

Economics and Research Department

NBH WORKING PAPER

1998/5

Gyula Barabás – István Hamecz – Judit Neményi:

FISCAL CONSOLIDATION, PUBLIC DEBT CONTAINMENT AND DISINFLATION (HUNGARY'S EXPERIENCE TRANSITION)

May, 1999

ISSN 1419 5178

ISBN 963 9057 21 5

Gyula Barabás: Economist, Monetary and Fiscal Research Division
Economics and Research Department.

E-mail: barabasgy@mnb.hu

István Hamecz: Deputy Director, Monetary and Fiscal Research Division, Economics
and Research Department.

E-mail: hameczi@mnb.hu

Judit Neményi: Managing Director, Monetary and Fiscal Research Division,
Economics and Research Department.

E-mail: nemenyij@mnb.hu

The purpose of publishing the Working Paper series is to stimulate comments and
suggestions to the work prepared within the National Bank of Hungary.

The views expressed are those of the authors and do not necessarily reflect the official
view of the Bank

National Bank of Hungary
H-1850 Budapest
Szabadság tér 8-9.

Contents

1. MACROECONOMIC CONTEXT OF MODERATE INFLATION IN HUNGARY	10
2. BUDGET DEFICIT AND INFLATION.....	16
3. MEASURING AND FINANCING THE GOVERNMENT DEFICIT IN A TRANSITION ECONOMY	18
4. THE FINANCING OF THE CONSOLIDATED GENERAL GOVERNMENT DEFICIT.....	29
5. FACTORS INFLUENCING THE INDEBTEDNESS	32
6. CONCLUSIONS.....	39
CHANGE IN DEFICIT FINANCING OVER THE LAST TEN YEARS	40
- 1991 - UNLIMITED DIRECT FINANCING BY THE CENTRAL BANK.....	40
1992 - 1994 - THE YEARS OF POSTPONED FISCAL ADJUSTMENT	41
1995 - 1996 - FISCAL ADJUSTMENT CREATES THE CONDITIONS FOR SUSTAINABLE GROWTH.....	42
CONTINUING FISCAL REFORM	42
APPENDIX: <i>BUDGET DEFICIT, PUBLIC DEBT AND MONETISATION</i>.....	51
1.1. METHODOLOGY	51
1.2. CONSOLIDATION OF THE GENERAL GOVERNMENT AND THE CENTRAL BANK (DEFICIT AND DEBT CONSOLIDATION).....	52

Abstract

The study analyses the relationship between public debt, external and internal disequilibrium and inflation in Hungary through changes in the public sector borrowing requirement and in the structure of budget financing. The analysis is based on data from the 1986-1997 period in order to put the changes in true perspective.

Policy constraints stemming from high indebtedness and their macroeconomic consequences are analysed by comparing different measures of fiscal deficit, as well as by quantifying the factors determining the evolution of the public debt/GDP ratio. We focus on the operational deficit (which is derived from the nominal deficit by eliminating the inflation compensation component of interest payments) and on its financing. The study presents a detailed empirical analysis of the evolution of the financing structure (seigniorage - debt) as well as of the role and structural changes of debt financing.

The calculations are based on net consolidated public debt, which includes the combined debt of the budget and the central bank to other sectors net of claims. The consolidation of budget and central bank balances is unavoidable in order to get reliable indicators of the fiscal stance since in Hungary the central bank has been responsible for borrowing abroad in its own name. We introduced the category of 'extended' consolidated public debt (including the stock of central bank's sterilisation instruments) which enabled us to analyse the past eleven years in a consistent framework, and to reveal the trends as well as the dynamic relationships of the debt accumulation process. The analysis shows that the shift to a new regime of deficit financing based on issuing marketable government securities (in 1992) did not increase the fiscal burden, it merely revealed its true magnitude by separating monetary and fiscal functions and by increasing transparency.

The analysis of consolidated debt revealed that throughout the last ten years the implicit real interest rates on public debt exceeded the growth rate of the economy, which led to the continuous increase of the debt ratio (the gross debt/GDP around 90% in the middle of nineties). This effect was mitigated only from 1995 by the fiscal adjustment resulting a primary surplus in the budget. The seigniorage did not play an important role in financing after 1992, it amounted to 1-2% of GDP. However, the major element in the significant (over 15 percentage points) reduction in the debt-to-GDP ratio over the last three years was the devotion of privatisation revenues to retire public debt.

Analysing past developments, we came to the conclusion that despite the significant reduction in the debt-to-GDP ratio in the last few years, the debt burden is still significant and a further reduction of the debt to GDP ratio is inevitable in order to create the conditions for sustainable growth and to ensure the continuous convergence to developed countries. This requires a structural primary surplus of 1.5-2% of GDP in the medium run, if we take into account the requirement of sustainability, the goal of further reductions in the inflation rate and the fact that with the end of the privatisation process privatisation revenues will not provide additional sources for financing.

Introduction¹

Although Hungary played a leading role in the introduction of different reforms among the ex-socialist countries in the 1980s, the first half of the 1990s was a period of unsuccessful stabilisation, and by the spring of 1995 the country could not avoid the introduction of a comprehensive adjustment package². The unsatisfactory fiscal adjustments and its belated implementation are the main reasons for the failures of earlier attempts at stabilisation.

This study takes a closer look at the role of an important element of fiscal adjustment: *the transformation of the deficit financing regime*, the interaction between *market-based deficit financing introduced in 1992* as well as debt accumulation and macroeconomic processes is analysed. Other aspects of fiscal reform are not evaluated here³. Our objective is to analyse the relationship between the financing need and the market-based financing regime. In the course of this analysis, the transformation of the financing need (the fiscal deficit) and of the financing structure is surveyed.

The calculations are carried out for the *consolidated fiscal accounts*, which include the central budget, extrabudgetary funds, social security funds and local governments. They also contain the National Bank of Hungary (NBH), since the central bank had a significant influence on the financial position of the government in the period under investigation due to its special financing links⁴.

In the following we show that the establishment of central bank independence - which is very similar to arrangements in developed economies - was one of the basic elements of the new financing regime.

In order to be able to evaluate economic policy it is inevitable (both for the past and the future) to eliminate the effects of financial flows and debt-linkages between the central budget and the NBH, since the bulk of Hungary's sovereign external debt was in the central bank's books until the January 1997 debt conversion. Therefore, only the *consolidated public debt* indicator reflects the true structure of public debt (external vs. domestic, foreign exchange vs. local currency), and factors behind the debt accumulation process should be examined based on this indicator. *The study presents a detailed empirical analysis of the evolution of the financing structure (seigniorage - debt) as well as of the role and structural changes of debt financing.*

¹ This study is an extended version of a chapter in a forthcoming book on the Hungarian fiscal reform (eds.: L. Bokros - J.J. Dethier, publisher: The World Bank). Zsolt Lovas and Gábor Kiss contributed to the compilation of the database which we used in our calculations, Roberto Rocha gave us the first impetus to use this special framework. We are thankful for their help. We are grateful for constructive criticism and comments on earlier versions of the study to J. J. Dethier, Csaba László, Álmos Kovács, Ágnes Kerekes, George Kopits, László Náray, Péter Pete, György Sándor, András Simon, György Surányi, György Szapáry, István P. Székely. The authors are reliable for all remaining errors.

² Several studies describe and evaluate the elements of the "Bokros package", including Bokros (1997), Kornai (1997), Surányi (1995), Annual Reports of the National Bank of Hungary 1995, 1996.

³ A working paper of the National Bank of Hungary (Kiss (1998/4)) investigates these aspects of the "Bokros package" in details as well as László (1998).

⁴ A complete consolidation of fiscal accounts would include all major entities with quasi-fiscal activity (e.g., State Privatization and Holding Company, Eximbank, Hungarian Development Bank, etc.), but due to the lack of reliable information, this is not even attempted here.

Calculations are in gross terms for both claims and liabilities, as we intended to use categories that can be synthetic indicators of the debt accumulation tendencies of the last more than ten years, while it is obvious that in the period under investigation numerous regulatory and organisational changes occurred, which affected the role, the balance sheet structure and the profit of the two institutions involved in deficit financing - namely the budget itself and the National Bank of Hungary.

This is the reason why we defined the *extended consolidated (gross and net) public debt indicator* which - unlike the usual consolidated public debt indicators - includes *short term assets and liabilities of the central bank paying market interest rates*. Therefore, our debt to GDP ratios differ from the official ones as well, but the indicators we obtained are invariant to the institutional division of tasks, help reveal future tendencies and determine the basic requirements fiscal policy should fulfil in the future.

Among the changing (regulatory, institutional conditions, developing money and capital markets) environment of transition the reliable evaluation of fiscal policy can be done only by using several indicators reflecting different approaches. Therefore, we analysed the financing need both in cash flow and accrual basis, and the investigation of the adjustment process is based on the operational deficit in order to eliminate the bias due to inflation. The estimations were carried out for the 1986-97 period⁵, although the compilation of the time series was rather difficult, since in the beginning transparency concerning budgetary figures and the financing system was lacking.

Our main objective is to describe the relationship between fiscal policy and the relatively high inflation (around 20%), which has been more persistent in Hungary compared to other transition economies. The analysis of past developments in deficit financing can be an important contribution to formulate the requirements for fiscal policy in the disinflation period in front of us⁶. It would have been more obvious to investigate the period after 1992, when the deficit was financed through government securities at market rates. Then, however, we would not have been able to demonstrate the consequences of the magnitude and composition of the inherited debt burden, which limited the scope of fiscal policy in the first half of the nineties.

In the first and second chapters of the study we attempt to determine the “responsibility” of fiscal policy in the persistence of moderate inflation in the 1990s with the help of an overview of major factors influencing Hungarian inflation, moreover, the macroeconomic relationships of deficit financing are presented. In the third chapter we demonstrate that - in the face of high indebtedness, moderate inflation and a developing market for government securities - the characteristics of the fiscal adjustment process can be assessed only through different measures of the fiscal deficit. The fourth and fifth chapters deal with the dynamics of debt accumulation, the factors influencing the debt-to-GDP ratio are examined in the different subperiods of the new, market-based financing regime which was introduced in 1992. In the last chapter conclusions are drawn which - in our view - should be taken into account when formulating the deficit financing program of the future periods.

⁵ Where it was available, preliminary figures for 1997 are also indicated.

⁶ On the topic of disinflation see Surányi - Vincze (1998) and NBH Monetary Policy Guidelines, 1998.

1. Macroeconomic Context of Moderate Inflation in Hungary

In developed economies price stability is the ultimate goal of monetary policy, because inflation is primarily a monetary phenomenon, and therefore it can be controlled by the appropriate use of monetary policy. In transition economies, however, inflation has several other sources which originate in tensions accumulated in the former centrally planned economy. The relative price distortions developed in the previous regime make the higher rate of inflation unavoidable taking into account the relatively sticky nature of prices, as well as the fact that relative price corrections only rarely take place through price decreases. Thus, factors determining inflation in transition economies can be classified as follows:

- factors determined by monetary and exchange rate policy
- fiscal policy;
- relative price changes: elimination of price distortions on the one hand, and relative price changes due to the catching up of the economy to developed economies on the other hand;
- expectations and economic policy interests.

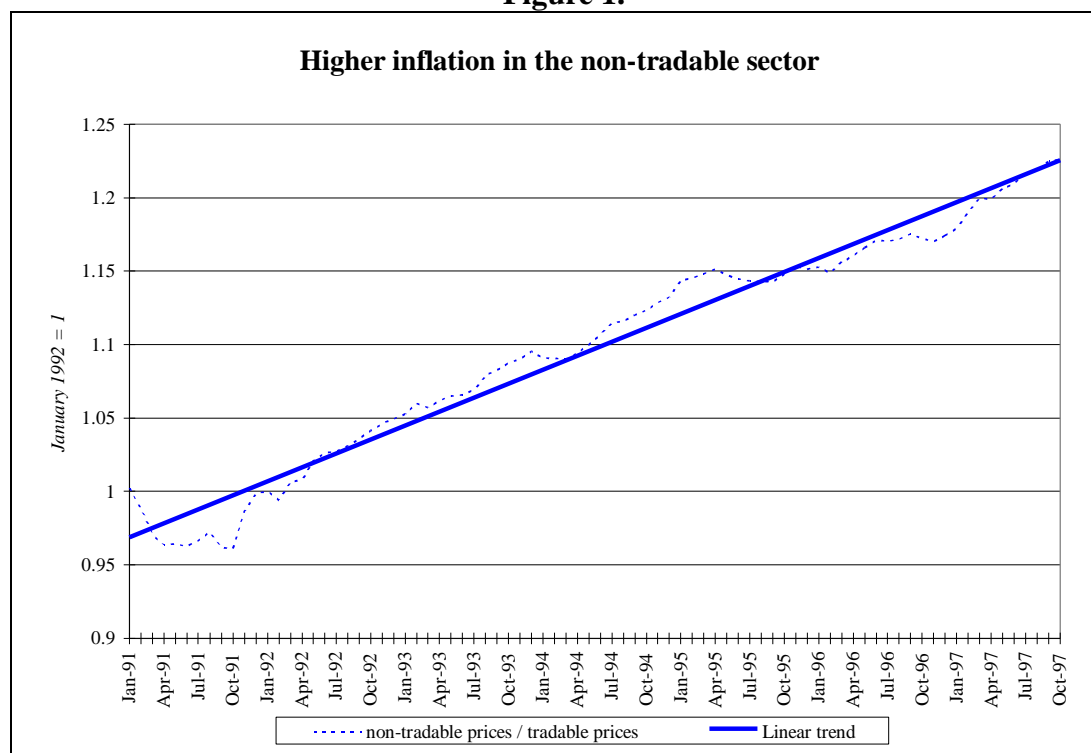
This study investigates factors influenced by fiscal policy, and we would like to answer the question how fiscal policy of the nineties contributed to the persistence of moderate inflation. It should be noted at the start, however, that the determination of the extent and method⁷ of a tolerable fiscal adjustment was a hard task among the constraints of the inherited debt burden and social hardships, as well as among the frictions of the infant government securities market. Tobin's observation that inflation is a veil in front of the redistribution of incomes seems particularly relevant under these circumstances.

The price and trade liberalisation process, as well as the elimination of different producer and price subsidies at the end of the 1980s and the beginning of the 1990s unavoidably brought about a one-time correction of relative prices (sometimes in several stages). At the same time, along with the transformation of the micro structure of the economy, a continuous relative price adjustment began between the tradable and non-tradable sectors parallel with the gradual development of a profit-oriented business sector. This relative price adjustment is a continuous endogenous process and it is related to the increasing productivity of the tradable sector⁸. (Figure 1.)

⁷ The cost-benefit analysis of budget expenditures and revenues and the analysis of redistribution effects have not been carried out to date, so the social costs of fiscal adjustment cannot be optimized theoretically, either.

⁸ The distinction between tradable and non-tradable sectors is based on competition with foreign firms. This competition takes place in foreign markets (export), on the one hand, and in domestic markets through the substitutability between import goods and domestic production, on the other hand. The real appreciation typical of the catching up process is related to the Balassa-Samuelson effect (Halpern-Wyplosz (1997)).

Figure 1.



The analysis of disaggregated price indices indicated that even at times of greater demand shocks only a few prices declined actually (Vincze-Zsoldos (1996)), therefore, the assumption of substantial downward rigidity of prices is justified. The entire period under investigation was characterised by relative price changes and inflationary pressures due to them, but a more detailed analysis can separate subperiods with different characteristics:

1986-1988 Lower inflation is due to regulated prices.

1989-1991 Price and trade liberalisation with high inflation. The devaluation of the Hungarian forint approximately compensated for the inflation difference between Hungary and its main trade partners.

Middle of 1991 - beginning of 1995 Inflation peaked in the middle of 1991, afterwards an ambitious disinflation program was announced which later proved to be unsustainable. The lesson of the period is that a lower inflation rate achieved by artificial relative price distortions leads after some time to the accumulation of tensions whose correction requires measures that result in a turnaround in the disinflation process⁹. The maintenance of the (PPI-based) real effective exchange rate and the “freezing” of energy and utilities prices were the two basic elements of the 1992 disinflation program. This period was marked by a spread between consumer and producer prices that grew to 10 percentage points¹⁰. The analysis of prices, profitability and competitiveness in the period is

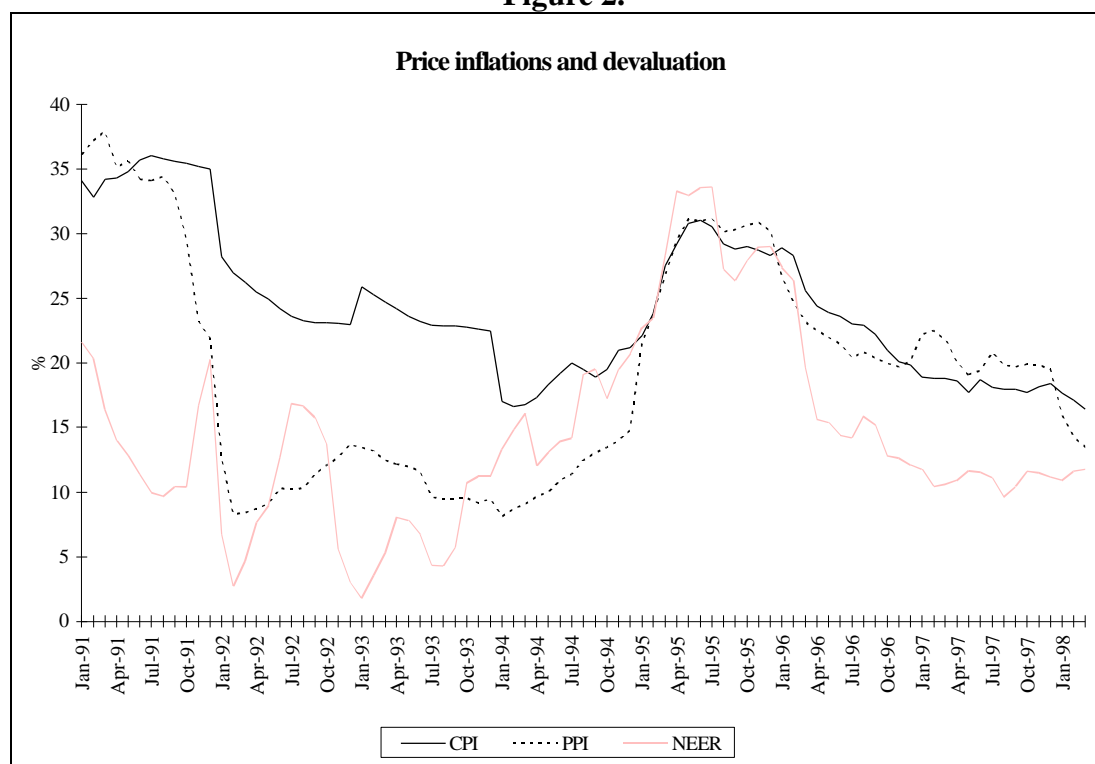
⁹ That is why the 1998 NBH Monetary Policy Guidelines declared “sustainable inflation reduction” as the ultimate goal of monetary policy.

