5-17.

Darby M.R., "Some Pleasant Monetarist Arithmetic" in *Federal Reserve Bank of Minneapolis Quarterly Review* (Spring 1984): 15-20.

Doan T.A. and R.B. Litterman, *Regression Analysis of Time Series (RATS)*, version 4.11 (Minneapolis, Minn.: Var Econometrics, 1983).

Eichengreen B., "Rational Expectation and Inflation: A Review" *Journal of Economic Literature* 24 (December 1986): 1812-1815.

Flood R.P. and P.M. Garber, "A Pitfall in the Estimation of Models with Rational Expectations" *Journal of Monetary Economics* 6 (1980): 433-5.

Friedman M., "Rational Expectations and Inflation: A Review" *Journal of Political Economy* 95 (February 1987): 218-21.

Maddala G.F., *Econometrics* (New York: McGraw-Hill, 1977).

Makien G.E., "The Greek Stabilization of 1944-46" *American Economic Review* 74 (December 1984): 1067-74.

Mark L. Jr., *Post-War Inflation in Hungary* (M.A. University of California, 1947).

————"The View from Hungary" in T.T. Hammond, ed., *Witnesses to the Origins of the Cold War* (Seattle: University of Washington Press, 1982).

Petö I. and S. Szakàcs, *A Hazai Gazdasàg Négyévtizedének Története: 1945-1985* [Four Decades of National Economic History: 1945-1985] (Budapest(Kozgazdasagi es Jogi Konyvkiado, 1985).

Raj B. and P.L. Siklos, "The Role of Fiscal Policy in the St. Louis Model: An Evaluation and Some New Evidence" *Journal of Applied Econometrics* 1 (1986): 287-94.

Sargent T.J. and N. Wallace, "Rational Expectations and the Dynamics of Hyperinflation" in *Rational Expectations and Econometrics Practive*, R.E. Lucas, Jr. and T.J. Sargent, eds. (Minneapolis: University of Minnesota Press, 1981), 405-29.

————*Rational Expectations and Inflation* (New York: Harper and Row, 1986).

Siklos P.L., "The Link Between Money Growth and Inflation Under Different Policy Regimes: The Postwar Hungarian Experience" *Explorations in Economic History* (1990, no. 4), 468-82.

————"The End of the Hungarian Hyperinflation of 1945-46" *Journal of Money, Credit, and Banking* (may 1989), 135-47.

————"Additional Thoughts on the Hungarian Hyperinflation of 1945-1946" *South African Journal of Economics* 55 (March 1987): 83-5.

Smith B.D., "American Colonial Monetary Regimes: The Failure of the Quantity Theory and Some Evidence in Favor of an Alternative View" *Canadian Journal of Economics* 18 (August 1985): 531-65.

————"Some Colonial Evidence on Two Theories of Money: Maryland and the Carolinas" *Journal of Political Economy* 93 (December 1985): 1178-1211.

Varga I., *Az Ujjab Magyar Pénztörténet és Egyes Elméleti Tanulsàgai* [The New Hungarian Monetary History and Some of Its Theoretical Lessons] (Budapest: Kozgazdasagi es Jogi Konyvkiado, 1964).

Webb S.B., "Four Ends of the Big Inflation in Germany" (unpublished, 1985).

————"Fiscal News and Inflationary Expectations in Germany After World War I" *Journal of Economic History* 46 (September 1986): 769-94.

Witte W.E., "Ending Hyperinflations: The Lessons which can be Draw" (unpublished, 1984).

Winkle F.F., "Some Aspects of the Recent Inflation and Stabilization of the Hungarian Currency" *South African Journal of Economics* 15 (1947): 178-91.