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# *The Dynamics of the Hungarian Hyperinflation, 1945-6: a New Perspective*

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## **1. Introduction**

From late 1945 through the middle of 1946, Hungary experienced the most gigantic inflation of modern history. But in August 1946, the astronomical price increases stopped, and lasting price stability followed. Indeed, the contrast is so dramatic that it is viewed by some as an economic miracle surpassing even the post-war German *Wirtschaftswunder*.

On the surface, the Hungarian hyperinflation, which witnessed a depreciation of the currency unit, the pengő, of about  $10^{27}$ , seems a kind of madness that raises two interlinked questions: First, how could such a fantastic destruction in the value of a currency take place, and second, what possible motive could anyone have for creating this inflation or at least for allowing it to happen?

According to most historians of the inflation, the answer to both questions is that Hungary's government used inflation to meet an onerous revenue requirement,<sup>1</sup> and the inflation simply got out of

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<sup>1</sup> Notably, B. Nagaro, "Hungary's Recent Monetary Crisis and its Theoretical Meaning", *American Economic Review*, 38 (1948), pp. 526-542; W.A. Bomberger and G.E. Makinen, "The Hungarian Hyperinflation and Stabilization of 1945-1946", *Journal of Political Economy*, 91 (1983), pp. 801-824; and P. Siklos, *War Finance, Reconstruction, Hyperinflation, and Stabilization in Hungary, 1938-48*, (New York 1991).

control. But in this paper, we will show instead that the Hungarian government, in which one of us (Horváth) played a role, believing high inflation was inevitable, accommodated it and steered it in ways to make it an instrument of capacity enhancement. Of course, ultimately the huge rates of inflation were beyond control and usefulness. But by that time hyperinflation had helped restore the Hungarian economy and when that task was achieved, lasting stability became possible.

This contrasts with the standard story of the inflation, which considers the episode a classic case of government ineptitude. It is certainly true that the Hungarian government used the inflation for other purposes besides capacity enhancement. Hungary did face burdensome revenue requirements that it could not easily meet in the aftermath of the war. These requirements included \$300 million in reparation payments, as well as payments in goods, to the occupying Soviet army. Altogether government revenues from standard means, such as taxes, could provide less than 10 percent of the government's needs.<sup>2</sup> With, initially, an interim government and then a newly elected coalition one, officials did not believe that the normal powers of taxation and command could be greatly extended. As a consequence, the government turned to an inflation tax.

This policy, in turn, spiralled into the most extreme instance of hyperinflation of modern times. The cause of this, according to the standard history, was the government's attempt to stabilize the value of tax revenues by launching a separate currency for the collection of taxes, the tax pengő (or TP). But in the process, officials adopted a policy by which all tax payments, and, later nearly everything else, were indexed to the inflation rate. Paarlberg writes that "the Hungarian experience reveals that a wrong signal can open the floodgates that lead to chaos. Above all, it illustrates the perils of inept indexation".<sup>3</sup>

While it is true that the government sought the means to raise revenues, rapid inflation was *primarily* seen as a way to reinvigorate Hungary's devastated economy, to spark the utilization again of those

<sup>2</sup> Bomberger and Makinen, "Hungarian Hyperinflation."

<sup>3</sup> D. Paarlberg, *An Analysis and History of Inflation*, (Westport, CT 1993), p. 85.

factors of production that were at the war's end, unemployed. Actually, policy makers believed that high inflation was not really a choice at all; it was present before the war ended and its continuation was inevitable. But they also felt that if it were marshalled correctly, inflation could help regenerate the economy. And regeneration of productive capacity was deemed, for obvious reasons, the best way to meet the government's long-run revenue needs.

Moreover, as we will suggest in this paper, rapid stabilization would not have occurred so quickly without the inflation. Because of coordination and organizational problems inherently faced by any nation emerging from catastrophic destruction (acutely so in the case of Hungary), this policy choice of the Hungarian government probably had the greatest likelihood of achieving success.

The specific mechanism the government utilized was to channel much of this expansion of the currency into enterprises, both public and private, at rates of interest that were effectively (and indeed overwhelmingly) negative. It may even be argued that the government simply gave money away for reconstruction. Of course, this government policy was inevitably unsustainable given the remarkable rates of inflation that ensued – which finally reached a daily rate of over 150,000 percent – but it will be argued that it was also basically successful. The Hungarian economy did rebound; people generally accepted the rationale behind the inflation; and the Hungarian economy and polity were able to emerge from the inflation into a period of relative stability.

This essay will describe the economic rationale for the policy of the Hungarian government, and it will illustrate why the policy was to a significant extent, a success. It is not claimed that Hungarian authorities consciously had these models in mind, but it is through a basic macroeconomic framework that the implementation and outcome of the policy can best be appreciated.

## **2. The Historical Background of Hungary's Hyperinflation**

Although Hungary was a German ally during World War II, it tried, with a measure of success until 1944, to remain at some remove from

the fighting that was ravaging Europe. As the war neared its end, the Hungarian government, led by Admiral Miklós Horthy, could see that Germany would lose and it sought to make a separate peace with the Allies. The result was not peace. In fact, in 1944, the Germans occupied Hungary, forced out Horthy's government, and installed Hungarian fascists in power. This turn of events assured that Hungary would play a much more active role in the war and that it would face the full force of the Soviet Army (and the might of United States air power) as the defeat of Germany neared.