¹⁰ The spread between consumer and producer prices was partly a statistical artifact (Darvas et al.(1994)). Producer price statistics are derived in a gross basis, thus they include energy related products cumulatively, their weight therefore is much greater in the producer price index than in the consumer price index.

not an objective of this study¹¹, but it is important to note that the correction of artificially maintained relative price distortions was inevitable for the exported, sustainable growth. The tension arising from energy prices that diverged from world prices was among the first things to be eliminated in order to achieve sustainable growth.

Since 1995 major developments in relative prices - besides energy price corrections - have been due to changes in relative prices of tradable and nontradable goods. Prices in the tradable sector are determined more and more by foreign prices and the rate of devaluation, while non-tradable inflation regularly exceeded the growth rate of tradable prices. The explanation for this is partly inflationary inertia resulting from the persistence of inflation around 20%, but tensions arising from frictional unemployment in the labour market play an increasing role. Fast growing productivity in the tradable sector makes the higher growth rate of wages possible, but it induces higher wage demands resulting in higher inflation also in the non-tradable sector due to competition for skilled labour. The privatisation of certain functions formerly performed by the state can also contribute to higher non-tradable inflation.

Figure 2.



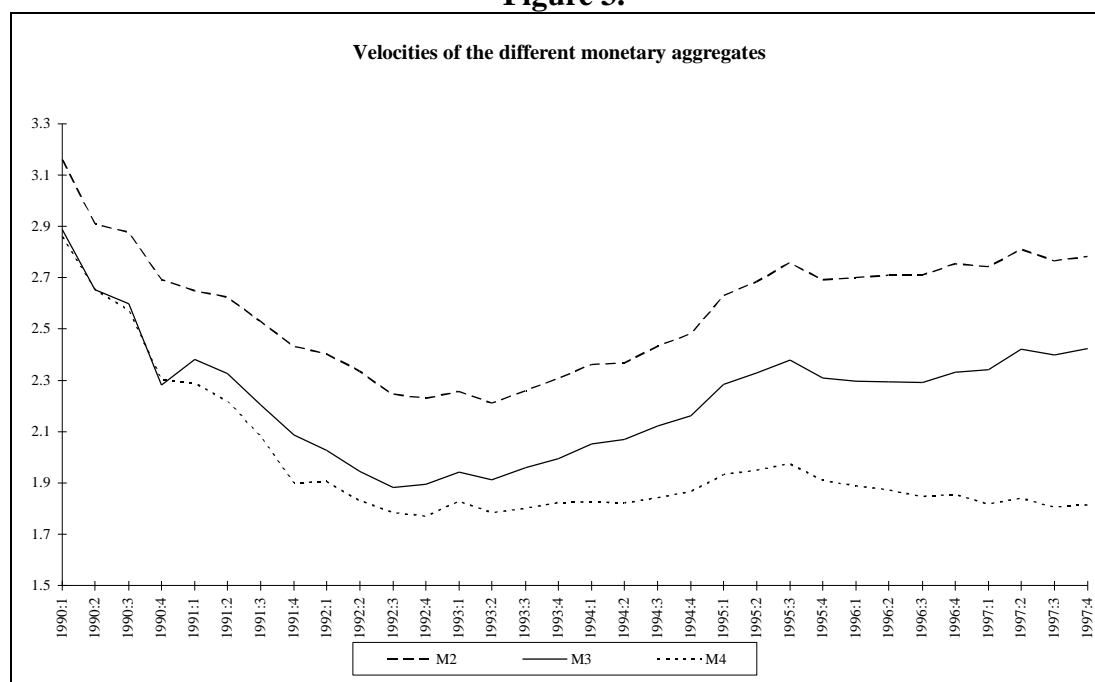
In the first phase of transition (1991-1994) *monetary policy* was characterised by too many ultimate goals, the transformation of policy tools and by unsatisfactory co-ordination between fiscal and monetary policy (Neményi (1996)). The goals of monetary policy were hard to define consistently among the changing conditions of the transition to a market economy, and the continuous changes were detrimental to the

¹¹ See Halpern (1996) for a comparative analysis of competitiveness indicators.

effectiveness of monetary transmission as well. Not even the ultimate goal of monetary policy could be determined unambiguously, because the high external debt burden was such a serious constraint that the current account deficit and the maintenance of external competitiveness entered the central bank's objective function. After successfully avoiding a balance-of-payment crisis in 1990, disinflation became the ultimate goal of monetary policy, but sustainability considerations necessary to ensure the continuity of the disinflation process were not given enough weight. The "stop-go" policy of the 1980s continued: in the period of 1990-95 disinflation enjoyed priority only until the deterioration of the current account forced the devaluation of the currency. Measures to boost economic growth ignored the requirements of external equilibrium and disinflation as in the previous decade.

The requirement of co-ordination among inflation, external competitiveness and economic growth was made explicit by the crisis that emerged at the beginning of 1995. Monetary policy no longer had an effective tool to contain inflation as the events of 1993-94 show, when real interest rates were continually increasing, but this could do nothing to stop the market from losing confidence in economic policy. The budget deficit could not be financed without the participation of the central bank, and Hungary's creditworthiness in international capital markets was in danger. The unsustainability of the situation was exacerbated by the Mexican crisis at the beginning of 1995 (Kornai (1997)).

Figure 3.



In the environment of rapidly changing money and capital markets the instability of money demand did not allow the central bank to follow monetary aggregate targeting (Riecke (1996), Neményi (1997)). In transition economies structural changes in money demand and savings due to the development of the financial system¹² are natural

¹² It is worth noting that the stability of money demand in itself is not sufficient for monetary aggregate targeting. It also needs a reliable model of the real economy which is/was not at the central

phenomena. This is also reflected in the velocity of monetary aggregates which showed substantial volatility in the period under investigation, only the velocity of the broadest money aggregate (M4¹³) seems to be stabilising. Monetary aggregate targeting was made difficult also by changes in the money multiplier and - from 1995 on - by more and more intensive capital inflows.

In these circumstances the choice of *the exchange rate as the intermediate target* seemed rather reasonable. The credibility of the fix, but adjustable exchange rate regime weakened substantially in the 1993-94 period, when devaluations depended on changes in the priorities among ultimate goals of monetary policy. Regular devaluations were necessary because the Hungarian inflation rate was permanently higher than that of the trading partners and because of the deteriorating trade balance.

Expectations has played an important role in the persistence of inflation since 1988, and they are also partly responsible for its slow reduction since 1996. Market expectations usually exceeded official government expectations concerning future inflation and they were formed backward-looking¹⁴. This process was reinforced by the choice of measures taken at times when policy corrections became unavoidable due to accumulated tensions. These measures have always had inflationary effects.

March 1995 was the last time when the central bank and the government “surprised” the public¹⁵ with higher than expected inflation which resulted in an over 10% decrease in real wages. This problem is known as *time-inconsistency*, which refers to the fact that monetary authorities have the advantage of being able to make their decisions in monetary and exchange rate policy after market expectations are formed. The market defends itself with higher inflation expectations, which can easily be self-fulfilling. That is the result is higher inflation, even if monetary authorities did not generate surprise inflation.

Hence, as long as time inconsistency is a serious problem, that is the probability of a possible surprise inflation is high, *the influence of inertial elements delaying disinflation remains strong*. The “unexpected” inflation rate of nearly 30% in 1995 naturally pushed wage demands upwards in the following years, which together with

bank’s disposal. This is well illustrated by the fact that the recession in 1990 was significantly greater than expected and that in 1995-96 was significantly smaller.

¹³ M4 includes the stock of government securities outside the banking system besides cash and bank deposits.

¹⁴ This can be demonstrated by comparing official government targets with the forecasts of several research institutions. Higher inflation expectations resulted in a higher (or close to the upper limit) growth of wages than agreed by the representatives of employees, employers and the government (Blanchard (1997)). Improvements in transparency and credibility are likely result in more forward-looking expectations.

¹⁵ The adjustment measures of March 1995 (devaluation of 9%, import surcharge, energy price correction) caused substantial changes in relative prices and income, and at the same time they created surprise inflation (CPI inflation approached 30%, the spread between PPI and CPI inflation disappeared). Net wages decreased by a further 5% in 1996. The preannounced crawling band system (with a $\pm 2.25\%$ band around the parity which was defined relative to a currency basket of 30% USD 70% DEM) was introduced first of all to improve credibility, and because the monthly rate of devaluation was determined based on the targeted inflation rate, the exchange rate was supposed to play the role of the nominal anchor. The sustainability of the new exchange rate regime was supported by a lower budget deficit and a strict income policy.

backward-looking wage contracts can make the disinflation process rather costly (Dornbush-Fisher (1992)). *In this situation without credibility improving policy measures which may include institutional changes as well¹⁶ disinflation can be only a slow process.*

In 1993-1994, the budget deficit was financed by short-term, floating rate securities from the developing government securities market due to the lack of confidence in economic policy. Therefore, the budget was quite sensitive to changes in yields which were based on market expectations of inflation. Thus, the structure of deficit financing also became an obstacle in the way of disinflation, since the growing financing need arising from high (rising) interest premium could be met usually only by monetization (direct financing by the central bank) in the absence of a correction in the primary budget deficit.

Before taking a *closer look at the role fiscal policy* in the explanation of inflation, it is worth surveying the reasons for policy-makers to use surprise inflation despite the fact that inflation is unfavourable for the economy in the long run. The motives of using inflation as an economic policy tool can be divided into three groups (Cukierman (1992)). We merely note that inflation was occasionally used as an economic policy tool in the last decade, though the weights of different incentives were varying.

- *The employment/growth motive* is related to political cycles and was detectable mainly at the time of early shocks (-1992), but it also appeared in 1994.

- *The current account (external competitiveness) motive* was very strong in Hungary. Devaluations aimed at stopping the deterioration of the current account led to higher inflation which in turn reinforced devaluation expectations, and foreign exchange speculation became permanent as a result. Monetary authorities took some time to regain some credibility even after the introduction of the preannounced crawling band regime in 1995.

- Finally, *the government revenue motive*. As far as seigniorage is concerned, it played a smaller than expected part in deficit financing. The primary balance of the budget, however, is not neutral to inflation, especially at times of unexpected inflation: the effect of higher inflation is felt in the revenue side rather soon, while the adjustment of expenditures is slower. Therefore, the incentives behind using inflation as an economic policy tool include other aspects than merely seigniorage in Hungary.

These considerations are reflected in expectations, and the inflationary process seems to have long lags, which shows the signs of hysteresis, even if expectations are rational and forward-looking. This is important for economic policy, because as long as the probability of a possible surprise inflation is not small, a decline in inflationary expectations is not likely, which eventually contributes to the persistence of inflation. The preannounced crawling band was helpful in reducing inflation in the period of regaining-creating credibility, after the policy correction of 1995. A basic prerequisite for this, however, was that fiscal and income policies should be consistent with the rate of crawl. In the followings, a special aspect of this issue, the interrelation between the financing need of the budget and its financing, as well as the inflation rate is examined.

¹⁶ See for example the case of New Zealand.

2. Budget deficit and inflation

In Hungary - which is a small open economy with a history of fixed exchange rates (under different regimes)¹⁷ - balance of payments considerations could never be ignored when analysing the relationship between the budget deficit and inflation. It can be justified empirically that the increasing budget deficit and the growth of domestic absorption which exceeded the growth of GDP, led directly to the worsening of the current account balance in the first half of the nineties. In the period before 1995 monetary expansion related to deficit financing directly contributed to inflationary pressures and it had indirect effects on inflation as well. The steady worsening of the current account balance necessitated exchange rate corrections which were accommodated by monetary policy. All this contributed to the persistence of inflation and sometimes even to jumps in the growth rate of prices. Thus, the budget deficit indirectly led to inflation through the current account deficit and devaluations.

Table 1. Macroeconomic Indicators
Percentage change unless otherwise indicated

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Real GDP	-0.1	-0.7	-3.5	-11.9	-3.1	-0.6	2.9	1.5	1.3	4.4
Domestic absorption (real)	-2.9	0.9	-3.1	-9.1	-3.6	9.9	2.2	-3.1	0.8	4.2
M3 (annual average)	..	..		26.3	36.4	19.9	14.4	15.1	22.8	18.8
Net domestic assets*	..	..		14.1	10.9	18.9	20.1	22.3	1.9	9.4
Corporate loans	..	..		21.7	5.9	-3.2	12.1	19.2	12.6	37.5
Current account/GDP	-2.8	-4.9	0.4	0.8	0.9	-9.0	-9.4	-5.4	-3.8	-2.2
Unemployment(percent of labour force)**	0.3	0.4	1.0	4.7	10.3	11.9	10.7	10.2	9.9	8.7
Inflation (CPI, YoY)	15.5	17.0	28.9	35.0	23.0	22.5	18.8	28.2	23.6	18.3
(CPI, end - year)	14.8	18.1	33.4	32.2	21.6	21.1	21.2	28.3	19.8	18.4

* Includes the effect of bank restructuring and debtor consolidation after 1993.

** Annual averages. Prior to 1993 registered, from 1993 according to ILO definition from Labour Force Survey

In the 1990s the choice between the different methods of deficit financing was constrained. Since external debt reached critical levels at the end of the eighties, external financing was seriously limited. The burden of foreign exchange denominated borrowing were recognised and this was reflected in the new deficit financing regime introduced in 1992, which took effect after the Central Bank Act (1991 LX. Act) was passed in Parliament. In the new regime:

- the budget deficit is financed exclusively through the market by issuing government securities (Treasury bills and bonds);

¹⁷ Before 1995 the exchange rate regime operated as an adjustable peg. In the preannounced crawling band regime introduced in March 1995 the exchange rate has been stuck at the stronger edge of the 4.5% wide band at almost all times. Therefore, the regime operated basically as a crawling peg despite the existence of the band around the parity.

- central bank financing of the deficit was limited, since January 1997 any direct financing by the central bank (that is participation in primary auctions) is prohibited in accordance with EU norms, which was made possible by the significant development of the government securities market and by the substantial reduction in the deficit financing need;
- government securities are purchased by investors (households, corporations and institutional investors) at their free will according to their investment decisions.

We must note already in the beginning that - contrary to beliefs - *this change in the financing regime did not increase the costs of deficit financing*, and unlimited central bank financing at preferential interest rates would not have eased the social burdens of transition to a market economy as some might claim. *The most important consequence of the financing regime reform was that costs¹⁸ hidden in the labyrinth of the previous financing system became explicit, and this meant a major improvement in the transparency of deficit financing.* An increasing share of the real costs of deficit financing appeared directly in the government's books, since the budget paid market interest rates on the new issues of government securities which covered the deficit financing of the given year plus the refinancing of maturing stock (for more details see Borbély - Neményi (1995)). In the beginning of the 90s, when repayment of the accumulated external debt meant a serious problem, the budget was not affected directly, because foreign exchange debt was in the books of the central bank, and the government paid preferential interest rates¹⁹ on long-term credit from the National Bank of Hungary. (Further details on the establishment central bank's independence are given in Barabás-Hamecz -Neményi (1998)).

The endogenous and exogenous shocks in the beginning of the 1990s played a part in the growth of the budget deficit. The problem was twofold: (i) *the rising deficit to GDP could not be financed from the market since the bad macroeconomic prospects and the undeveloped state of the government securities market made both domestic and foreign investors unwilling to invest in forint denominated Treasuries;* (ii) *changes in the deficit structure - especially the rising real interest rates - showed the signs of a potentially explosive debt accumulation process.*

The public sector can be divided into four subsystems and the central bank, but only *two players have a distinguished role in deficit financing*: the central budget decides about financing issues and debt management, and the National Bank of Hungary decides about financing through the monetary expansion²⁰.

¹⁸ In the past costs showed up in the reduction of the central bank's net real wealth due to special accounting practices. A good description of the mechanism and consequences of this process can be found in Rocha - Saldanha (1992).

¹⁹ To make it clear we must emphasize the problem was not that the nominal or inflation induced costs were not observable - our efforts are partly directed to filter these out -, but the identification of the real costs was nearly impossible in this non-transparent system without a thorough investigation the easily accessible figures were misleading.

²⁰ Among the fiscal subsystems local governments have the right to accumulate debt in their own right. In the beginning of the nineties there were plans to decentralize deficit financing in order to increase the responsibility of social security funds, but the deficit of social security funds (which regularly exceeded the planned figure) could not be financed from the market at a reasonable cost, therefore social security funds were given access to use the account of the budget at the central bank.

In light of the fact that the shift to the new financing regime in 1992 coincided with the rise in the budget deficit, and the government securities market was rather illiquid and in the first phase of its development, the possibility of direct financing by the central bank was eliminated only gradually. Macroeconomic aspects and especially *co-ordination between fiscal and monetary policies were assigned primary importance. Radical fiscal reform, however, was postponed until the escalation of the financing crisis at the end of 1994.* It was obvious from the beginning, but when it turned out that further monetary restrictions were ineffective²¹, it became even more evident that if the central bank withdraws from deficit financing, after some time it will lead to even larger monetary financing, that is “unpleasant monetary arithmetics” can arise (Sargent- Wallace (1983)). That is why the prohibition of direct central bank financing was introduced only gradually. In the first phase of transition (before 1995) the constraints on direct financing were violated several times, situations arose when market financing was not possible. This was the case in September 1993, when the situation was solved by reducing central bank refinancing rates below market rates (“opening the repotap”), and in 1994, when the direct financing limit of 4% of budget revenues (56 billion forints) imposed by the Central Bank Act was raised to 80 billion forints.

The significant development of the government securities market and the introduction of the primary dealer system enabled the National Bank of Hungary in 1997 to give up its functions as a market maker, and now its open market operations are driven by monetary policy considerations. At the same time central bank financing of the budget became market-based which means that the NBH does not participate at the primary issues and has no obligation to provide the budget with funds neither in an indirect form.

A simple scheme of the relationships between the deficit financing need, debt accumulation and inflation is summarised in the first part of the Appendix. In chapter 3 and 4 the financing need and its composition are analysed, and chapter 5 contains the detailed analysis of the debt-to-GDP ratio.

3. Measuring and Financing the Government Deficit in a Transition Economy

There are several special characteristics of Hungary, which have to be taken into account when investigating the changes in public debt and in budget financing:

- Current problems can not be understood disregarding the accelerating indebtedness of the 1980s. The *high level of foreign currency denominated debt* was the most important binding constraint for the economic policy in the early nineties, therefore we analysed more than one decade (1986-1997) for a better understanding of the impact of the pre-transition period.

²¹ After the negative real interest rates of 1993 a correction process began which produced high ex ante and ex post real interest rates, but even these could not ensure financing.

- *The deviation between the official deficit of the general government and the borrowing requirement* was large in the first period of transition (Tanzi, (1992)).²²
- Privatisation incomes as one-time financing resources decreased the public debt significantly as from 1995 onwards the bulk of *the privatisation revenues was used to retire government debt*.
- In the centrally planned economy *the National Bank of Hungary* (NBH) pursued strong *quasi fiscal activities*, the profit payments to the government were much lower than the seigniorage due to transfers given by the central bank (Neményi, (1997)).
- The overwhelming proportion of the foreign debt was held by the NBH, consequently *the clear assessment of the debt burden requires the consolidation of the balance sheets of the general government and the central bank*. (For methodology of consolidation see Appendix 1.) As a result of the consolidation cash-flows between the government and the NBH have been filtered out and financial connections with market participants (residents and non-residents) outside the general government and the NBH has been revealed in this paper.
- Two different forms of deficit financing are distinguished in our paper: *monetization and debt financing*. Items of the central bank liabilities were separated into two groups: monetary base and debt. The distinction between monetary base and debt is made according to the interest paid on the liability of the central bank: monetary base comprises the cash and banknotes plus the mandatory reserves of commercial banks with below market interest rates. On the other hand the stock of sterilisation instruments (reverse repo, deposits and sterilisation bonds) are added to the consolidated public debt as the NBH pays market interest rate on the stock, and these instruments are to avoid the undesirable money-multiplication. A monetary base excluding reverse repo, NBH-bonds, HUF and foreign currency denominated voluntary deposits of commercial banks was used in this paper which is appropriate for the analysis of capital inflows and sterilised intervention. The size of monetization was regarded as the change in the monetary base. *Due to this narrow definition of the monetary base the gross consolidated public debt figures included in this paper exceed official ones*. The 'extended' gross public debt category used in this paper eliminates the deficiency of the official figures, where sterilised intervention of the central bank decrease the debt/GDP ratio as sterilisation instruments are not included in the gross public debt. Our gross debt figures enable us *to capture the shift in the denomination structure of the debt* due to the foreign currency market intervention and sterilisation of the NBH.
- In a quickly changing environment the fiscal stance can not be evaluated by one deficit figure. Large interest rate volatility and shifting timing of interest payments cause quite significant deviation between *cash-flow and accrual budget deficits*. While the cash-flow deficit reflects the actual financing requirement of the general government, accrual figures contribute to the proper macroeconomic assessment of the fiscal stance. Under moderate inflation the operational (or real) deficit (Tanzi et al (1993)), which excludes the distortionary impact of inflation can provide useful

²² This is reflected in the increasing stock of non-deficit financing public debt (credit-, bank- and debtor consolidation, transforming of housing loans, assuming the debt of large corporates etc.), which added more than 10 percentage points to the debt/GDP ratio in 1990-1994.

information about the actual size of the fiscal adjustment and the demand impact of the fiscal policy.

- When accomplishing the analysis over a longer period, *the deficit calculations have to be based on changes in public debt because* (i) reported cash-flow figures very often do not reflect actual cash-flows for the whole period of the last ten years, (ii) a significant part of the increases in the stock of debt was unrelated to the official deficits, (iii) the methodology of the budget changed several times according to regulations.

Nominal Deficits (Cash Flow, Accrual Basis balances and Changes in Public Debt)

Table 2 reports the different figures of the general government balance. It can be seen that during the nineties the most often used, “headline” cash flow deficit figures differed sometimes very significantly from the other indicators of the fiscal stance.

Table 2. Indicators of General Government Balances*
(percent of GDP)

	1990	1991	1992	1993	1994	1995	1996	1997
1. Cash flow balance	0.3	-3.0	-7.0	-6.5	-8.4	-6.7	-3.1	-4.8
2. Accrual basis balance	0.3	-3.0	-7.0	-7.7	-9.6	-7.3	-4.6	-4.7
3. Primary balance	4.3	1.0	-2.6	-2.9	-2.7	1.6	4.3	3.1
4. Operational balance	-4.7	-3.7	-5.5	-5.1	-5.5	-2.1	+0.6	-0.4
5. Change in general government gross debt	-5.1	8.7	4.0	11.3	-2.1	-2.0	-12.9	-8.3

* For the lack of information and accounts, the effect of inflation could not be eliminated from the primary balance (see Kiss (1998)), thus only the interest payments were accounted for according to the cash, accrual and operational approach.

The divergence between the cash flow and the accrual figures can be basically explained by the frequency of interest payments applied to government debt and, in case of short-term debt, by the maturity and timing of issues. The difference between the cash flow and accrual deficits reflect the fact that the size of interest payments accounted for in the official deficits strongly depended on the possibility of postponing cash-flow interest expenditures by issuing government bonds with annual interest payments. In 1993 and 1996 the restructuring of the cash-flow interest payments, while in 1995 the accelerating inflation was responsible for the gap between cash-flow and accrual deficit figures.

Table 3. Components of the General Government Cash Flow Balance
(Percent of GDP)

	1990	1991	1992	1993	1994	1995	1996	1997**
1. Central Government balance	0.6	-3.6	-6.8	-5.1	-6.4	-5.5	-2.0	-4.0
of which:								
2. Primary balance	4.6	-0.6	-1.6	-1.2	-0.4	2.9	5.3	4.1
3. Interest balance	-5.1	-3.3	-5.0	-4.2	-6.5	-8.4	-6.5	-7.9
4. profit transfer (+) from/transfers for losses (-) to the NBH	1.1	0.4	-0.2	0.3	0.5	0.0	-0.8	-0.3
5. Extrabudgetary funds balance	0.1	0.4	0.1	0.4	0.0	-0.2	-0.1	0.1
6. Social Security Funds balance	0.0	-0.6	-0.6	-1.0	-0.8	-0.7	-1.0	-0.6
7. Local Governments balance	-0.4	0.8	0.3	-0.8	-1.3	-0.3	0.0	-0.3
8. General Government balance	0.3	-3.0	-7.0	-6.5	-8.4	-6.7	-3.1	-4.8
9. of which: primary balance	4.3	1.0	-2.6	-2.9	-2.7	1.6	4.3	3.1
10. General Government Revenues*		52.3	51.3	53.0	50.4	46.2	45.7	43-44
11. General Government Expenditures*		55.4	58.4	59.4	59.0	52.8	48.7	48-49

* GG revenues and expenditures exclude privatisation revenues and are on a consolidated basis. (NBH estimates).

** Preliminary figures.

The fiscal stance could be more accurately evaluated by the accrual budget deficit figures in period 1986-97. Accrual budget deficit figures include those liabilities of the general government, which are due but have to be paid in the future and, as a consequence, accrual deficit may indicate problems of financing early, when the government still does not have to face the accrued expenditures. The cash-flow deficit figures underestimated the accumulating tension in the early 90s, as can be seen in Table 3. Fiscal policy decisions were based on the cash-flow figures, which might have contributed to the fact, that the adjustment in the primary balance was postponed until 1995. *Using the accrual figures it could have been revealed earlier that a significant improvement of the primary balance is necessary to avoid the unsustainable path, which was the result of the vicious circle of high deficit -- increasing public debt -- increasing interest payments.*

Table 4. Gross debt of the General Government
(End of Year Stocks, in Billion HUF)

	1990	1991	1992	1993	1994	1995	1996	1997
1. Deficit financing debt of the central budget in per cent of GDP	465.8	578.5	796.2	1012.9	1215.2	1413.8	1788.1	2200.0
	22.3	23.2	27.1	28.5	27.8	25.4	26.1	26.2
2. Non-Deficit Related Debt in per cent of GDP	363.8	374.8	486.1	749.8	859.8	972.3	1289.5	961.7
	17.4	15.0	16.5	21.1	19.7	17.5	19.1	11.5
3. Fiscal Liability Related to FX losses* in per cent of GDP	519.2	777.9	888.9	1182.0	1440.1	2023.3	1563.3	1886.7
	24.9	31.1	30.2	33.3	33.0	36.4	23.1	22.5
4. Liabilities of Extrabudgetary Funds and Local Governments and SS Funds	18.5	15.0	16.6	57.4	99.6	104.4	79.9	81.4
5. Forex Debt of the Government in per cent of GDP	37.4	118.8	133.9	202.7	236.5	324.1	295.2	332.8
	1.8	4.8	4.6	5.7	5.4	5.8	4.4	4.0
6. Gross debt of the General Government in per cent of GDP	1404.7	1865.0	2321.7	3204.8	3851.2	4837.9	5016.0	5463.0
	67.2	74.7	78.9	90.3	88.2	86.2	73.3	65.0
7. Gross debt at constant 1997 prices	6046.2	6083.5	6209.8	7068.6	7008.6	6862.2	5938.9	5463.0

*Non-interest bearing debt with the NBH, since 1996 foreign exchange denominated liabilities to the central bank.

Actual public sector deficits were higher than what the cash flow balance figures report because of so-called *off-budget liabilities* (i.e. bonds issued for the housing finance reform, bank restructuring bonds and guarantees). The latter, though they did not have an immediate macroeconomic impact, contributed significantly to the increase in the public debt/GDP ratio and of borrowing requirements in later years. A rough estimate of the true fiscal position of the government is provided by the change in government debt to GDP. The difference between the change in debt in percent of GDP²³ and the cash-flow deficit to GDP in 1993 was almost 5 percentage points (Table 2. Row 5), which is an indication of the magnitude of off-budget obligations during the transition. The non-deficit-financing debt of the general government increased by 4.6 percentage points to 22 percent of GDP in 1993 and played important role in the intensification of the debt burden—as reflected by the fact that the gross consolidated debt/GDP ratios steadily increased until reaching its peak of 100% in 1995²⁴ (see Table 5. Row 4.).

Table 5. Consolidated* public debt
(in percent of GDP)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1. Net consolidated public debt	31.2	39.9	38.9	44.0	41.8	43.9	46.6	59.3	63.2	59.6	52.5	47.6
HUF denominated	-16.7	-14.9	-14.5	-12.0	-12.0	-10.5	1.2	11.3	13.0	18.3	23.8	29.1
FX denominated	47.9	54.8	53.4	56.0	53.8	54.5	45.4	48.0	50.2	41.3	28.7	18.5
Domestic	-16.7	-14.9	-14.5	-11.1	-5.6	-1.2	9.1	20.9	24.4	30.7	32.1	32.7
Foreign	47.9	54.8	53.4	55.0	47.5	45.1	37.5	38.4	38.8	28.9	20.3	14.9
<i>Memorandum items</i>												
2. Gross debt of the general government	60.4	67.2	63.3	72.3	67.4	75.0	79.0	90.3	88.2	86.2	73.3	65.1
3. Monetary base	21.2	21.1	19.7	19.7	16.8	19.9	20.4	17.1	13.9	12.8	12.6	11.8
4. Gross consolidated debt**	76.1	78.9	70.8	73.6	70.4	81.0	76.3	95.8	96.9	100.9	84.6	75.8
5. Gross consolidated claims	44.9	39.0	31.8	29.6	28.6	37.1	29.7	36.5	33.7	41.3	32.1	28.2

* Computed by netting out the financing flows between the budget and NBH.

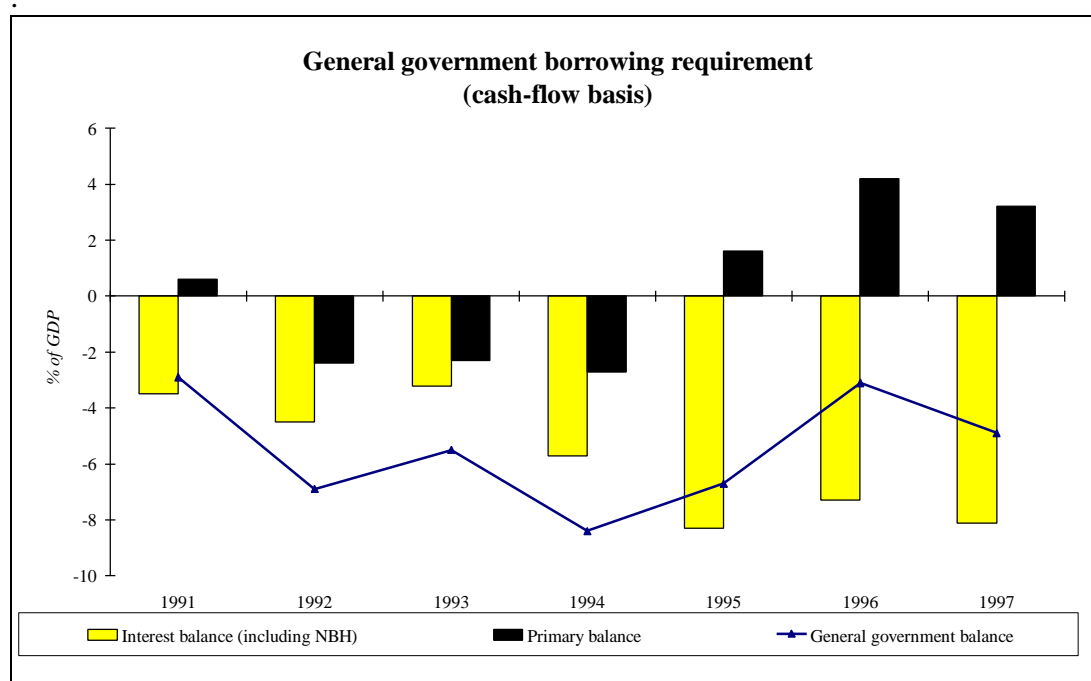
** 'Extended' gross consolidated public debt: includes all the financial liabilities of the NBH except the monetary base and claims of the general government on the central bank.

The cash flow deficit is an indicator of the *net* financing needs of the government. Its two components, primary balance and interest payments, are shown in Figure 4. The deterioration in the government's fiscal position became manifest in 1994 as the interest payments/GDP ratio measured on a cash basis jumped up (his ratio was already higher and increasing on an accrual basis) and this made unavoidable the need to achieve, sooner or later, a significant surplus in the primary balance.

²³ Which differs from the change in debt to GDP ratio that will be analysed in Section 5.

²⁴ It should be noted once again that these are the so called extended figures including sterilization stocks of the central bank as well.

Figure 4.



The conventional cash flow deficit measure is a poor indicator of the true fiscal stance in periods of moderate and volatile inflation. Under such circumstances *the volatility of the cash-flow based figures reflect more the debt managers' room for manoeuvre than an underlying fiscal adjustment in the public sector*. For the investigation of the fiscal stance it is necessary to filter out the inflation compensation part of the interest payments, to turn to the operational (real) deficit (see Tanzi, Blejer and Teijeiro (1993)).