The destruction that ensued was massive. After four years of relatively light damage from the war, Hungary became a battle ground. Over a period of about six months, from late 1944 through early 1945 when the Germans and their Hungarian allies were defeated in Hungary by the Red Army, the country was ravaged. Half of all industrial capacity was completely destroyed, and an estimated 90 percent was damaged.<sup>4</sup> Production of key raw materials also fell dramatically; coal production fell to about 40 percent, and bauxite production to barely one percent, of their pre-war levels by the spring of 1945.<sup>5</sup> Transportation could not function. Rail lines had been bombed and locomotives that were not destroyed were simply taken by the retreating Nazis and the advancing Russians alike. Infrastructure throughout the country was in shambles. All of the bridges over the Danube in Budapest were bombed and disabled.

Hungary had witnessed a notable increase in the cost of living even before the fighting became severe. Primarily due to the reduced availability of consumer goods, the cost of living more than doubled from January 1943 to late 1944. However, with the escalation of the violence, monetary policy became nearly meaningless. By the time the fighting ended, the Hungarian authorities found themselves not only scrambling for funds to pay reparations and conduct some minimal government functions, they found themselves without an

<sup>4</sup> J. Fekete, *Back to the Realities: Reflections of a Hungarian Banker*, (Budapest 1982).

<sup>5</sup> Siklos, *War Finance*.

immediate ability to create money. Retreating Hungarian fascists had taken the plates to print currency with them to Germany.<sup>6</sup>

By the time one can again sensibly measure the cost of living, April 1945, consumer prices had increased about fourteen and a half times over the level in late 1944.<sup>7</sup> In other words, the new government, even before it had the equipment to print money, had inherited a hyperinflation.

Most historians, however, choose to date the start of the hyperinflation to later in the summer, when prices began rising steadily at 50 percent or more per month, the typical definition of hyperinflation. In fact, after the explosion in prices in early 1945, there was a lull during which time the price level appears to have been relatively stable. But this relative stability in prices did nothing to alleviate the problems in the economy, which was still reeling from the shock of war. Indeed, stability, which coincided with a nearly constant stock of money,<sup>8</sup> suggests a static (and thus depressed) supply of goods. Price stability without an increase in output was undesirable and probably not sustainable. In any case, some government officials believed that if nothing were done to improve the functioning of the economy, economic turmoil would only increase. The supply shock, with the destruction of a large portion of the nation's capital stock and the inflation that accompanied it, presented the government with a problem that temporary price stability could not solve.

### **3. The Dynamics of the Hungarian Hyperinflation**

#### *a. Inflation Toward Stabilization*

It was not unique to the Hungarian government and the officials of its central bank to believe that accommodating inflation might be

<sup>6</sup> Actually, the currency printing presses did not stop entirely. Money was printed outside the country, in Germany and by the Soviet Army. However, money supply figures (in Siklos, *War Finance*) suggest that on balance, supply was unchanged from early 1945 until June of that year.

<sup>7</sup> Siklos, *op. cit.*

<sup>8</sup> *Ibid.*

a way to reemploy idled factors of production. Indeed, after World War I, German officials defended inflation as a means of restoring employment, a position that has been given some theoretical underpinnings.<sup>9</sup> And in fact, the inflation rate in the three years after the war was significantly higher in Germany than it was in Great Britain. But in the early 1920s, unemployment was lower in the former.

Of course, it is important to recognize that the “benefits” of inflation to Germany occurred before 1923, before the start of its famous hyperinflation. Once inflation careered out of control – almost five years after the war ended and after much of Germany’s pre-war production had been restored – it is clear that the German economy deteriorated. Uncertainty about prices, government policy directions, and the possible responses of France and Great Britain made German entrepreneurs nervous about commitment to future production. Investment slowed as entrepreneurs were reluctant to plan ahead.<sup>10</sup> In 1945 Hungary, circumstances were quite different. As noted above, high inflation was already in evidence, the country was in ruins, and entrepreneurs had little with which to restart their production lines.

To understand what kind of environment Hungary faced, consider a simple macroeconomic model of aggregate supply and demand. The country was, indeed, devastated by the war; estimates are that overall at least forty percent of the total stock of capital in Hungary was destroyed or disabled.<sup>11</sup> This loss of productive capacity, a massive supply shock, would, of course, have calamitous macro-effects. Assuming a constant stock of money, Hungary should have experienced rising prices and depressed output – both of which, as noted above, were very much in evidence.

Such a supply shock should also lead to significant unemployment of labour. Assuming a uniform loss of capital across sectors, and an elasticity of substitution among factors that was unchanged from the

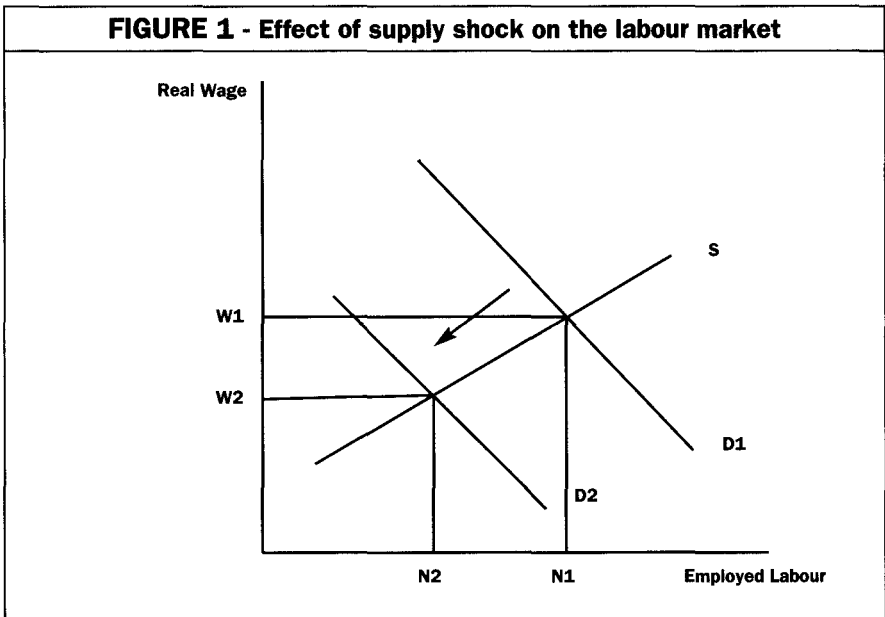
<sup>9</sup> See, K. Laursen and J. Pedersen, *The German Inflation, 1918-1923*, (Amsterdam 1964).