Nominal and Operational (Real) Deficits

Since inflation in Hungary has been above 15 percent on an annual basis since 1987, the changes in the government's fiscal position are best evaluated by examining the real deficit over time—which requires eliminating the inflation compensation component (i.e. the fact that investors have to be compensated for the effects of inflation) from interest payments and revenues²⁵.

The calculation of the operational deficit are based on *public debt data (gross and net) derived from the consolidated balance sheets of the general government and the NBH*. (See Appendix 1.) The so called *below the line approach was applied* - i. e. the general government balance are measured as the changes in stock of financing (money and debt) items - in order to avoid problems stemming from unreliable deficit figures. End of year CPI was chosen as the relevant price index for HUF denominated items, although GDP deflator would be a more appropriate price index for the whole economy. On the other hand the GDP deflator is available in an annual average form only, which is not compatible with the below the line approach, a reason why we

²⁵ In this paper only the interest payments were corrected for the inflation. The problems of correction of the primary balance are explained in Kiss (1998).

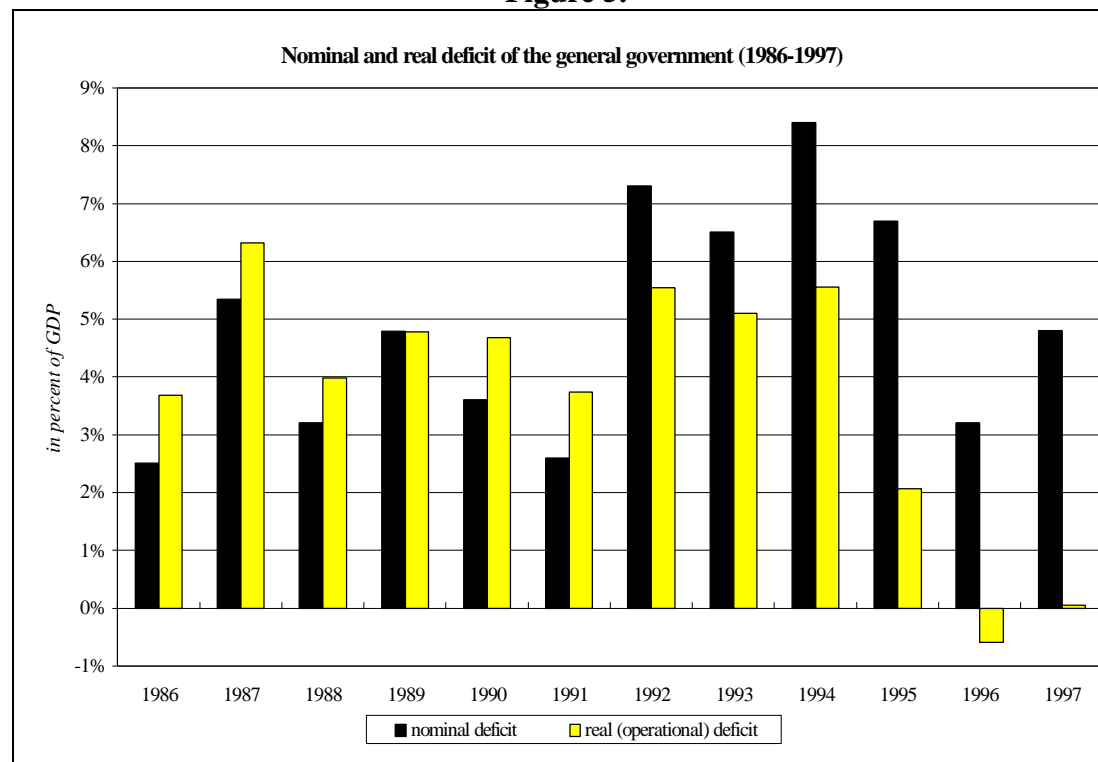
turned to CPI time series. As a result our operational deficit figures are underestimated since in the investigated period CPI inflation exceeded price increases calculated from the GDP deflator.

In order to get operational deficit figures comparable with cash and accrual basis deficit figures reported by the budget *increments of the non-deficit financing debt were not treated as deficit in the year of the increase, but interest payments (over inflation) on this type of debt was included in the deficit.*

Figure 5. presents the deviation of nominal and real deficits over the period 1986-96. It is clearly noticeable that, until 1992—the year of the change in the financing regime—, real deficits were always larger than nominal (cash-flow) deficits. Theoretically, this can not happen, since real interest payments are defined as nominal interest payments minus inflation compensation.

In Hungary, however, the consolidated government (general government + central bank) had been a net lender to the domestic sector until 1992, and central bank lent to the corporate sector at preferential, below-market interest rates. These hidden transfer to the corporates increased the net real interest payments compared to net nominal ones and resulted in real deficits exceeding nominal deficits during 1986-91 .

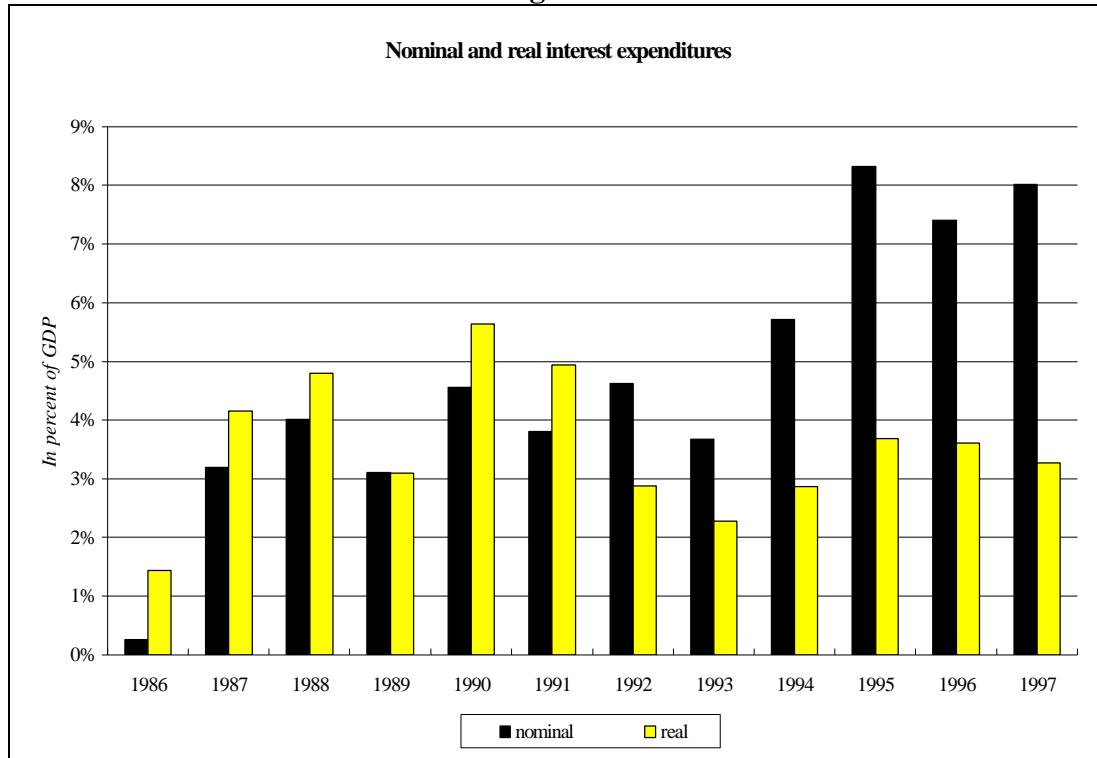
Figure 5.



Since the inflation compensation component on HUF-denominated debt equals domestic inflation while that on foreign currency-denominated debt equals foreign inflation, there is a considerably higher spread between nominal and real interest payments in the case of HUF-denominated debt. Figure 6. shows the evolution of the net nominal and real interest payments of the consolidated public debt. During this period, nominal annual average interest payments were 1.7 percent of GDP over 1986-

90, then 6.3 percent in 1991-96. By contrast, if we look at interest charges in real terms, there is no practical difference between the two subperiods with real annual average interest payments amounting to 3.7 percent of GDP over 1986-90 and 3.6 percent for 1991-96.

Figure 6.



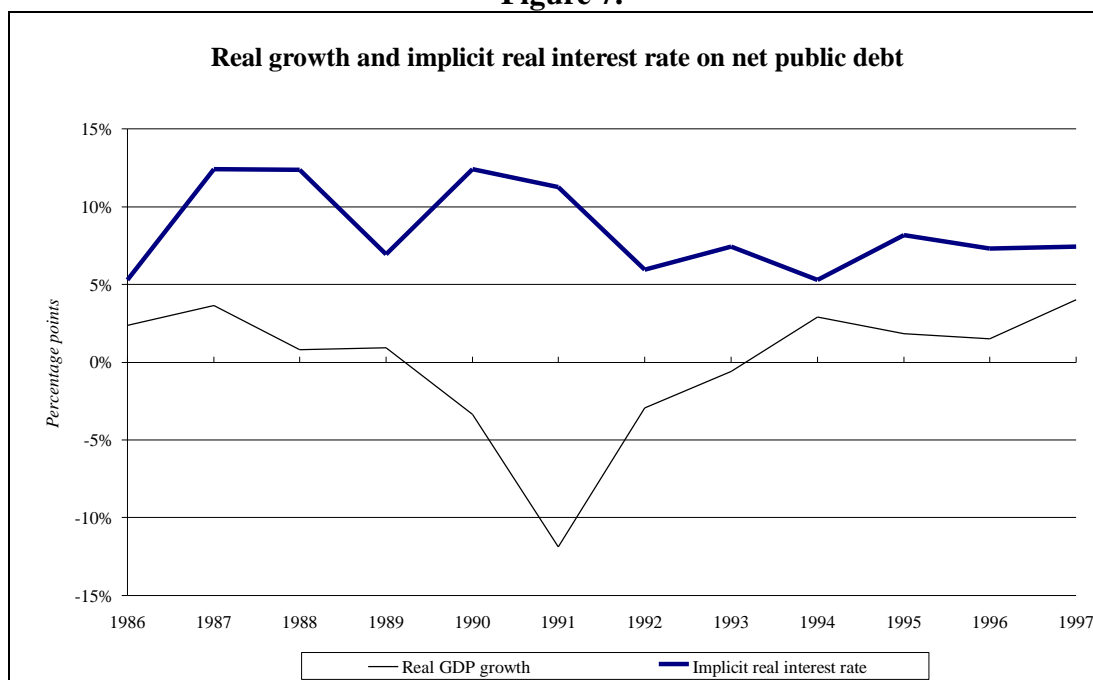
From what has been said so far, we can conclude that, *in the period 1986-91, the fiscal position was actually worse than what was indicated by the cash flow deficit figures* - the "headline" deficit figure reported to the public - for three main reasons:

- interest expenditures on the public debt (paid to the central bank) were lower than market interest rates,
- the budget did not have to carry the full burden of the external debt owed by the central bank,
- and the domestic corporate sector had been subsidised through central bank lending at below market interest rates.

All this helped postpone fiscal adjustment and contributed to the deterioration of public finances.

The changes in the operational deficit show that government debt was clearly on an unsustainable path until 1995. This is supported by the observation that, as shown in Figure 7, there was a gap between the implicit real interest rate on the debt and the real growth rate of the economy, requiring the generation of primary surpluses in the budget. However, this was rarely the case before 1995 and no significant change took place in the size and structure of the primary balance until the marginal cost of borrowing increased to a critical level—reflecting the fact that the general government financial position was unsustainable.

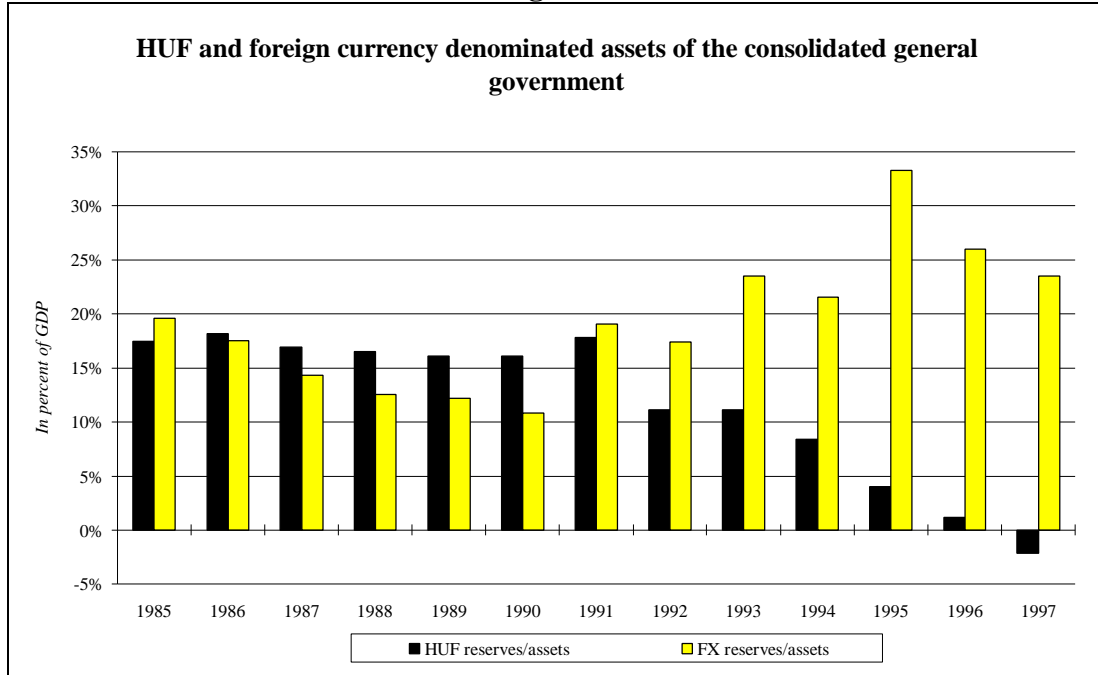
Figure 7.



As seen in Figure 7, there was a large gap between the real growth rate and the real interest rate (computed according to the inflationary compensation assumption) on the net debt. At first glance, the real interest rate, prior to 1992, seems to be "too high" (around 10 percent), even taking into account the interest payments on the external debt. There are two reasons for this gap.

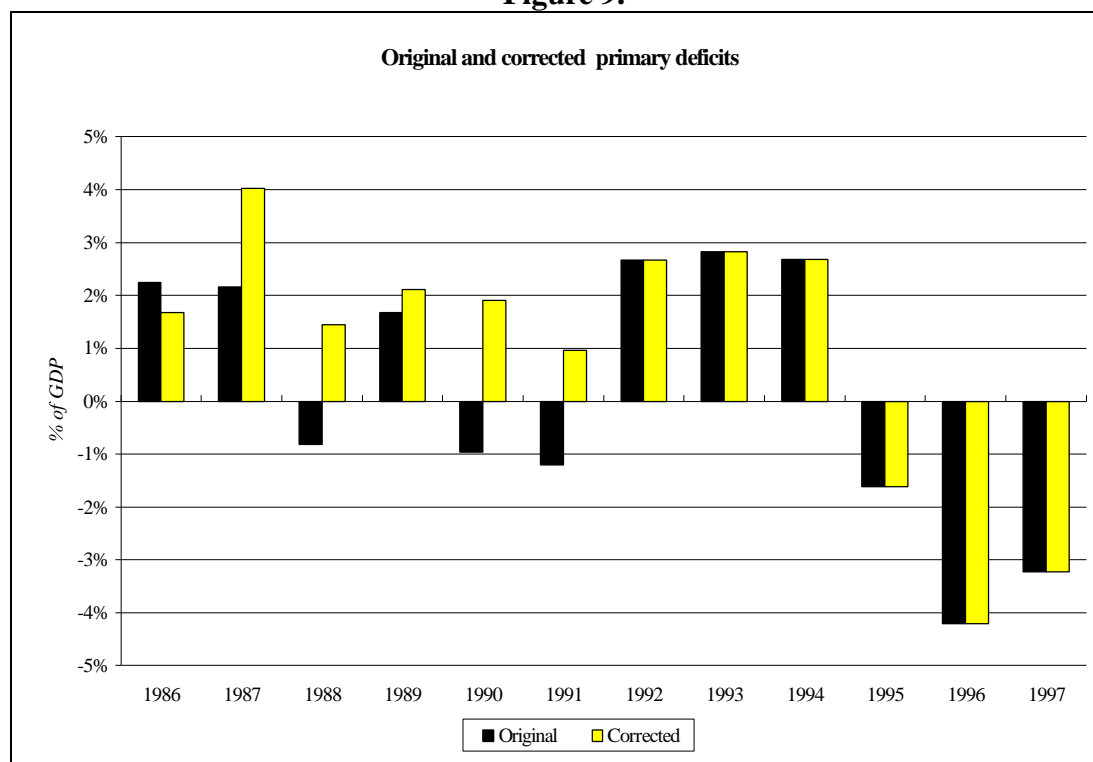
- First, the primary deficit for the pre-transition period was under-reported so that real interest payments, derived as the difference between the operational deficit and the primary deficit, were overestimated. This under-reporting definitely played a role given the lack of transparency in fiscal reporting during that period (Kopits and Craig (1998)).
- Second, before 1992 (Figure 8.), the general government extended large HUF denominated credits to the private sector and was a net lender in HUF to the private sector at interest rates below market rates.

Figure 8.



In order to obtain a more accurate measure of the primary deficit in situations where the operational deficit is higher than the nominal deficit and where real interest rates on consolidated general government's claims are negative—as was the case in Hungary before 1991—Tanzi, Blejer and Tejeiro (1993) suggest computing a "corrected deficit." This correction is obtained by reducing implicit real interest rate to a level equivalent to the trend of real interest rates. In our calculations of the corrected deficit, we have assumed that the implicit real interest rate of the net debt was the same prior to 1991 as the average during transition period. This assumption reduces the net interest payments of the pre-transition period. The results, shown in Figure 9, lead to the conclusion that primary deficits were higher than reported in the early transition period and that the reported surpluses of 1988 and 1990-91 would become deficits if these assumptions could be verified.

Figure 9.



* Corrected primary balance is derived by assuming that real interest rates did not change over the observation period.

Thus the true cost of borrowing in the pre-transition period can be discovered only on the basis of the consolidated public debt when the interest charge on the external liabilities are taken into account directly. However, the excessively high real interest rates in the pre-transition can be attributed to the lack of transparency in fiscal reporting and to hidden transfers to the private sector. This is the reason why we have calculated the corrected primary deficit figures for the before 1992 period. The implicit real interest rate on the net debt has stabilised at around 6.5 percent since 1992. It is important to emphasise that this does not represent the real marginal cost of borrowing for the government because it also includes the opportunity cost of holding foreign exchange reserves. The marginal cost can be estimated by assuming that the wedge between foreign exchange lending and deposit rates of the government is equal to that prevailing in 1995-96. This estimate yields a marginal cost of 5 to 6 percent in real terms.

Notwithstanding the correction above made in order to have a clearer picture, it should be pointed out that, from the point of view of the sustainability of the general debt in the past, it does not matter which factor was dominant since *there is no reallocation of data that can produce a combination of primary deficits, real interest rates, and real growth rates that is sustainable.*

It is tempting to infer from our analysis of deficits that fiscal policy became looser as the transition process progressed. Taking into account that GDP fell by almost 20 percent over 1989-92, government revenues and expenditures were very sensitive to the business cycle. The claim can be made that, in 1991-94, *the exogenous* (i.e., cycle-related) *part of fiscal expenditures was at least as responsible for the deterioration of*

the fiscal stance as high real interest rates and the recession induced by several real shocks. We adjusted non-interest revenues and expenditures of the general government to take this effect into account. We assumed that, every year, potential current revenues are related to the previous year's current revenue/GDP ratio and to the growth rate of GDP. For non-interest expenditures, we took the previous year's non-interest expenditure/GDP ratio adjusted to the potential growth rate of the economy. In our calculations we have assumed that after the big bang of 1991 the growth rate of the potential GDP was still slightly negative because of the fall in both effective labour and the net capital stock. We have further assumed that after the stabilisation package of 1995 the potential growth rate of the economy gradually accelerated to 3- 3.5 percent. This is a variation of the "Dutch method" of cyclical adjustment (Chand 1993)²⁶. Table 4 shows the results of this simple ad hoc model. Given the crude nature of the estimation it is preferable to look at trends in the non-cyclical component rather than at actual levels. The primary deficit deviated from its trend level for non-cyclical reasons until 1995, most strikingly in 1994. As a result of the adjustment policy initiated in 1995, the primary deficits in 1995 and 1996 were below their cyclical levels loosening of fiscal policy is evident for 1997.

Table 6. Non-cyclical Component of the Primary Deficits
(Percent of GDP)

	1992	1993	1994	1995	1996	1997
Non-cyclical total	2.1	-0.6	2.0	-3.5	-2.2	1.6

4. The Financing of the Consolidated General Government Deficit

Table 7. shows the sources of financing of the operational deficit of the consolidated general government: seigniorage (defined as change in the monetary base), changes in net credit to the economy by NBH, changes in the stock of domestic deficit financing debt, changes in the net foreign currency liabilities (without revaluation gains/losses) and privatisation revenues.

²⁶ Given the non-transparent nature of fiscal accounts and the incidence of lot of special events in this period the actual estimation is much more complicated, the details of it can be found in (Kiss 1998).

Table 7. Operational deficit and its financing
(per cent of GDP)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
1. Operational deficit	3.7	6.3	4.0	4.8	4.7	3.7	5.5	5.1	5.5	2.1	-0.6	0.1
(2+3+4)												
2. Net seigniorage (2a-2b)	0.8	2.0	1.5	3.1	0.3	4.5	2.7	0.0	-0.5	1.3	1.4	1.0
2a. Gross seigniorage	1.1	2.3	1.7	3.3	0.6	5.8	3.5	0.2	0.0	2.0	2.1	1.6
2b. Interest payments on mandatory reserves	0.2	0.3	0.2	0.2	0.3	1.3	0.8	0.2	0.5	0.7	0.7	0.6
3. Forint denominated financing (3a.-3b.+3c.)	-0.7	1.4	0.1	0.6	1.3	1.8	7.3	1.1	3.0	2.0	4.4	5.1
3a. Government debt outside the central bank	0.1	0.0	0.3	0.9	-0.1	0.8	3.4	3.7	1.2	0.6	2.6	0.4
3b. Central bank financing of the private sector	0.8	-1.4	0.3	0.3	-1.4	-2.0	-4.9	-0.3	-1.5	-2.3	-2.5	-3.7
3c. Privatisation revenues	0.0	0.0	0.0	0.0	0.0	-0.9	-1.0	-3.0	-0.3	-0.8	-0.7	1.0
4. Foreign currency denominated financing (4a.+ 4b.)	3.5	2.8	2.4	1.1	3.0	-2.6	-4.5	4.0	3.1	-1.2	-6.4	-6.1
4a. Net forex liabilities	3.5	2.8	2.4	1.1	3.0	-3.6	-5.9	0.6	2.6	-8.6	-7.8	-7.7
4b. Privatisation revenues	0.0	0.0	0.0	0.0	0.0	1.0	1.4	3.4	0.5	7.4	1.4	1.6

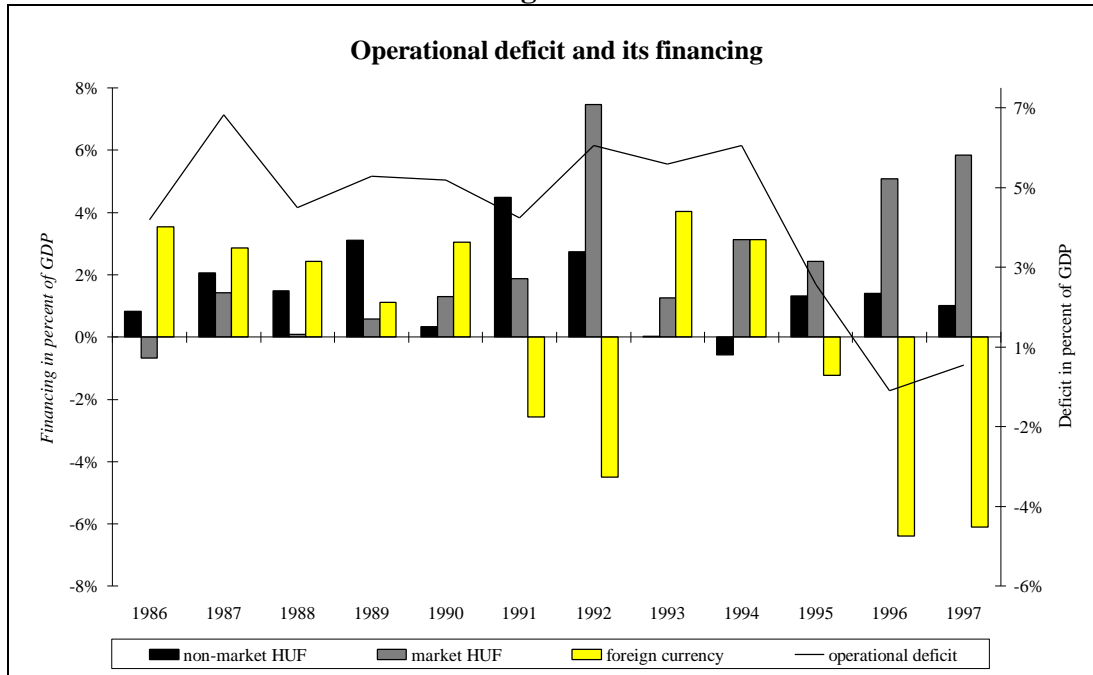
Since examining these financing items separately may give a distorted picture of the interrelated economic processes underlying them, we have reclassified financing flows into three broad categories:

- *Net seigniorage*: monetary seigniorage corrected by the interest paid on mandatory reserves by the central bank,
- *Market domestic currency financing*: the domestic currency financing defined above minus changes in net credit to the economy by NBH, and
- *Foreign currency financing*: changes in net foreign currency financing minus privatisation revenues (in foreign currencies).

The rationale for this reclassification is that, since the operations of NBH also covered quasi-fiscal central bank activities, monetary seigniorage in Hungary differs significantly from the government's revenue from money creation. (Thus it is relevant to present seigniorage as a source-and-use approach (Klein-Neuman, 1990).) Only interest payments on mandatory reserves—the non-negligible costs of the monetary base—was taken into account when computing net seigniorage.

The results are shown in Table 7. and, graphically, in Figure 10. Since privatisation revenues were used to retire net foreign currency debt, the adjusted forex financing—defined as the difference between foreign exchange finance and the foreign currency part of privatisation revenues—shows the endogenous part of the increase in external sources. The same logic applies to the domestic part, where it can be assumed that banks reacted to the changes in interest rates set by the NBH by reallocating their loans and free reserves at the central bank.

Figure 10.



The main changes in deficit financing taking place over the last decade could be identified from the figures above. In the second half of the 1980s, foreign-currency financing dominated and HUF-denominated market finance was negligible (as the government provided cheap finance to the state-owned sector with the intermediation of the central bank). The foreign debt position deteriorated in the early 1990s. *The state refrained from further borrowing abroad in 1991-92 but the growing current account deficit led to a new wave of external debt in 1993-94. In 1995, as a result of the adjustment program, general government borrowing needs were cut significantly and could be covered from domestic sources.*

Net seigniorage—in percent of GDP—was fairly volatile over 1986-96, with a maximum value of 4.9 percent in 1991 and a minimum value of -0.8 percent in 1994. There was no permanent increase or decrease in the level of gross seigniorage over 1986-96 and only slight reductions in the average net seigniorage with two distinguishable subperiods (1986-91 and 1992-96). Prior to the introduction of the new regime in general government financing, seigniorage revenues fluctuated between 0.3 and 3 percent of GDP, peaking in 1991 at 4.9 percent when inflation reached its high. *Since 1992 seigniorage has not played a more important role in Hungary than in developed market economies.* After 1992, the government could not rely heavily on money creation as a source of finance, as a new arsenal of savings instruments (government and corporate securities, pension and investment funds, etc.) developed and an increasingly larger part of domestic savings went directly to the budget or to the corporate sector. Surprisingly in the years of financial crises both gross and net seigniorage declined considerably - though the central bank could not avoid to participate in the direct financing of the budget - because market participants were unwilling to hold the domestic currency. *Money demand always declined when inflationary pressure increased, which resulted in a decrease in the tax base of seigniorage* (Table 8.). The continuous financial innovation also lowered the cash/GDP ratio and the tax base of the seigniorage. The high mandatory reserve ratio

needed some compensation, therefore near market interest rates were paid on required reserves. *All this clearly indicates that in an open economy money financing is unable to remedy the problems of financing, it only postpones the necessary adjustment.*

Table 8. Components of seigniorage
(in percent of GDP)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<i>1. Gross seigniorage (1.1+1.2)</i>	<i>1.1</i>	<i>2.3</i>	<i>1.7</i>	<i>3.3</i>	<i>0.6</i>	<i>5.8</i>	<i>3.5</i>	<i>0.2</i>	<i>0.0</i>	<i>2.0</i>	<i>2.1</i>	<i>1.6</i>
1.1 Change in real monetary base	0.0	0.2	-0.9	0.3	-4.2	1.1	-0.1	-3.0	-2.7	-0.9	0.0	-0.3
1.2 Inflation tax	1.1	2.1	2.6	3.0	4.8	4.7	3.6	3.2	2.7	2.9	2.1	1.9
2. Interest paid on mandatory reserves	0.2	0.2	0.2	0.2	0.2	1.3	0.8	0.2	0.5	0.7	0.7	0.6
<i>3. Net seigniorage (1.- 2.)</i>	<i>0.8</i>	<i>2.0</i>	<i>1.5</i>	<i>3.1</i>	<i>0.3</i>	<i>4.5</i>	<i>2.7</i>	<i>0.0</i>	<i>-0.5</i>	<i>1.3</i>	<i>1.4</i>	<i>1.0</i>

Our results concerning the size and role of seigniorage in financing the budget differ significantly from other authors' estimations (Oblath-Valentiny (1993), Kun (1995) and Hochreiter et al (1996)).

According to our computation, in 1993 the gross seigniorage amounted to the 0.2% of GDP and if the interest payment on the mandatory reserves are taken into account the government did not have seigniorage. Using the same (monetary seigniorage) approach Hochreiter et al. (1996) estimated 4.2% seigniorage in percent of GDP for Hungary. The most important difference can be attributed to the definition of monetary base. As we have already noted, this is a crucial point from the point of view of the analysis of budget financing in Hungary. A significant part of commercial banks' claims on the central bank - the stock of sterilisation instruments and foreign exchange deposits - was excluded because of two reasons. First, the NBH pays market interest rate, therefore does not collect seigniorage revenues on these stocks. Secondly, these claims on the NBH do not play a role in the money multiplication, on the contrary the NBH applies them to squeeze liquidity from the market. *A wider monetary base - for example which was used by Hochreiter et al. (1996) - would overestimate government income from monetization.* (For details see Barabas-Hamecz (1996)).

Our results differ also from those authors' results who used *opportunity cost approach* (Kun (1995) and estimated 3-4% annual seigniorage over 1991-1995. The difference between the estimations of monetary and opportunity cost seigniorage can be explained by the change in the marginal costs of government borrowing in the nineties reflected by the opportunity cost figures. We believe, however, that *in the analysis of budget financing - and so in this paper as well - the monetary seigniorage should be applied.* The opportunity cost approach may provide useful information about the portfolio decisions of investors and the changes in the propensity to hold money.

5. Factors influencing the indebtedness

Real interest rates have been above the real GDP growth rates for the whole period, pushing the debt/GDP ratio up until it peaked in 1995 at 85.0 percent. Until 1995, this was not counterbalanced by an adjustment in primary deficits. Moderate inflation

provided 1 to 3 percent in additional finance (inflation tax) to the government. As a result, the primary balance corrected by the seigniorage could not alleviate the increasing debt burden until the fiscal adjustment of 1995 (4% primary surplus). Increasing real interest on Treasuries led to an increasing PSBR that required either higher monetization or higher prices on the debt, so that the "snowball effect" accelerated during 1993-94. The steadily increasing interest rate did not convince investors to buy forint denominated assets. They only became willing to invest in forint denominated assets after the perceptible devaluation of the forint.

The debt/GDP ratio was affected by denomination structure of the public debt and exchange rate movements. In 1992 Hungary experienced a temporary decrease in foreign currency denominated debt/GDP ratio due to the real appreciation of the forint. As the current account deficit deteriorated in 1993-94, it became impossible to significantly reduce the foreign exchange-denominated part of the debt and therefore the debt/GDP ratio. This only became possible after March 1995 when the credibility of economic policy improved.

Table 9. Components of changes in net consolidated public debt/GDP ratio

	1991	1992	1993	1994	1991 - 1994	1995	1996	1997	1995 - 1997
I. Net consolidated public debt to GDP (%)	43.9	46.6	59.3	63.2		59.6	52.5	47.6	
II: Changes in net consolidated public debt/GDP (1.-2.+3.-4.+5.+6.+7.)	2.1	2.7	12.7	3.9	21.4	-3.6	-7.1	-4.9	-15.6
1. Primary balance	-0.2	2.7	2.8	2.7	8.0	-1.6	-4.2	-3.2	-9.0
2. Net seigniorage	4.5	2.7	0.0	-0.5	6.7	1.3	1.4	1.0	3.7
3. Changes in non-deficit financing debt	0.0	2.9	7.8	1.0	11.7	-0.1	-0.1	-0.6	-0.8
4. Privatisation revenues	0.1	0.4	0.4	0.8	1.7	6.6	0.7	2.6	9.9
5. Combined effect (a.+b.)	8.8	5.7	2.5	1.1	18.1	2.3	2.6	1.0	5.9
a. real growth effect	5.6	1.3	0.3	-1.7	5.6	-1.1	-0.9	-2.0	-4.0
b. real interest rate effect	3.2	4.3	2.3	2.7	12.5	3.5	3.5	3.0	10.0
6. Real exchange rate effect	-2.3	-3.1	-4.9	-0.2	-9.5	5.0	-0.8	-1.0	3.2
7. Others	0.3	-2.4	4.9	-0.3	2.5	-1.4	-2.5	2.5	-1.3
<i>Memorandum items:</i>									
Changes in real exchange rate*	96.4	94.4	88.5	99.5		110.6	98	96	
Implicit real interest rate	6.7	9.6	4.8	4.8		5.6	5.9	6.0	
GDP growth	-11.9	-3.0	-0.6	2.9		1.8	1.5	4.4	

*Changes in real exchange rate was calculated by the GDP deflator, values below 100 indicate real appreciation.