<sup>10</sup> N. Ferguson, “Constraints and Room for Manoeuvre in the German Inflation of the Early 1920s”, *Economic History Review*, 49 (1996), pp. 635-666.

<sup>11</sup> Estimates are from Bomberger and Makinen, “Hungarian Hyperinflation,” and Fekete. *Back to the Realities*.

pre-war era, we would get a severe unemployment problem (Figure 1). Though exact numbers of unemployed are hard to come by, it is clear that large segments of the labour force were idle in the months after the war.

The initial supply shock should be regarded as the origin of the hyperinflation. Although we think of hyperinflation (if not all inflation) as a monetary phenomenon, where the government prints too much money, our textbooks remind us that an inflation can occur as well from a significant supply disruption, and clearly did in this case; indeed, the government could not even print money at first. Whether it *continues* or not will depend on the actions of monetary authorities, but the evidence shows that contraction in supply, not expansion of money, provided the impetus for the rising price level.<sup>12</sup>



<sup>12</sup> Historians have at least noted the importance of the initial shock. For example, Paarlberg indicates the importance of 'the dearth of goods' in starting the inflation. But while they acknowledge the preexisting problem, they do not recognize the limits on the options of the government that that condition created. The issue of an inflationary supply drag at a constant money supply is discussed in J. Horváth "A Theory of Institutional Inflation", in N. Schmukler and E. Marcus (eds.) *Inflation Through the Ages*, (New York 1983).



Of course, the lost capital, enormous though it was, cannot account entirely for the magnitude of inflation. But consider the effects of the *kind* of capital that was lost. For example, the railroads were totally disabled; thus, even if goods were produced in one section of the country producers could not get those goods to market except at much higher prices. Cross-border trade was also at a standstill. Cities such as Budapest (from where these price estimates are largely taken), were dependent on goods from the Hungarian countryside and from abroad, and there were especially large increases in prices for whatever goods could be brought in. Moreover, as might be expected in such a distressed situation, inflation was aggravated by the rapid conversion of money into goods. Effectively then, although the stock of money rose by a relatively small percentage, the velocity temporarily increased by a large one.

The Hungarian authorities faced the reality of the shock and the subsequent inflationary jump, and they believed that they had two basic choices: They could accommodate the inflationary surge or they could dampen it. The latter course could have involved contraction of the money supply, reduction in government expenditures, increased taxation, or some other effort to reduce aggregate demand. Arguably, there were already negative demand effects from pessimism and demoralization within the country from the very rapid and extensive devastation the country had undergone. Any of the policy alternatives besides inflation would likely have only deepened pessimism – and with it hopes for quick emergence from the catastrophe of the war. Of course, to the government these did not seem like plausible options in any case. As Kálmán Saláta of the Smallholders Party noted in a 1946 parliamentary debate, “...this inflation...could only be barred by methods which would have made it impossible to design a realistic governmental budget.”<sup>13</sup> Given the state of the infrastructure and the fact that the government bureaucracy needed to be rebuilt, tax collections were seen as too costly by any means other than an inflation tax.

<sup>13</sup> *Nemzetgyűlési Napló* (Parliamentary Records), 25 October 1946, p. 181. All translations from the parliamentary records are by János Horváth.

Thus, authorities from the outset believed that their best (and perhaps only feasible) alternative was to accommodate the inflation, but to utilize it for more than raising revenues. They believed that the inflation could be channeled in such a way as to employ factors of production and raise national income.

The rationale for this policy is straightforward. To extend the simple example of aggregate output, rapid money growth is typically portrayed as a demand shock that should stimulate consumption and so raise quantities supplied. Indeed, a presumption in high inflation is that there is little point in holding money and so it is rapidly converted into goods, and, in turn, existing capital is utilized more fully.

However, in this case, a consumer demand stimulus would be insufficient unless there was also renewed investment to restore a significant level of productive capacity to pre-devastation levels. Hungarian authorities felt that inflation could also be utilized to stimulate investment and increase employment far more than a demand stimulus could be expected to induce. Put another way, while money growth is typically considered a stimulus to aggregate demand through consumption, the Hungarian policy was thought to be a way to shift the aggregate supply curve most of all. This meant using high inflation in some way to affect the behaviour of entrepreneurs (rather than consumers) to invest money in productive activities.

Basically, there are two channels by which this can be effected. Inflation, if it is not fully indexed, can be used either to lower the real cost of capital or to lower the real wage. Either is possible only if the suppliers of capital and/or labour acquiesce to a reduction in their real returns and it is generally thought in the literature that this will be unlikely. But in fact, Hungarian authorities managed, at least indirectly, to do both.

In theory, there should be no difference in policy makers' ability to affect real costs with or without inflation. If expectations are rational, suppliers of factors should adjust to the inflation, making any inflationary component moot. If, indeed, the returns

are, in real terms, too high (for some reason) then these should adjust downward – lower real rates of interest in the capital markets and lower real wages in the labour market – as suppliers gain information on the true state of their respective markets, making inflation unnecessary. In fact, since high inflation is disruptive (hence costly) to an economy, it may seem preferable for policymakers to do their utmost to contain inflation and let markets take their course.