In Table 9. the components of changes in net consolidated debt have been depicted. The 1990s can be divided into two remarkably different subperiods: between 1991 and 1994 net consolidated public debt jumped 21.4 percent of GDP, while in 1995-97 it dropped 15.6%. The spectacular (more than 35% of GDP) difference in debt dynamics can be explained by four main factors:

- Improvement in the *primary balance* is responsible for the largest proportion of the difference (17% of GDP).
- Increases in *non-deficit financing debt* (12% of GDP) pushed net debt higher only in the first subperiod.
- The acceleration of *privatisation lowered the net debt* by more than 8% of GDP in the second period.
- The drastic *drop in GDP, and the following recovery* explains approximately 10 % of the difference between the two subperiods.

Furthermore *movements in real exchange rate* had an opposite impact on the net debt. Between 1991 and 1994 due to the large proportion of the foreign currency denominated debt the real appreciation of the HUF decreased the net debt significantly by 9.5% of GDP. As the proportion of the foreign currency denominated debt diminished the real appreciation effect also declined: because of the 9% devaluation of the forint in 1995 real depreciation caused an increase of 3.2 of GDP in the net debt between 1995 and 1997.

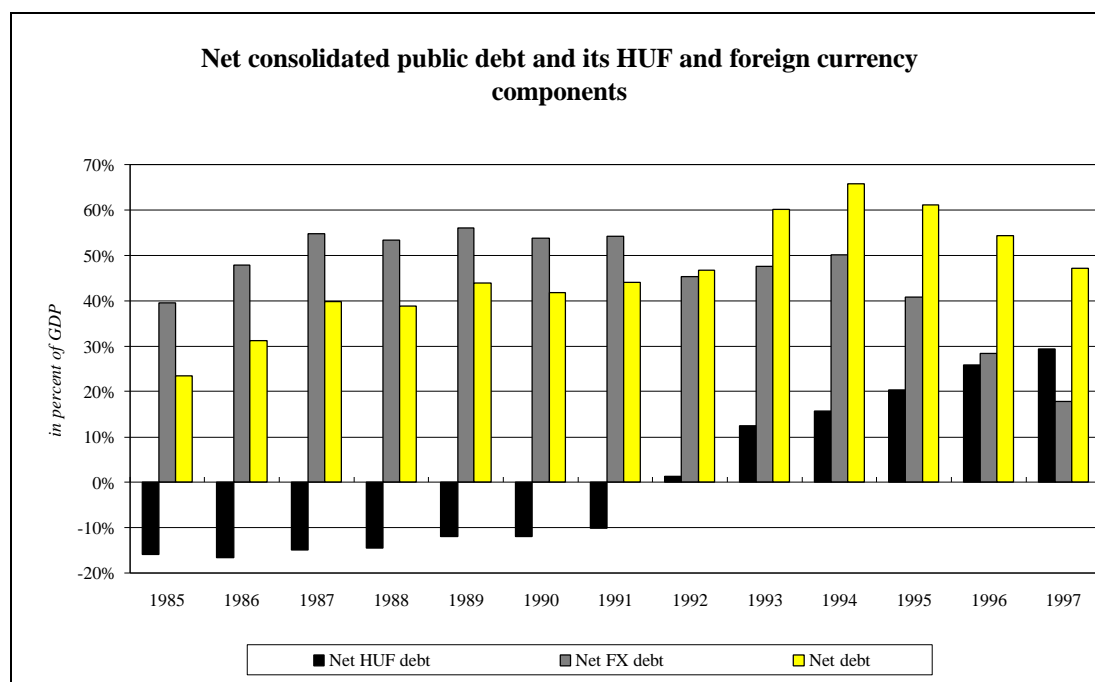
Assessing the components *behind the considerable drop in debt ratio in 1995-97, the most important factor was the impact of the privatisation revenues* (9.9%). Despite of the major adjustment in the primary balance two-thirds of the decrease in the debt ratio stemmed from privatisation receipts. This indicates that in a period when the government can not rely on incomes from privatisation taming down the debt ratio is a slow and difficult process.

Structural Changes in Public Debt

Table 7 and Figure 10 report domestic and foreign *currency* financing rather than the conventional domestic versus foreign financing. The difference between the two is the foreign currency financing by residents. There were marked changes in domestic versus foreign currency financing during the period. *Our estimates show that, for the 10-year period as a whole, there was no foreign currency financing, indeed net foreign currency denominated debt declined by more than 20% of GDP.* However the size of the FX denominated debt in 1994 exceeded the 1985 level by some 10 percent of GDP, indicating that changes in the structure of deficit financing, the shift from foreign to domestic sources was particularly strong in 1995-97 with the FX-denominated debt dropping by an annual average of more than 10 percent of GDP. Domestic financing during the pre-transition period was dominated by passive forms of financing, i.e. by a credit crunch to the private sector by the NBH. Active or totally voluntary financing was minimal—at about 20 percent of all domestic currency financing—in this period. The transition, however, witnessed a marked increase in the active or voluntary forms of domestic financing—to about 45 percent of domestic currency financing—and as a consequence NBH's direct influence diminished over time.

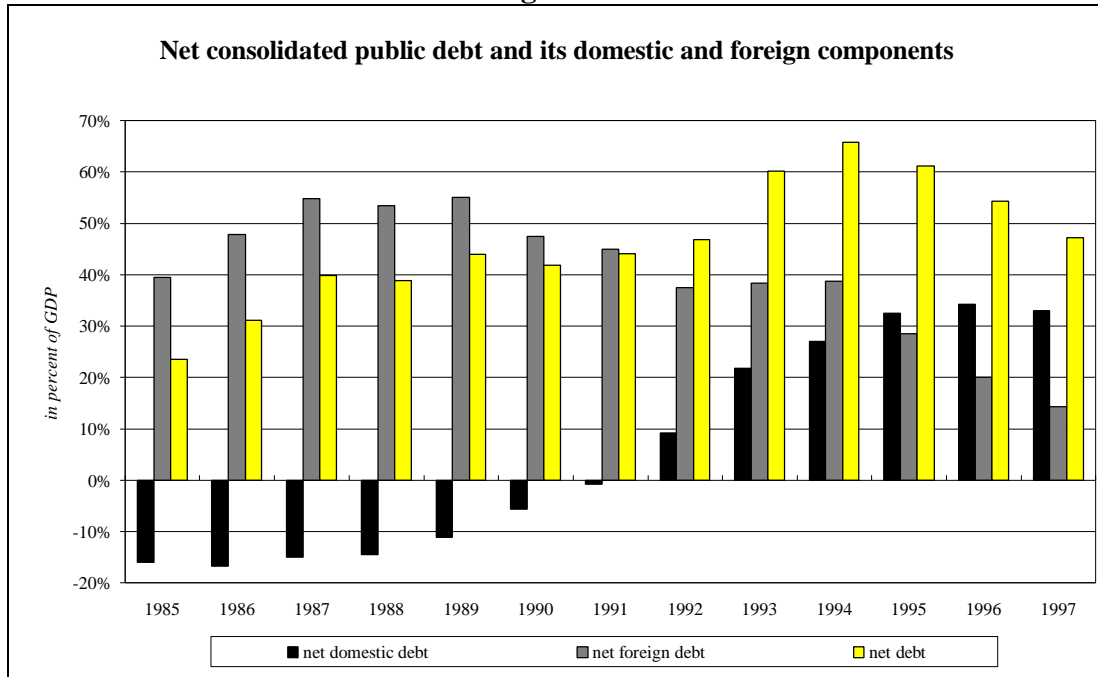
An interesting aspect of this evolution is the considerable change in the denomination and residential structure of the public debt. The denomination of net public debt is shown in Figure 11. It significantly influenced the difference between real and nominal government interest payments and the spread between real and nominal deficits. Until 1991 net foreign currency debt exceeded net debt, the consolidated government was a net creditor in HUF. In 1986-1990, the government extended net credit to the private sector of about 13 percent of GDP.

Figure 11.



The residential (domestic-foreign) structure of the public debt is shown in Figure 12. Prior to 1989 the general government deficit was wholly financed from abroad, the proportion of *the domestic debt* started to increase in 1990 and *climbed up to 70 percent of total net debt by end-1997*.

Figure 12.



After 1995, both the denomination and residential structure of the public debt were influenced by three factors already mentioned in section 1. First, the development of government securities markets accelerated: they have deepened and become more liquid. Second, public sector borrowing requirements have been significantly reduced by the adjustment measures implemented in 1995-96. Finally, the capital flows reversal as the capital outflow prior to 1995 returned strengthened by the liberalisation of capital account transactions and the introduction of the convertibility of the Hungarian forint.

As a consequence of these factors, the main characteristics of public debt has been transformed. The average maturity increased, and in mid-1997 Hungary has a yield curve with a seven-year time horizon. The restored credibility of economic policy pursued and the crawling peg exchange rate regime made Hungarian forint investments more attractive for resident and non-resident investors. These developments—especially in capital inflows—have led to a significant change in the ownership composition of the external debt. The share of state (NBH and government) holdings in external debt has been declining, while private sector gross indebtedness has grown rapidly (Table 10.).

Table 10. Foreign Exchange Debt of Hungary*
(shares of total)

	1990	1991	1992	1993	1994	1995	1996	1997
I. Gross debt								
1. NBH	83.5	79.2	75.2	75.9	72.1	68.8	62.2	54.3
2. Government	2.4	6.6	7.5	8.3	8.2	6.5	7.1	7.5
3. Financial institutions	8.5	8.8	8.4	7.5	8.6	9.4	14.1	20.9
4. Enterprises	5.7	5.3	8.9	8.3	11.1	15.3	16.6	17.2
I. Total (1+2+3+4)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
II. Net debt								
1. NBH	101.9	82.1	86.0	79.5	71.2	59.1	50.8	35.8
2. Government	1.9	7.7	11.0	12.3	11.4	9.7	8.5	11.2
3. Financial institutions	4.4	3.6	2.2	3.4	7.6	13.0	15.5	22.1
4. Enterprises	-8.1	6.5	0.7	4.8	9.8	18.2	25.1	30.9
I. Total (1+2+3+4)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Excluding intercompany loans.

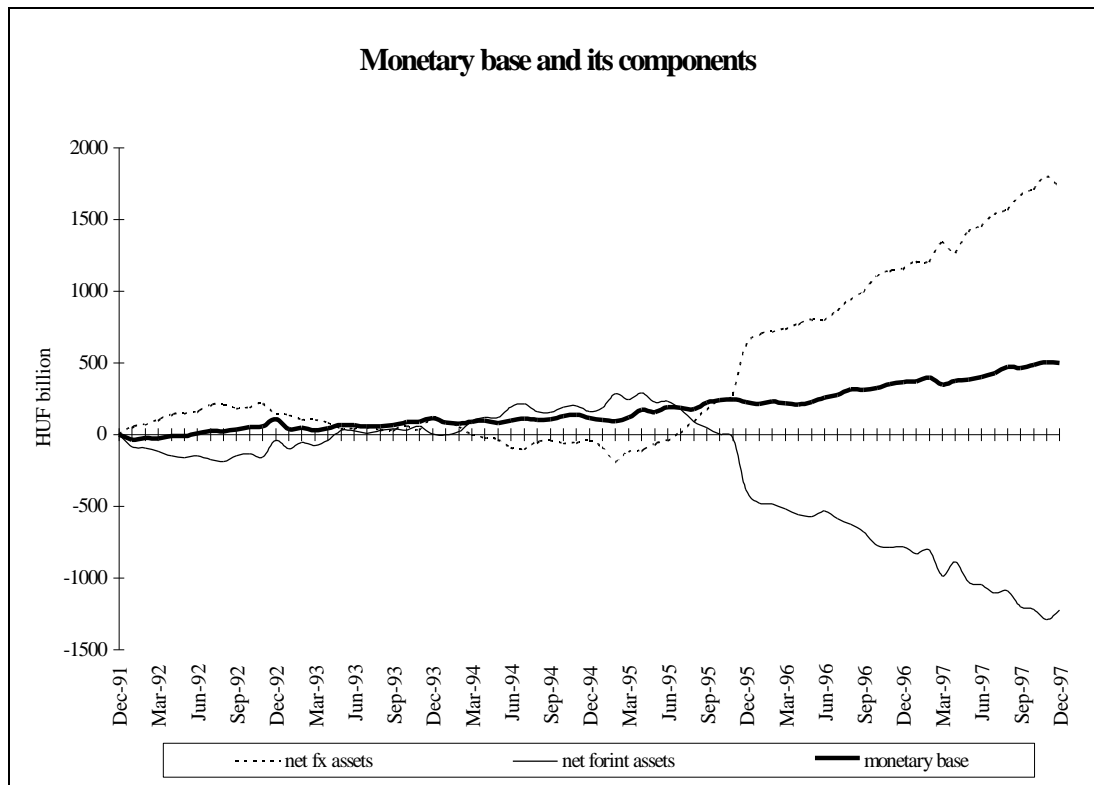
Capital Inflow and its Impact on Public Debt

The story of how Hungary's public debt was restructured is a process which has both fiscal and non-fiscal aspects.²⁷ The surge in capital inflows provided an opportunity to change the forint- and forex-mix in the denomination of the debt. But this, however, had non-negligible costs that had to be factored into the policy design. Although Hungary has the highest inflow of foreign direct investment in the Central and Eastern European region (with an average of \$1.2 -1.5 billion per year), non-debt capital inflows were not always sufficient to cover the external borrowing needs stemming from the steadily deteriorating current account. After March 1995 the current account improved considerably, capital inflow accelerated and the excess liquidity stemming from this became the major challenge facing monetary policy.

The NBH followed a policy of sterilisation of these inflows: the central bank intervened on the lower edge of the pre-announced band to prevent the exchange rate from further appreciation and sterilised the excess forint liquidity. (Under the pre-announced crawling band regime the central bank has an obligation to intervene at the edges of the ± 2.25 percent width band.)

²⁷ A detailed analysis is provided in Neményi J. (1996), "Capital Inflow, Macroeconomic Equilibrium, The Public Debt and The Profit and Loss of the National Bank of Hungary."

Figure 13.



Cumulated changes, December 1991 = 0

The composition of capital inflows changed since the new regime was introduced. Interest arbitraging elements started to grow in mid-1994 when monetary policy was tightened by increasing domestic interest rates. The introduction of the new exchange rate regime gave a further impetus to these inflows, which increased due to high spread between domestic and foreign interest rates taking into account the depreciation of the forint. Until the last quarter of 1995 enterprises and commercial banks—certainly those with access to foreign sources—were also seeking foreign loans. When domestic interest rates and current account deficit started to decline the proportion of interest arbitraging capital inflows diminished. As Hungary was upgraded by major international credit rating agencies, the share of the country in international investment funds increased, which added to the capital inflow, mainly in late 1996 and early 1997. The Budapest Stock Exchange was booming in 1996 due to the large sums (around \$750 million) non-residents invested in Hungarian equities.

The surge in capital inflow and the sterilised intervention of the NBH resulted in a shift in the structure of the debt: on the one hand, the increasing official forex reserves allowed some additional amortisation of the external debt but, on the other hand, the public debt denominated in forint increased significantly because of sterilisation activity.

Figure 13. clearly shows how the accumulation in net foreign currency denominated assets of the central bank was offset by the decreasing stock of net forint denominated assets. Due to the active sterilisation policy of the NBH the annual growth rate of the monetary base remained under control in the range of 15-20%. What were the tools used for sterilisation? In 1995, the NBH sold substantial share of its portfolio of

government securities (more than HUF 80 billion) to sterilise capital inflows. In 1996 "reverse repos"²⁸ became the main tool of sterilisation. The government was cautious in using privatisation revenues because the largest part of these non-recurring incomes had been spent on debt reduction by pre-payment in order to smooth the monetary aggregates and keep the fiscal stance in line with longer-run stabilisation. Budget borrowing requirements had been cut and could be financed from the market. When capital inflows were the strongest, the government recognised that the most cost-effective way of sterilisation was if the budget took part in the sterilisation by issuing more securities than its net borrowing requirement and depositing the excess amount at the central bank.

Since a large proportion of the intervention stemmed from permanent items, the NBH intended to increase the average maturity of the sterilisation instruments. In the lack of marketable Treasuries, the central bank decided to squeeze liquidity by offering 6-month and 12-month deposit facilities and in June 1997 the central bank issued its own bill with maturity of year.

Due to the active NBH sterilisation policy, the decline in interest rates lagged behind what the government had hoped for but *ex post* it is difficult to say that a more ambitious interest rate reduction would have been feasible. The second half of 1995 was the period of regaining investors' confidence and this always requires some interest sacrifice. Until the interest differential became large, the sterilised intervention was quite expensive—especially in 1995, when domestic interest rates were high, well over parity. Based on estimations of the average interest differential, the excess expenditures related to the sterilisation approached 1 per cent of GDP in 1995, falling below 0.5 per cent of GDP in 1996. This cost appeared in the profit and loss account of the NBH which, having already deteriorated in the second half of 1995, turned to a significant loss in 1996. On the benefit side of a cost-benefit evaluating of the sterilisation policy, it should be mentioned that the inflow of capital allowed the government to swap the forex debt into HUF-denominated securities and alleviated the external debt burden.

6. Conclusions

The analysis of different deficit indicators showed that during transition:

- the traditional cash flow balance did not reflect the true nature of fiscal policy. This can be explained by the gradual shift to market-based financing and the restructuring of public debt.
- The accrual basis balance was a better indicator of fiscal policy, but it was still significantly distorted by the inflation component of nominal interest rates. Exchange rate losses were not appropriately accounted for by the statistics, therefore, in a period when the restructuring of public debt is substantial, the ratio of external and internal (forint denominated) debt is changing, the cash flow balance and its changes can be misleading.

²⁸ Reverse repurchase agreements, which are one-week and one-month deposit facilities with the central bank, collateralized by government securities.

- As long as inflation is high, it is indispensable to calculate the operational deficit indicator in order to be able to reliably analyse the fiscal stance.

The fiscal transparency was reduced by the fact that a substantial part of public debt could only be shown by taking into account the balance sheet and income statement of the central bank. The comparison of different deficit indicators reveals that *the unsustainability of fiscal policy was signalled both by the accrual basis and the operational deficit indicators well before 1995*. The analysis of the operational deficit shows that the adjustment program in March 1995 was not only the result of the fiscal policy conducted in the first half of the decade - which was shown also by the cyclically adjusted primary balance -, but it was the consequence of accumulated tensions that were hidden in the non-transparent financing system of the 1980s as well.

In the 1980s domestic financing of the budget deficit was carried out mainly by direct lending to the government. Voluntary financing methods based on investment allocation decisions hardly existed, direct lending by the central bank was unlimited. By the second half of the 1990s, the net financing need of the budget could be covered from the domestic government securities market. *Over the last ten years the structure of deficit financing and of public debt by currency denomination and by investors has been transformed, since 1995 forint-denominated financing by domestic investors has become predominant*. This is due to the followings:

- The financing need decreased substantially.
- The liquidity of the government securities market has increased and its development accelerated as far as the number of instruments and institutional characteristics are concerned.
- The Hungarian forint became convertible and capital controls were gradually eliminated.
- The credibility of monetary policy strengthened and capital inflows were substantial.

Due to the factors mentioned above, the transformation of the debt structure can be characterised by the following:

- The duration of forint denominated debt increased, a benchmark yield curve is now available up to five years.
- Forint denominated investments have become attractive both for domestic residents and foreign investors.
- The shares of forint denominated debt and holdings of domestic investors have increased within public debt.

Change in deficit financing over the last ten years

- 1991 - unlimited direct financing by the central bank

Our calculations - based on the net consolidated debt of the central bank and the budget - indicate that in the previous financing regime *the true financing need is likely*

to have regularly exceeded the official budget deficit figure. This was hard to recognise because of the lack of transparency both in the government's books and in the financing system: the budget received basically unlimited credit from the central bank at a preferential interest rate, therefore, the true costs of external debt accumulation did not appear directly in the government's books, they were instead financed by the loss of central bank wealth. This loss could be identified by the fact that the profit of the National Bank of Hungary had been well below seigniorage revenues throughout the period. *This profit was reduced by costs of quasi-fiscal activities.* The public sector (the budget and the central bank) was a net lender in this period in Hungary, that is it carried out the financing of the mostly state-owned corporate sector. The increasing financing need was covered by foreign borrowing. Hence, the roots of the financing crisis peaking in 1994 can undoubtedly be found in the irresponsible debt accumulation of the second half of the 1980s.

1992 - 1994 - the years of postponed fiscal adjustment

This period can be regarded as the drift to the path of explosive debt accumulation. The primary budget deficit was not particularly high (only 1-2% of GDP), and its deterioration can well be explained by developments in the real sector. As a result of the new market-based financing regime, an *increasing share of the costs of the accumulated debt appeared directly in the budget.* Rising interest payments lie behind the growing deficit, which took decision makers as a surprise, since they had not experienced a situation like this before. The adjustment was postponed due to: (i) the lack of transparent accounting, (ii) official optimism delaying the recognition of the debt spiral, and (iii) forecasts which considered the signs of an imminent macroeconomic crisis (first of all the current account deficit) as temporary. It is doubtful, however, that in 1993 - at the deepest point of the crisis, among the conditions of increasing financial discipline and of external and internal shocks - the private sector (firms and households) would have tolerated further substantial fiscal restrictions. The detailed analysis of the primary balance showed that *cyclical effects were quite strong in this period, and there was no significant fiscal loosening in 1992-94 compared to the previous periods. The external debt accumulated in the 1980s, however, was a serious constraint for the fiscal policy of transition.*

A surprising result of the analysis is that even though the National Bank of Hungary participated actively in the financing of the rising deficit monetary deficit financing was not rising. *Seigniorage did not exceed 1% of GDP on average.* The reaction of market players was remarkably fast: *the demand for forint dropped immediately as inflation and devaluation expectations increased* and the yields on new investment instruments became attractive.

Central bank interest rate hikes in themselves could not have prevented the debt accumulation process stemming from the mutually reinforcing relationship between rising real interest rates and an increasing deficit financing need. While the relationship of monetary and fiscal policies were characterised by the lack of co-ordination, monetary policy measures themselves were sometimes contradictory (e.g., an interest rate hike and a cut in the required reserves ratio at the same time).

The financing crises was aggravated by a serious *credibility crisis.* By the end of the period, interest rate policy lost its effectiveness. High interest rates had no antiinflationary effect, instead they fed inflation and devaluation expectations.

Government securities became the safest investments for the banking sector, because at the real interest rates prevailing at that time corporate financing was rather risky due to moral hazard and adverse selection problems.

The textbook relationship of growing deficit @ increasing central bank financing @ escalating monetization @ rising inflation did not work in this direct form. The already fairly low seigniorage (gross and net) of the period was continuously decreasing in 1992-94. Despite the fact that the central bank's provided additional finance to the budget using indirect channels (i.e. provided refinancing credits to the banking sector at a lower interest rate than market rates) in 1993, monetary aggregates were not expanding, because part of the surplus liquidity was absorbed by the increase of foreign exchange savings and the other part financed the rising deficit of the current account directly.

1995 - 1996 - fiscal adjustment creates the conditions for sustainable growth

As the international experience shows, *the fiscal adjustment of March 1995 was based on measures (devaluation, import surcharge) which characterised countries whose stabilisation attempt was less successful* (Alesina - Perrotti (1997), Kiss (1998)). Therefore, the main question was whether - under the temporary protection of these measures - other reforms in the different subsections of the general government, which were vital for sustainable growth, could be carried through. This issue is beyond the scope of this study, but we can state that reforms have been gradually implemented over the last three years which *contributed to a reduction in the financing need and to the turnaround of the debt accumulation process.* The deficit financing need decreased by more than 4 percentage points in two years, partly due to the primary surplus. The interest payment-to-GDP ratio has been declining since 1996, partly as a consequence of decreasing interest rate premia. The reduction in the interest rate premium is also due to declining indebtedness which is a result of external debt retirement financed by privatisation revenues and capital inflows. The current account deficit is substantially lower than in the previous period (2,2% of GDP in 1997) and it can be financed by non-debt type capital inflows (that is foreign direct investment). Substantial export growth by foreign-owned companies operating in Hungary played an important role in the decline of the current account deficit in 1997. The improving external balance is the result of both the fiscal adjustment as well as the privatisation process and foreign direct investments. The shift in the debt structure to forint denominated instruments had no significant extra costs, since the interest premium has reduced substantially.

Continuing fiscal reform

During the nearly three years (March 1995 - end 1997) of the stabilisation process *the net debt-to-GDP ratio declined by more than 15 percentage points to 47% of GDP.* Three factors had an influence *on the debt-to-GDP ratio* besides real interest rates and economic growth: (i) privatisation revenues as one-time financing sources, (ii) the change in the denomination structure of the debt (the share of forint denominated debt increased), and the slight real appreciation of the forint following the 10% real depreciation in 1995, (iii) significant primary surpluses in 1996-97.

As far as the future is concerned, sustainable growth, further disinflation, and in the medium-long term price stability will be the main goals of economic policy. While it is

obvious that stable economic growth is inevitable for the convergence process, a recent major change is that disinflation has become a condition for sustainable growth. *Real appreciation will accompany the catching up process to developed economies*, and economic policy will face the difficult task of manoeuvring between trying to avoid significant real appreciation which would lead to competitiveness losses and the deterioration of the current account, as well as achieving real appreciation at the lowest inflation rate possible with the help of co-ordination between monetary and fiscal policies.

Strict monetary policy is vital for disinflation, but it cannot be effective without the support of fiscal policy. Put it in other way: both policies need to have independence, but this independence needs to be curbed, because policy co-ordination is crucial. For monetary policy this seemingly contradictory requirement means that a more flexible exchange rate is needed in order to improve the effectiveness of interest rate policy. The independence of fiscal policy can be created by further reductions in indebtedness. In the followings, at the end of the study, factors determining the scope of monetary and fiscal policies will be investigated.

The analyses in the previous chapters support the supposition that *several factors may seriously limit the effectiveness of monetary policy in the future*. Under the circumstances of financial innovation, liberalisation and globalization the monetary transmission mechanism is constantly changing, which makes the forecast of the expected effects of monetary policy measures difficult. Disintermediation also reduces the effectiveness of monetary policy. The independence of monetary policy is significantly curtailed by the current exchange rate regime, the preannounced crawling band with a narrow band which has basically worked as a fixed exchange rate so far. This exchange rate regime was an important contribution to regaining the credibility of economic policy in the last three years, but the quasi-fixed exchange rate can constrain interest rate policy and increase inflation inertia in the future. Furthermore, the quasi-fixed exchange rate regime does not enable monetary policy to be restrictive both in the tradable and non-tradable sectors. On the one hand, monetary policy can put pressure on wage growth in the tradable sector by real appreciation, but the real interest rates belonging to this exchange rate policy are too low for active disinflation. On the other hand, if the central bank intends to maintain high real interest rates, the rate of devaluation can decrease only slowly which allows wages in the tradable sector to grow faster. Therefore, the effectiveness of monetary policy decisions can be improved in the future by a managed floating exchange rate regime with a wider band. In the current quasi-fixed regime when monetary policy is not independent, further fiscal adjustments are vital for the disinflation process.

As our empirical analysis of the last ten years shows, *in the transition period fiscal policy played a role* in the persistence of moderate inflation, later in disinflation *through different - direct and indirect - channels*. The reduction of the budget deficit was a key element in the sustainability of the exchange rate regime. The high (nearly 6% of GDP) operational deficits of the 1992-94 period reflected the increasing demand- and inflationary impact of the government, as a consequence of the fact that the continuously increasing financing need could be fulfilled only at rising real interest rates. The lack of transparency in deficit and debt accounting can be interpreted as an indirect inflationary effect. Since foreign borrowing was carried out through the central bank, part of the costs related to public debt did not appear in the government's books,

which made the determination of the extent of fiscal adjustment crucial for stabilisation difficult. The *debt conversion* between the budget and the National Bank of Hungary at the end of 1996 contributed to an improvement in transparency by the fact that a substantial part of the costs of external debt now directly appear in the budget. Finally - before March 1995 - the delays in fiscal adjustment were coupled with growing trade and current account deficits, which made the exchange rate correction and its inflationary consequences unavoidable.

In the run-up to joining the European Union, the requirements of sustainable growth and disinflation cannot be met without a restrictive fiscal policy. One of the most complex tasks of the future seems to be the definition of the deficit financing need which *corresponds to the above requirements.* When determining the major indicators of fiscal policy, it must be taken into account that in the short-run privatisation revenues cannot help the financing of the deficit after 1998²⁹. These goals require concentrated and co-ordinated efforts on part of the fiscal and monetary policies. The shift in the structure of forint and foreign exchange denominated debt will depend on developments in the short- and long-term components of the current account and the capital inflow.

The analysis of the last ten years' deficit financing provides some lessons for further fiscal adjustments. To continue the reduction of indebtedness, which - besides sustainability considerations - is a requirement for joining the European Union, fiscal adjustment must carry on. For the determination of the extent of the necessary adjustment - the necessary primary surplus - the accrual basis and operational deficit indicators are indispensable even if in the future the discrepancy between the indicators of different approaches decreases as the inflation rate declines and the share of fixed and indexed government securities in public debt increases.

The structural analysis of *the entire public sector* (including the activity of the State Privatisation and Holding Company) can serve as a basis for creating the harmony between the budget deficit and the rate of disinflation. The following table summarises the primary surpluses necessary for the maintenance of gross consolidated public debt with different hypotheses about seigniorage and the growth rate of the economy³⁰. The sustainability simulations were based on the gross consolidated public debt, because - as we already mentioned - the interest rate necessary for the simulations cannot be interpreted dynamically for the net public debt.

The extended consolidated - gross and net - public debt indicator calculated in our study differs in several respects from the officially published figures, because both the liabilities and claims were accounted entirely and in gross terms. This means that the gross debt is larger than the official figures by the stock of domestic, interest-bearing forint and foreign exchange liabilities at the National Bank of Hungary, but refinancing credits were also taken into account among the claims of the central bank besides the foreign exchange reserves. We did not consider, however, those "doubtful" claims of

²⁹ This does not mean that nothing is left (or ought) to be privatized in the future, since the state still has plenty of assets that are not necessary for performing its functions or that are not used efficiently by the state. In case of these assets a protracted, less spectacular privatization process is likely to follow whose principles are not known yet.

³⁰ Thus, we did not include the implicit public debt in this investigation, since we have no reliable information on its magnitude.

the government which are not guaranteed to produce revenues, for instance claims from the corporate and banking sector consolidations.

Therefore, the extended consolidated gross public debt used in our calculations includes:

- Foreign borrowing by the National Bank of Hungary
- Direct foreign borrowing of the budget
- Forint denominated government securities outside the central bank
- Domestic and foreign borrowing of the different fiscal subsystems (local governments)
- Besides the above items which are also included in the official figures, our gross public debt measure incorporates the interest-bearing domestic liabilities of the central bank's balance sheet: the stock of reverse repo, forint and foreign exchange deposits, as well as the stock of sterilisation bonds issued by the NBH. Thus, the *extended consolidated (gross and net) public debt indicator* defined this way - unlike the usual consolidated public debt indicators - includes the central bank's short-term liabilities and claims bearing market interest rates. Hence, even though our debt-to-GDP ratios differ from the official ones, they are invariant to institutional division of debt, and they help identify future tendencies and determine requirements for fiscal policy.

Table 11. Sustainability Check

(Required primary balance in order to sustain the gross debt/GDP ratio)

Basic assumptions:

Net public debt: 47.6% of GDP

Gross liabilities: 75.8% of GDP

Gross claims: 28.2% of GDP

Real interest rate: 6 %

		Long-run growth rate (%)				
		2.0	2.5	3.0	3.5	4.0
Seigniorage (% of GDP)	0.0	2.9	2.6	2.2	1.8	1.4
	0.5	2.4	2.1	1.7	1.3	0.9
	1.0	1.9	1.6	1.2	0.8	0.4
	1.5	1.4	1.1	0.7	0.3	-0.1

Of course, the budget receives revenues from the consolidated claims, and these have to be treated in the model as well. We decided to assume that interest on claims is just enough to maintain the claims-to-GDP ratio without using additional resources, that is it is sufficient to consider the gross consolidated debt³¹. In the calculations we assumed the real interest rate to be 6%, because even though the real interest rate was closer to 5% on gross liabilities, this was calculated based on CPI inflation, and the discrepancy

³¹ This assumption is fairly close to the actual situation.

between CPI inflation and the GDP deflator implies a difference of at least 1 percentage point.

As Table 13 shows, the calculations were carried out under different assumptions about long-run economic growth and net seigniorage³², but naturally we do not consider these outcomes equally likely. For net seigniorage the smaller figure seems more realistic, because:

- Over the last six years average net seigniorage amounted to 1% of GDP
- This value is 0,5-0,75% of GDP in developed countries.
- Financial innovation and as a consequence the reduction in the demand for cash are likely to continue in the future.
- In order to improve the competitiveness of the Hungarian banking sector, the required reserve ratio is likely to decline.
- The expected change in inflation is going to reduce the inflation tax.

As far as the long-run growth rate of GDP is considered, the most likely value is between 2.5-3% in our opinion. This figure might look too small at first sight, but we have to draw attention to the following factors:

- If we think of really long-run growth, this value is not low at all, since, e.g., in Western Europe this value was around 2-2.5 % in the past decades. Our estimation was based on the results of empirical growth models, we substituted Hungarian variables into the estimated models.
- Since Hungary's population is forecasted to decrease further, the growth of per capita GDP - which is a better measure of convergence - will be faster, and the difference in the growth rates vis-a-vis the European Union is even greater, as the average population of the EU is still rising.
- The high (per capita) GDP growth is not the only way of convergence. Convergence can be achieved via equilibrium real appreciation as well, which seems to be true for the Hungarian economy, and the magnitude of equilibrium real appreciation is estimated at 2-2,5% annually. Summarising the last three points, the per capita GDP growth calculated at purchasing power parity - which is the real indicator of convergence - is rather fast, 5-6% annually even under the above assumptions³³.
- It is important to note that the long-run growth potential does not imply that the Hungarian economy could not grow substantially faster in the short-run even for

³² We did not consider the debt reducing effect of real appreciation, since this cannot be regarded as a real long-term effect due to the described changes in the currency structure of debt, that is we can assume the elimination of net consolidated foreign exchange debt even in the short-run, if the economy continues to stay on the equilibrium path.