However, for there to be wage restraint and low interest rates, there has to be a set of credible policies and an authority able to coordinate them. In Hungary's case, it does not seem that this state of affairs obtained. Indeed, the government was unable to articulate a credible policy on curbing inflation because it seemed apparent, without a clear ability to command sufficient revenues, it would *have* to resort to money printing. But at the same time, the authorities were able to use inflation to effect reductions in real capital costs and wages – increasing the demand for capital and labour – which in real terms as of mid-1945 were probably too high. These reductions could not have been effective, and were perhaps not even possible, through any alternative policies.

### *b. The Cost of Capital*

Consider a simple model of an economy where the demand for capital is a function of output and real interest rates, or  $K = f(y, r)$ , and entrepreneurs invest to the point where the value of output from new capital must equal the user cost. That is, the marginal value product of capital ( $P * Y/K$ ) will equal the marginal cost of an additional unit of capital. The user cost will include the purchase price, the real interest rate, disruption costs and so on.

If a firm can realize an increased output price, even though it may be assumed that the marginal product of additional capital falls, there would still be incentives for greater investment if the user cost does not rise as rapidly. In normal times, it may be assumed that if there is rapid inflation, although the price of output rises, user costs will grow as well; indeed as inflation becomes very rapid, the rental cost would

include an ever rising interest premium to cover expected inflation. With all other factors rising in price at least as much as the inflation rate, there will be at best no increase in capital demand; more likely demand will fall.

Moreover, capital markets tend to function badly if at all, in a hyperinflation. Of course, high inflation will encourage borrowers; debtors benefit disproportionately because they can pay off loans with easy money. But typically, in hyperinflation, investment is reduced because no creditors will make loans – or if they will, they do so only at enormous rates of interest to insure a positive real return, raising user costs not lowering them. Instead of an expansion of capital there is a contraction. In the case of an economy with an already shrunken capital base, this would seem to lead to further deterioration of conditions not reconstruction.

But government does have potentially the means of lowering user costs. First, it can, through its fiscal policy, subsidize entrepreneurs directly to acquire capital. Then, regardless of the price of other factors, the effective cost to entrepreneurs falls.

Second, government is able to influence nominal rates of interest, and any subsequent inflation adjustments. That is, the terms of loans from the central bank will set the conditions under which a nation's banks may borrow. Market rates will emerge based on central bank rules and behaviour. Banks may require a return on their own cost of funds, but, if central bank rates are set low enough, the real cost of borrowing may be kept low enough to continue to encourage bank participation.

Although outright government giveaways might be a clearer path to capital restoration, it also might be less efficient than by using bankers. Since banks specialize in knowing the creditworthiness and long-term prospects of potential borrowers, the government, by using the banks, was effectively lowering transactions costs and getting money to entrepreneurs in proportions that would reflect their general creditworthiness and ability to contribute to a reconstruction. Bankers, more than government bureaucrats, would have better knowledge of which entrepreneurs in the community

were most likely to use the funds efficiently to effect capital restoration.

Of course, the central bank needed to overcome the reluctance of lenders to lend under hyperinflation as well as provide a means to keep real interest rates low enough to encourage borrowing. Indeed, the authorities sought a method to use the banks to essentially engineer a wealth transfer to entrepreneurs – but one in which the banks also realized a profit.

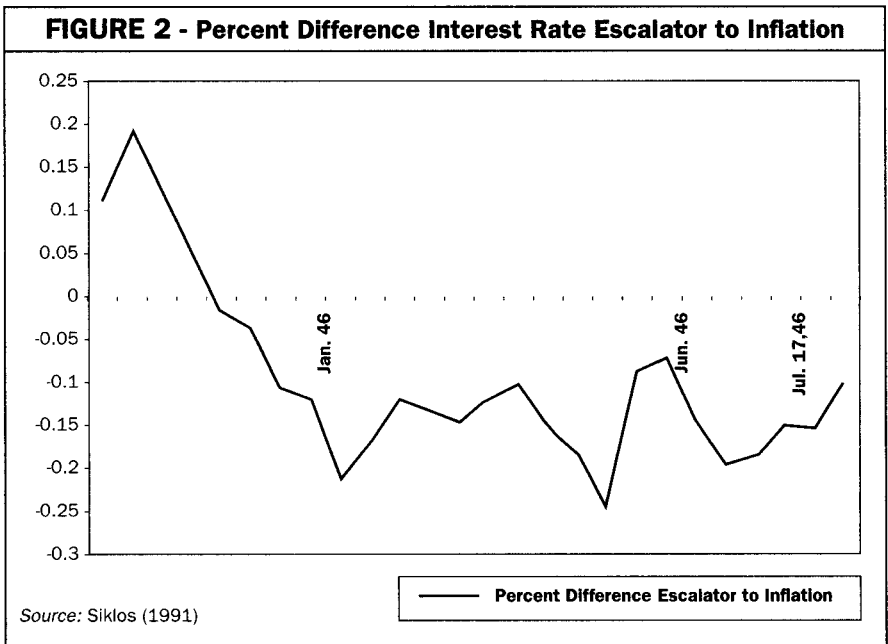
The most obvious way would be to set nominal rates at a level that would lead to a real interest rate that was effectively negative. Note the importance of the inflation channel here. If the authorities wanted to encourage entrepreneurs to borrow, a negative interest rate is a strong incentive. Of course, one never sees a negative *nominal* rate, and so a negative real rate depends on inflation. A bank might agree to lend at a negative real rate provided it could realize a significant enough spread over its own borrowing rate. In other words, through inflation, the central bank can get real resources into the hands of entrepreneurs through banks, using the bankers' expertise, and also compensate the bank for the transaction. With increased lending, this guarantees a soaring money supply, but presumably this is a temporary expedient; through it, the government achieves its goal of lowering the cost of capital and creating incentives of economic restoration.