³³ Considering the fact that the level of per capita GDP calculated at purchasing power parity is most likely to be significantly underestimated, the catching up to the European Union will take 20 years in the optimist scenario based on the figures presented.

several years. However, even if the economy grows substantially faster than the above rate in the next years - that is the debt-to-GDP ratio declines faster - this is not an argument for deviating from the long-run cyclically neutral equilibrium. In this situation fiscal expansion is not only unnecessary, but also dangerous from a cyclical point of view, because it may jeopardise the disinflation process and the macroeconomic equilibrium.

- Furthermore, for the determination of the primary surplus necessary for future sustainable growth and convergence, one must consider that Hungary's current indebtedness is too high for its level of development. When the developed industrial economies were at Hungary's present development level, their debt-to-GDP ratio was significantly lower than that of Hungary today³⁴. Hence, in the case of Hungary the debt sustainability constraint for the primary balance is substantially harder, the possibility for deviation from the long-run, cyclically neutral equilibrium is less.
- The sizeable surplus of the primary balance and the low budget deficit are important not only to avoid the increase of the debt-to-GDP ratio and to keep economic growth on a sustainable path. The budget deficit has to be considered as part of domestic savings, and since at an increasing level of domestic savings the economy can grow on a higher equilibrium path, the rise in the primary surplus - paradoxically - results in the medium-run in a higher economic growth rate.

In summary, if Hungarian policymakers are serious about disinflation, and financial innovation continues, net seigniorage is not expected to exceed 1% of GDP. If the revenue arising from expected money creation is compared to the long-run economic growth rate of approximately 3% estimated by the growth model, then it can be seen that in order to sustain gross debt the cyclically neutral primary surplus has to reach 1.5-2% of GDP. A reduction in debt and disinflation together require an even higher primary surplus close to the levels in 1996 and 1997.

³⁴ In the 1960s, the average gross debt/GDP ratio of those small, open European economies for which we could obtain data (Austria, Belgium, Finland, the Netherlands, Norway, Switzerland, Sweden) was on average 20.5%. If we disregard Belgium whose gross debt-to-GDP ratio amounted to 52.9% already in this period, the average value is 15.1%.

References

- Blanchard, O J. (1997):** The Optimal Speed of Disinflation (The Case of Hungary). Paper presented at the Seminar on Disinflation in Eastern and Central Europe, organized by the National Bank of Hungary and IMF, Budapest, June 3. 1997
- Bruno, M. - S. Fischer (1990):** Seigniorage, Operating Rules and the High Inflation Trap, Quarterly Journal of Economics, 1990 Vol 105 No.2. pp 353-374
- Barabás, Gy.- Hamecz, I. (1997):** Tokebeáramlás, sterilizáció és pénzmennyiség, (Capital Flows, Sterilisation and the Quantity of Money), MNB-füzetek (NBH Working Paper) No. 1997/3. (in Hungarian)
- Barabás, Gy.- Hamecz, I. - Neményi J. (1998):** Fiscal Deficit and Public Debt during the Transition, Chapter 2. in 'Public Finance Reform in an Economy in Transition: The Hungarian Experience'. ed. Bokros, L. and Dethier, J.-J., The World Bank, forthcoming
- Chand, S. K. (1993):** Fiscal Impulse Measures and Their Fiscal Impact, in: How to Measure the Fiscal Deficit. Analytical and Methodological Issues. ed. by M.I. Blejer and A. Cheasty, IMF
- Cottarelli, C. (1993):** Limiting Central Bank Credit to the Government (Theory and Practice), IMF Occasional Paper No. 110.
- Cukierman, A. (1992):** Central Bank Strategy, Credibility and Independence, MIT Press, Cambridge, Massachusettes, London
- Darvas, Zs. - Hamecz, I.-Simon, A. (1994):** Volume and Price Indices, mimeo, NBH
- Dornbush, R. - S. Fisher (1992):** Moderate Inflation, The World Bank Economic Review, Vol 7, No 1. pp. 1-44
- Efford, D. (1996):** The Case for Accrual Recording in the IMF's Government Finance Statistics System, IMF Working Paper 1996/73, July 1996
- Fry, Maxwell J.(1997):** Emancipating the Banking System and Developing Markets for Government Debt, Routledge
- Halpern L. (1996):** Az árfolyam, árfolyampolitika és a versenyképesség közötti kapcsolat. (The relationship between exchange rate, exchange rate policy and competitiveness) Versenyben a világgal kutatási program BKE Muhelytanulmányok 19. (In Hungarian.)
- Halpern L. - Ch. Wyplosz (1997):** Equilibrium Exchange Rates in Transition Economies. IMF Working Paper 96/125
- Hochreiter, E. - R. Rovelli - G. Winckler (1996):** Central Banks and Seigniorage: A Study of Three Economies in Transition. European Economic Review, Vol 40 629-643 old.
- Kareeman, F. (1994):** Applying Market Principles to Government Borrowing. European economy, 1994 No. 1 pp 3-57
- Kiss G. (1998):** Az államháztartás szerepe Magyarországon a kilencvenes években. (The role of the general government in the 1990s in Hungary.) MNB Füzetek 1998/4 (In Hungarian.)

- Klein, Martin -Neumann, Manfred J M.** (1990): What is It and Why Gets It? *Weltwirtschaftliches Archiv*, 1990 Vol 126 pp. 205-221
- Kopits, G. - Craig, J.** (1998): Transparency in Government operations, IMF Fiscal Affairs Department. IMF Occasional Papers 158
- Kopits G.** (1994): Midway in the Transition. *Acta Oeconomica*, Vol 46(3-4), 267-292 old.
- Kornai, J.** (1997): Adjustment without recession: a case study of Hungarian stabilisation, in *Lessons from the Economic Transition, Central and Eastern Europe in 1990s.* ed. by S. Zecchini, OECD Paris
- Kun, J.** (1995): Seigniorage and Burdens of Government Debt, NBH Working Paper 1995/3
- László Cs.** (1998): Characteristics of Finance Reforms in Hungary, 1988-1997 in 'Public Finance Reform During the Transition, 1988-1997). in: *Public Finance Reform in an Economy in Transition: The Hungarian Experience'*. ed.: Bokros L. -J.J. Dethier. Worldbank (forthcoming).
- Leone, A. M.** (1993): Institutional and Operational Aspects of Central Bank Losses. IMF PPAA/93/14, September.
- Neményi, J.** (1996): Capital Inflow, Macroeconomic Equilibrium, The Public Debt and The Profit and Loss of the National Bank of Hungary, *Acta Oeconomica*, vol.48, No.3-4
- Neményi, J.** (1997): Monetary Policy in Transition - the Case of Hungary. In: "Monetary Policy in Transition in East and West: Strategies, Instruments and Transmission Mechanisms", Proceeding Volume of Conference held in Vienna, :November 1996
- Oblath, Gábor - Valentiny, Ákos** (1993): Seigniorage és inflációs adó (Seigniorage and Inflation Tax), *Közgazdasági Szemle*, 1993 október. (in Hungarian)
- Rocha, R. R. - Saldanha, F.** (1992): Fiscal and Quasi-Fiscal Deficits, Nominal and Real: Measurement and Policy Issues, World Bank Working Papers Series 919
- Sargent ,T.J. - N. Wallace** (1981): Some Unpleasant Monetary arithmetic, Federal Reserve Bank of Minneapolis, *Quarterly Review*, 1981 pp. 1-17
- Surányi Gy.** (1996): Economic Stabilisation in Hungary, A "Monetary Policy in Central and Eastern Europe, Challenges of EU Integration", Bank of Austria Vienna, 49-62. old.
- Surányi Gy. - Vincze J.** (1997): Inflation in Hungary (1990-1997), in "Disinflation in Eastern and Central Europe " proceeding volume of the conference organized by the National Bank of Hungary and IMF, Budapest, June 13, 1997), ed.: Cottarelli C. - Szapáry Gy. (forthcoming)
- Tanzi, V.** (1993): Fiscal Policies in Economies in Transition, IMF Working Paper WP/93/22
- Tanzi, V. - Blejer, M. I. - Teijeiro, M. O.** (1993): Effects of Inflation on Measurement of Fiscal Deficits: Conventional Versus Operational Measures, in: *How*

to Measure the Fiscal Deficit. Analytical and Methodological Issues. ed. by M.I. Blejer and A. Cheasty , IMF

Vincze J. - Zsoldos I. (1996): A fogyasztói árak struktúrája, szintje és alakulása Magyarországon 1991-1996-ban. (Development of Consumer Prices in 1991-96) MNB Füzetek 1996/5 (in Hungarian)

Zsoldos I. (1997): A lakosság pénztartási viselkedése Magyarországon. (Propensity to Hold Money of Households in Hungary) MNB Füzetek 1997/6 (in Hungarian)

Hungary, Structural Reforms for Sustainable Growth, The World Bank Report on Hungary, 1995

Data Sources

Annual Report of the National Bank of Hungary, NBH, various issues

Government Finance Statistics Yearbook, IMF, various issues

Government Securities Market Hungary, Government Debt Management Agency, various issues

International Financial Statistics Yearbook, IMF various issues

Statistical Yearbook of Hungary, CSO, various issues

Appendix: Budget deficit, public debt and monetisation

1.1. Methodology

The connection between inflation and fiscal stance can be investigated starting from the well known budget constraint:

$$(1) \quad PB_t + D_{t-1} * i_t = \Delta H_t + \Delta FX_t + \Delta HUF_t$$

$$\text{and} \quad D_t = FX_t + HUF_t,$$

- PB: primary balance,
- D: general government debt
- i: interest rate,
- H: monetary base
- FX: foreign currency denominated government debt,
- HUF: forint denominated government debt,
- Δ : change in stocks,
- t: variable in year t.

The budget deficit can be financed by interest bearing debt (D) and by money creation (H). The dynamic relationship between deficit and debt is calculated by rearranging equation (1).

$$D(D_t / Y_t) = b_t - s_t + (D_{t-1} / Y_{t-1}) * (r_t - g_t) / (1 + g_t) \quad (2)$$

where:

- b: primary balance in percent of GDP
- s: seigniorage in percent of GDP
- r: real interest rate
- g: real GDP growth

Equation (2) indicates that the debt/GDP ratio can be on an explosive path if real interest rate (r) is higher than the real GDP growth (g) and this effect is not offset by the surplus of the primary balance ($b=PB/Y$). Money financing (seigniorage, $s=DH/Y$) reduces the debt/GDP ratio, however, is not sustainable in the medium run as it increases inflation and deteriorates the current account. If a large proportion of the debt is denominated in foreign currency, like in Hungary, then exchange rate movements affect the debt/GDP ratio considerably. By rearranging equation (2) the level of primary balance, which leaves the debt ratio unaffected can be determined. Seigniorage decreases the required level of primary balance as shown in (3):

$$b = s - (D/Y)_{-1} * (r-g)/(1+g) \quad (\text{negative } b \text{ means primary surplus})$$

(3)

It is worth emphasising that when investigating sustainability, debt/GDP ratio has to be divided by (1+g) before multiplied by the real interest rate real growth rate differential.

1.2. Consolidation of the general government and the central bank (deficit and debt consolidation)

Deficit consolidation

Equation (1) below is simply the budget constraint, which equates the above-the-line total nominal deficit with below-the-line financing sources. The nominal deficit is equal to the primary deficit plus total net interest payments. Interest paid on the general government's debt (including debt held by the central bank) increases the budget deficit. Central bank transfer of profits (less operating expenses) to the government reduces the deficit. The deficit is financed by increasing domestic market debt, by (net) borrowing from the central bank or by issuing foreign debt directly (the latter was insignificant in Hungary during that period).

$$(1) \quad D_{gg} = PB + i_b B + i_g C_g + i^* C^* E + \Delta E^* C - S_c = \Delta B_d + \Delta C_{gd} + \Delta C^* E$$

- D_{gg} : general government budget deficit,
- PB: primary balance (excluding privatisation revenues),
- B: government's net domestic debt outside the central bank ($B = B_n + B_d$)
- $-B_n$: non-deficit financing domestic debt outside the central bank
- $-B_d$: deficit financing domestic debt outside the central bank
- C_g : net liabilities at the central bank ($C = C_{gn} + C_{gd}$),
- $-C_{gn}$: non-deficit financing debt at the central bank
- $-C_{gd}$: deficit financing debt at the central bank
- C^* : foreign debt of government in foreign currency terms
- S_c : central bank's dividend paid to the government,
- i : domestic nominal interest rates,
- i^* : foreign nominal interest rate
- E: nominal exchange rate

The simplified balance sheet of the central bank (excluding non-financial assets/liabilities which are not relevant in this context) can be written as follows:

$$NFA^* E + C_g + C_p = H + NW$$

- NFA^* : net foreign assets of the central bank in foreign currency
- C_g : net credits to the government
- C_p : net credits to the private sector
- NW: net worth of the central bank
- H: monetary base, the sum of cash and banks' reserves ($H = CU + R$)

From this balance sheet, we can derive (2) which shows the quasi-fiscal deficit. It is equal to the (negative) change in net worth of the central bank:

$$(2) \quad D_{cb} = -\Delta NW = -i^*NFA^*E - \Delta NFA^*E - i_g C_g - i_p C_p + i_r R + S_c = \Delta H - \Delta C_g - \Delta C_p - \Delta(NFA^*E)$$

By combining (1) and (2), the nominal consolidated deficit can then be written:

$$(3) \quad D_c = D_{gg} + D_{cb} = PB + i_b B - i^*NFA^*E - i_p C_p + i^*C^*E + i_r R = \Delta B_d - \Delta C_{gn} - \Delta C_p - \Delta(NFA^*E) + \Delta(C^*E) + \Delta H$$

The real consolidated public sector deficit, also called operational deficit, can be obtained by dividing all terms in equation (3) by the price level P and decomposing the real interest rate into various components to show the impact of inflation. This is shown in (4) where lower case variables indicate real variables.

$$(4) \quad d = pb + r_b b - r_p c_p + (r^* + e')(c^* - nfa^*)e = (\Delta H - r_r R)/P - \Delta c_p + \Delta b + \Delta(c^*e - nfa^*e)$$

- r: real domestic interest rate
- r*: real foreign interest rate
- e: real exchange rate
- e': real depreciation of exchange rate

Debt consolidation

The net debt of government consists of three parts: the domestic debt, the central bank's net claims on the government and the direct foreign debt:

$$NGD = B + C_g + C^*E$$

The change in net government debt results partly from the financing of the budget deficit and partly from the accumulation of the non-deficit financing government debt, while privatisation revenues reduce the debt burden, as shown by the identity below.

$$\Delta NGD = D_{gb} + \Delta B_n + \Delta C_{gn} + \Delta EC^* - PR$$

- PR: Privatisation revenues

The bulk of the non-deficit related increase of the market debt are Treasuries issued for the recapitalization of the banking sector. Non-deficit related government liabilities at the central bank basically reflects devaluation losses on foreign debt. There is also a small amount of devaluation loss on the direct foreign credits of the government.

Privatisation revenues are recorded "below-the-line" and leave the budget deficit unaffected, but reduce the non-deficit financing government debt.

The monetary base is viewed as a source of seigniorage and not as a part of the public debt, therefore the net consolidated public debt, NPD, must be written:

$$NPD = B + B_n + C^*E - NFA^*E - C_p = NGD - H - NW$$

and the change in the net consolidated public debt equals the change in net government debt minus gross seigniorage and change in central bank's net worth.

$$\Delta NPD = \Delta NGD - \Delta H - \Delta NW = D_c + \Delta B_n + \Delta C_{gn} - \Delta H - PR$$

This means that the net public debt is determined by the consolidated deficits, the accumulation of non-deficit financing government debt, gross seigniorage and privatisation revenues. Gross seigniorage (or monetary seigniorage) measures the extent to which the consolidated government has recourse to money financing. Net seigniorage is defined as the change in monetary base minus interest that the central bank pays to commercial banks on mandatory reserves. Seigniorage has two main components: the net inflation tax and the real variation in the monetary base (the base of the inflation tax).

Operational (real) deficit and its financing

The operational or real deficit of the consolidated government can be calculated by filtering out the impact of inflation. Theoretically inflation influences primary balance as well, nevertheless in this paper only the inflation compensation part of the interest payments has been subtracted. The impact of inflation can be subtracted from interest payments in two ways using the budget constraint. The left hand side of equation (4) comprises the so called above the line approach, where operational deficit consists of primary balance and real interest payments. Approaching from the deficit side interest payments have to be decreased by the impact of inflation on the debt of the previous year-end.

$$(4) d_o = pb + r_b b - r_p c_p + (r^* + e') (c^* - nfa^*) e = (\Delta H - r_i R) / P - \Delta c_p + \Delta b + \Delta (c^* e - nfa^* e)$$

- d_o operational deficit,
- r_p and r_b : domestic interest rates,
- r^* : foreign interest rate,
- e : real exchange rate,
- e' : real depreciation,
- small letters (b, d, etc.) indicate real variables (nominal variables were deflated by the domestic GDP deflator, while foreign variables by foreign prices P^*).

Because of the unreliable deficit figures it is better to calculate the operational deficit with the below the line approach using the right hand side of equation (4), since changes in the stock of debt can be observed much more accurately. Real deficit

calculating from the financing side composed of four items: (i) net seigniorage (seigniorage minus interest paid on mandatory reserves), that is interest paid on compulsory reserves of commercial banks is a negative financing item and not included in the deficit, (ii) credits given by the central bank to the private sector reduces net debt, (iii) changes in domestic market debt and (iv) changes in foreign debt, both in real terms. (This approach was applied in World Bank Papers on Hungary and Rocha and Saldanha (1992)).