In the Hungarian case, the authorities used both banks and direct subsidies, but in all instances, for all practical purposes, they gave money away to those able to influence the means of production. State enterprises received grants outright. A quarter or more of Hungarian government expenditures went toward the financing of state enterprises. Moreover, through the short-lived Ministry of Reconstruction, thousands of unemployed workers were hired directly to restore infrastructure and bring in the harvest.

Private business also received funds – ostensibly as loans – directly from the government. Just how much they received is unclear. But the evidence suggests that the loans were substantial. Paal, in her work on the stabilization period, has noted the unusual and important

involvement of the government during this entire period in private credit markets.<sup>14</sup> Indeed, loans were extended both through the Hungarian National Bank and through the Ministry of Reconstruction. And as Siklos points out, the government had no expectation of these “loans” ever being repaid,<sup>15</sup> although, given the rate of money creation, repayment of principal did not have much meaning unless loans were fully indexed to the cost of living, which they were not.

The terms were quite favourable to say the least. Loans were adjusted for inflation, but as the accompanying figure (Figure 2) shows, the escalator was consistently behind the rate of change in the cost of living. Moreover, the escalator continued to lag behind cost of living increases even when indexation brought other aspects of economic life (including TP denominated deposits) in line with cost of living changes.



<sup>14</sup> B. Paal, “Destabilizing Effects of a Successful Stabilization: A Forward-Looking Explanation of the second Hungarian Hyperinflation”, manuscript, (1998), Cornell University.

<sup>15</sup> Siklos, *op. cit.*

But the Hungarian government also utilized the banking system throughout the country to provide a source of funds for entrepreneurs. The government and central bank,<sup>16</sup> to encourage bank participation in this effort, essentially paid banks to take money – albeit depreciating money – and, in turn, put it in the hands of producers. The central bank’s discount rate throughout the period was a constant (and in light of the magnitude of the inflation, absurd) *three* percent,<sup>17</sup> which meant that in an environment where inflation rates were reaching thousands of percent per day real rates of interest were grotesquely negative.<sup>18</sup> Banks could therefore receive a negative return from borrowers – *viz à viz* the inflation rate – and be effectively subsidized

**TABLE 1. Bank Notes in Circulation**

End of month	
July 1945	25,433,900,000
August 1945	35,521,100,000
September 1945	51,034,100,000
October 1945	115,961,100,000
November 1945	364,592,000,000
December 1945	765,446,300,000
January 1946	1,646,450,000,000
February 1946	5,237,808,300,000
March 1946	34,001,636,300,000
April 1946	434,304,091,200,000
May 1946	65,588,977,992,200,000
June 1946	6,277,271,200,000,000,000,000
July 1946	47,300,000,000,000,000,000,000,000

Adapted from Siklos 1991 and Nagaro 1948

<sup>16</sup> Note that the Hungarian central bank was, prior to the World War II, an independent entity, and in fact was barred from granting direct credit to the government. This rule was suspended before the start of the war so that the government could direct credit creation from the bank. Moreover, in 1946, the government temporarily took direct control of the bank through a commissioner whose role was to ensure among other tasks, that the bank acted in ways supportive of “the general interests of the country,” quoted in Bomberger and Makinen, “The Hungarian Hyperinflation”, footnote 9.

<sup>17</sup> See, Bomberger and Makinen, *op. cit.*

<sup>18</sup> See Paarlberg, *op. cit.* It should be noted that Siklos has argued the central bank applied a discount rate on the deposits of banks, and so effectively the nominal rate was well above 3 percent. However, even with the additional rate, the real rate was still negative to a significant extent.

by the government in the process. It would be anticipated that under such a regime, money creation would be tremendous, and this was clearly the case as Table 1 shows.

There is one question that must inevitably arise at this point: why did the banks not take the money given to them by the government and turn it into real goods instead of loaning it out at a depreciating rate of return? There are several reasons why this did not occur. Of course, there undoubtedly *was* some profiteering, but bankers were constrained by three factors. First, the Hungarian banking community was small and rather clubby; it was dominated by four large banks.<sup>19</sup> Thus, the banking sector was fairly easily monitored and since the central bank conditioned further loans on the behaviour of the banks – that is, whether they used the funds to further government policy of restoring production – banks could have jeopardized their ability to continue in business and to have profited themselves.

Second, Hungarian banks, like their German counterparts, had close relationships (including equity participation) with the companies they loaned to. Consequently, the banks themselves benefited from the wealth transfers. Further, as equity owners, banks had a direct interest in firms' long-term prospects, which presumably would be enhanced more by capital expansion than by commodity profiteering.

Finally, there was altruism. While this is hard to quantify, it has been noted by historians and by contemporary observers that in devastated regions of Europe in the aftermath of the war, people pulled together out of a sense of duty to get their country back to normal. This was especially evident in countries like Hungary with primarily a single ethnic group and shared cultural values. Bankers, like others in the community, were willing to sacrifice short-term profit potential for the longer-term goal of economic growth and stability.

### *c. The Cost of Labour*

The inflation that the government encouraged also increased employment. Theoretically, this is possible but unlikely in most

<sup>19</sup> Fekete, *Back to the Realities*.

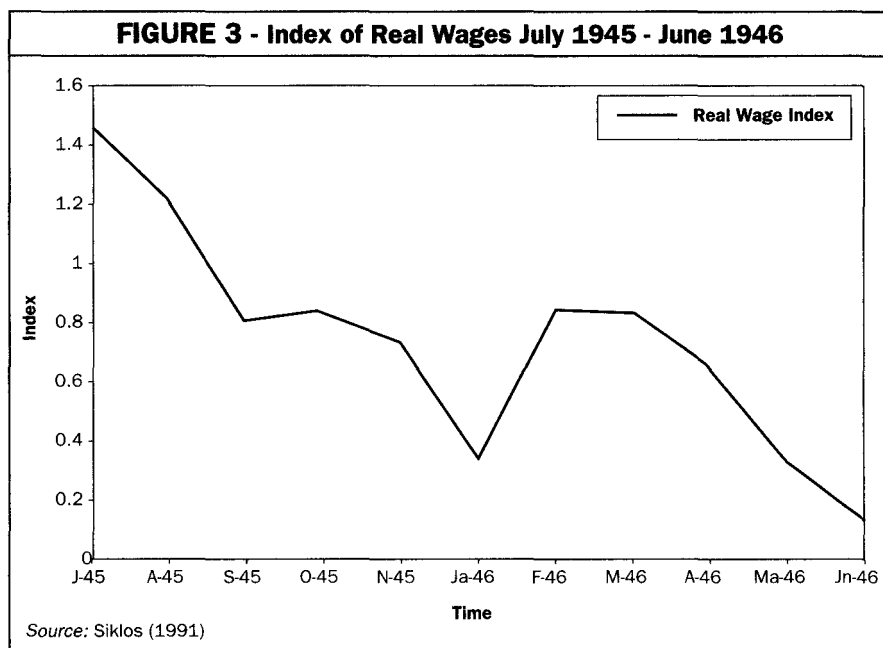


circumstances. As inflation erodes the real wage, (assuming no or incomplete indexation), employers have an incentive to hire more labour. Indeed, as the real wage continues to fall, there would be an incentive for firms to substitute labour for capital, and return unemployed labour to the workforce. Although the marginal product of additional labour may be low, each worker adds to overall productive gains for the economy. Falling wages will continue to encourage firms to hire more workers as long as labourers are willing to accept what they are offered.

Though such a policy can be supported from a theoretical perspective, it is inevitably limited in its application. Workers will not accept drastically falling real wages as a rule. Moreover, workers will generally not assent to policies that explicitly engineer a wealth transfer from themselves to producers. Yet in the Hungarian case the government was effectively taxing resources away from workers (and farmers and shopkeepers) to give to the entrepreneurs.

It seems clear that such a wealth transfer must have a willing populace. It is highly doubtful that in most democratic settings, a policy that transfers wealth from the majority of citizens to a few that are generally better off to begin with could be implemented or at least not on a wide scale. (Indeed, it seems likely that part of the reason for indexation of some banks deposits in Hungary, beginning in 1946, was to ameliorate what was otherwise a vast transfer of the nation's resources. Even in the Hungarian case, it was not sustainable.)

But in the meantime, real wages fell steadily, and dramatically. As the index in Figure 3 suggests the real wage declined by more than 85 per cent in the first seven months of 1946 alone. It should be noted that this figure somewhat overstates the real wage loss. This figure represents the loss in the money wage, but workers often received in kind payments of food or other commodities. Still, there is every reason to believe that the losses suffered by workers were massive. Even if various commodity payments made up 50 percent of the losses – which is almost certainly too high – the wealth transfer would still be large. As Hungarian finance minister Jenő Rácz told parliament in



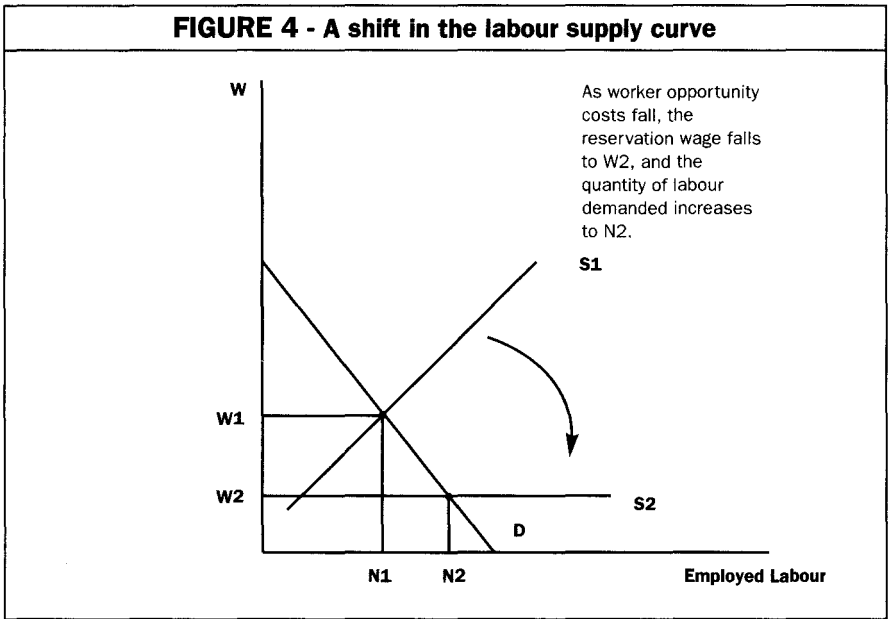
1946, during the period of inflation people had acquiesced in “exceptionally low living standards.”<sup>20</sup>

There is no doubt that this kind of transfer would be hard to achieve in other contexts. For example, in a developing country today, workers would be unlikely to accept such a huge loss in their real wages and, indeed, one would expect that any attempt to lower real wages by even 25 percent would spark social unrest. Hungarian workers did not rebel, nor did they leave the work force. Yet, as a temporary state of affairs, this is not so surprising. What was the average Hungarian worker’s opportunity cost in early 1946? With the country devastated, arguably the alternative was something close to starvation and longer-term deprivation. With such a low opportunity cost, there were few incentives to engage in protest activities that could only slow recovery.

There is reason to believe that the devastation and supply shock of 1944-5 led to a major shift in the labour supply curve. Given falling opportunity costs and diminished expectations, the supply curve

<sup>20</sup> *Nemzetgyűlési Napló*, 25 October 1946, p.181.

**FIGURE 4 - A shift in the labour supply curve**



would be likely to become horizontal at a very low wage. Thus as Figure 4 suggests, even with a drastic shrinkage of the capital stock, and a substantial increase in unemployment (Figure 1), the altered supply curve leads to a low market clearing real wage ( $W_2$ ) and a markedly larger number of employed – even before any restoration in the capital stock, and shift in the demand curve for labour.<sup>21</sup> However, for the level of employment to advance beyond  $N_2$ , labour demand would finally have to shift to the right.

Of course, the preceding analysis does raise the question: why bother with inflation? If workers accept a lower real wage in principle, then they should be indifferent between stable prices and a reduced nominal wage and a stable nominal wage and increased prices. In

<sup>21</sup> Indeed, anecdotally, there is much evidence that people were re-employed in industries where the capital stock was destroyed, and low productivity resulted. Finance Minister Rácz noted, dramatically, how “millions of peasants...harnessed themselves before the plough,” while “industrial workers [returned to factories that were] burnt ruins...” *Nemzetgyűlési Napló*, 10 December 1946, p. 384. Under these circumstances, the marginal product of labour would be low, and wages fell accordingly.

theory, no doubt this is true. But in order for the government to effect this, there must be credibility on the part of government policy-makers that they will not promote inflation, and that they have the ability to coordinate all segments of the economy toward that end. Even if the government had wanted to do so, it is exceedingly doubtful (as noted earlier) that, under the particular circumstances of post-war Hungary, anyone could have credibly delivered a “no inflation” pledge. There was not only concern within the population at large about the authority’s ability to conduct both fiscal and monetary policy but also lingering fears of additional supply shocks due to uncertain conditions where Hungary’s soil was still occupied by the Red Army.

Consequently, more inflation became highly probable (although of uncertain magnitude) and would have been rationally anticipated. More important, in such circumstances, workers will generally figure that they will do better to accept erosion of their real wage through inflation than to agree to a nominal wage cut. That is, given conditions of uncertainty, nominal wage stickiness may well be the result of rational calculation.

Consider a case where workers can accept a 50 percent nominal wage cut or endure one from an expected increase in the price level of 100 percent. If both can be delivered with certainty, the worker should be indifferent between the outcomes (although given the disruption of high inflation a worker may well be more inclined to prefer the former). But now introduce a high degree of uncertainty in the government’s ability to deliver on its inflation rate pledge. If there is any inflation in the first case, workers lose more than 50 percent of their real wage, and in most scenarios workers do worse than if they had accepted inflation. For example, if the inflation rate turns out to be less than 100 percent, workers will do worse to accept a nominal wage cut than a rigid nominal wage with inflation. If the rate is greater than 100 percent, the outcome depends on whether the inflation rate turns out to be much higher if the government accommodates inflation than if it makes a non-credible commitment to resist it. So if workers take a nominal pay cut of 50 percent and inflation turns out to be 50 percent, that would produce the same real

wage as a rigid nominal wage and a 200 percent inflation rate. Since high inflation appeared likely (and, indeed, had appeared earlier in the year) and given that it was unlikely that the authorities (even if they had wanted to) could deliver anything close to price stability, workers probably preferred inflation as the means to drive down the real wage.

Moreover, Hungarian workers were actually receiving a nominal pay increase – only an increase that lagged behind the inflation rate. This way they could experience a real-wage erosion over time; if real wages fell too low, too fast, workers could demand a nominal wage increase to brake it. It might be argued that Hungarian workers engaged in an ongoing implicit contracting process, whereby they re-evaluated their wages daily given information on inflation and on their perceptions of their opportunity costs. Note that in Figure 3 real wages do not fall steadily. Although they fall lower on trend, they move upward on a couple of occasions. Presumably the rate of decrease in real wages had been too steep in the previous period and workers demanded a scaling up to recoup some of their losses.

However in the longer term, wages did fall on trend, and we can infer the value of the opportunity costs in the few months before stabilization in August 1946. In the spring of 1946, there appeared the so-called “calorie” wage, by which workers were paid in money and in-kind enough to permit basic subsistence.<sup>22</sup> The wage varied by type of employment (manual labourers had a higher calorie wage than white collar workers) and by family size. However, that this wage was generally accepted suggests that the average worker’s opportunity cost was finally, by the end of the hyperinflation, at or below subsistence. As was noted in Parliament, “[A] great many very basic and urgent necessities had to be given up while the meeting of these needs was postponed into the distant future...”<sup>23</sup>

Admittedly, this kind of assault on wages could not continue indefinitely even in a devastated country such as post-war Hungary.

<sup>22</sup> Discussed in Siklos, op. cit.

<sup>23</sup> Jenő Rácz, *Nemzetgyűlési Napló*, 25 October 1946, p.181.

There needed to be a promise of stabilization in the foreseeable future. The Hungarian government – after November 1945, an elected regime – promised just that: eventual stabilization and an end to hyperinflation. Indeed, it was observed that the “population sensed the determination and commitment that motivated the government to give [eventually] a firm and stable money to the country.”<sup>24</sup> Thus, hyperinflation was deemed a temporary sacrifice for the good of the nation and, even as it continued, officials could point to gains that were being made. As a result, at least for several months, workers endured a severe deterioration in their wages and their wealth.

Overall, inflation served two goals for the Hungarian government. It was, first, a means of taxation to acquire resources; but, second, it proved a means – indeed was *the* principal means – for Hungarian reconstruction.

### **3. Analysis and Conclusions**

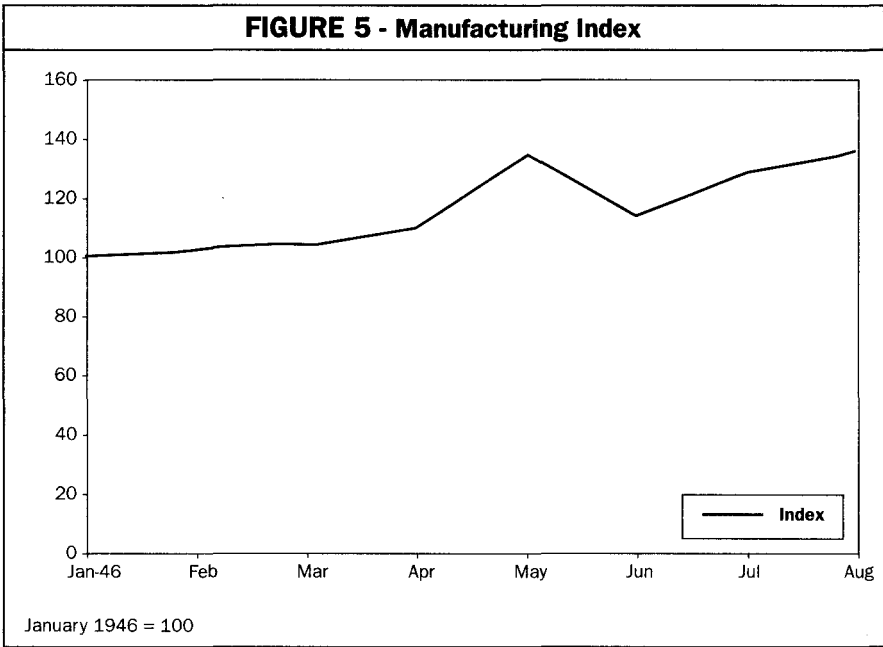
There have been several analyses of the end of the hyperinflation and subsequent stabilization.<sup>25</sup> These explain how a regime change was instituted and stability in the monetary system was restored. Credit is given to credible government policies along with the return of Hungary’s gold supply, which had been removed by the retreating Nazis.

But, as we have argued, this hyperinflation had a goal beyond stabilization. It was a conscious effort at economic restoration and revitalization. In that case, the appropriate measure of success or failure is the state of the Hungarian economy in August 1946 when the new regime (and currency, the forint) was implemented.

<sup>24</sup> Kálmán Saláta *Nemzetgyűlési Napló*, 25 October 1946, p. 181.

<sup>25</sup> See P. Siklos, “The End of the Hungarian Hyperinflation of 1945-4”, *Journal of Money, Credit and Banking*, 21 (1989), pp. 132-47, as well as Paal “Destabilizing” and Bomberger and Makinen, “The Hungarian Hyperinflation”. Cagan treats the Hungarian case in his classic, “The Monetary Dynamics of Hyperinflation”, in M. Friedman (ed.) *Studies in the Quantity Theory of Money*, (Chicago 1956). As others have pointed out, however, his analysis suffers in the Hungarian case from the fact that he did not have accurate data.

In fact, the Hungarian economy went far in only one year. As Figure 5 shows, production in manufacturing increased substantially.



At the same time, infrastructure – especially the railroads – was largely restored, and raw materials production was renewed. Indeed, given that the series for the manufacturing index begins only in January 1946, the graph clearly understates the recovery of the manufacturing sector. Fekete<sup>26</sup> reports that iron and metal industries were at 75 percent, and railroads at 90 percent, of their prewar level by August 1946.

Because Hungary faced such massive devastation, it must have seemed unlikely in early 1945 that Hungary could restore its productive capacity quickly. But it clearly did while other devastated regions did not. Germany, for example, was not close to its pre-war level of productivity one year after the war's end, but Hungary was.

<sup>26</sup> Fekete, *Back to the Realities*.

Siklos has argued that the extremes of the hyperinflation imposed longer-term costs despite the relatively painless transition to stability that the government managed to effect in August 1946.<sup>27</sup> That may well be true. So tremendous an inflation is unlikely to be undertaken and ended costlessly, and there were costs to Hungary's hyperinflation. But on the terms set by the Hungarian government – where the restoration of production was the overriding goal – the policy of inflation must be accounted an overall success.

Of course, this success is at least partly attributable to the special circumstances of Hungary's predicament. The low opportunity costs of workers, the lack of a functioning capital market, the credibility of government pledges of eventual stability are among factors that might have been particularly relevant in the Hungarian case. The nature of Hungarian society and its cultural institutions might also have played a part, though this is a matter for another study. But the case remains important in its own right as an example of how even the most unlikely economic forces might be turned to benefit a nation at a time and place where few "normal" options seem to exist.

<sup>27</sup> Siklos, "The End of the Hungarian Hyperinflation."