

**Exchange rate policy of Hungary on the way to
European Union membership**

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1. Introduction

Since 1989, a transformation in the political and economic structure of the Central and Eastern European countries has been going on. In their external economic as well as in their foreign policy relations there can be observed a reorientation of the Central and Eastern European countries to the West, especially to the European Union. This can be seen also in the fact that most of them have signed an association agreement, called Europe Agreement, with the European Union, or have even made an application for accession into the Union. The economic and political conditions, required for membership in the European Union were designed at the Copenhagen Council in 1993. These criteria, which are often referred to as Copenhagen Criteria, include that the candidate country

‘has achieved:

- stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities;
- the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union;
- the ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union;

and has created :

- the conditions for its integration through the adjustment of its administrative structures, so that European Community legislation transposed into national legislations is implemented effectively through appropriate administrative and judicial structures.’¹

The countries which have made the greatest progress in transition are candidates to become members of the European Union at the next enlargement round. Accession

negotiations started in March 1998 with the Luxembourg Group, that is, with the countries which were invited to join the European Union in the next enlargement round in the Luxembourg Summit held in December 1997: Cyprus, the Czech Republic, Estonia, Hungary, Poland and Slovenia. All of them have made remarkable progress in the harmonization of their legal systems as well as in negotiations for accession to the European Union. All of the 29 chapters to be negotiated from the 31 chapters of the Aquis Communautaire have been opened and 17 to 23 chapters are already concluded.² It is planned to complete the negotiations with at least the above mentioned candidates by the end of 2002. In this case, they could be members of the European Union by January 2004.

Hungary made its application for accession to the European Union on 31st March 1994. The negotiations started exactly 4 years later. The country is ranked as one of the top candidates with 22 concluded chapters. The reason for the positive valuation of the developments in Hungary by the European Commission lies not only in the enormous progress which the country has made concerning the fulfilling of the Copenhagen Criteria. The stabilization efforts of the country with respect to future membership of the Economic and Monetary Union (EMU) also play an important role in this. Although the fulfillment of the Maastricht convergence criteria, which include criteria of inflation and interest rate convergence as well as the exchange rate and debt criteria, is not a subject of the accession negotiations, nonetheless, the European Union supposes that the candidates will make efforts towards these stability criteria. In Hungary, the achievements of the consolidation of the national finances are already visible. However, the inflation rate and the resulting domestic interest rates clearly still lie above the European Union average. This fact represents a great challenge to the monetary policy, which focused on the exchange rate policy strategy until

¹ The European Commission.

² State of August 2001.

early 2001. For this reason, the main scope of the present work lies in the analysis of the exchange rate policy of the country.

The transformation on the economic level means the transition of the economic order from the centrally planned to the market oriented system. In most transition countries, the liberalization of the economy resulted in an acceleration of inflation. Moreover, in several cases, it reached hyperinflation. The reason for this was that in the centrally planned economies price stability was achieved by the repression of price adjustments and did not reflect market equilibrium. As it was not the causes of inflation, but its symptoms that were dealt with, it could not be kept under control as soon as price adjustments were allowed for. The reason why the monetary authorities of transition countries tried to apply the exchange rate policy for achieving price stabilization was that monetary policy instruments were underdeveloped and central banks were not able to announce a credible monetary policy target in order to warrant price stability. Nevertheless, the exchange rate policy can be devoted to achieving two main targets which, however, seem to be in conflict with each other, at least in the short run. Control over inflation calls for exchange rate rigidity, while the maintenance of international competitiveness requires more flexibility. Combining the two requirements, there emerges the demand for an exchange rate regime which is able to secure a balance between them. In economic literature there has been an extended discussion about this subject. Nevertheless, proposals for an optimum exchange rate policy strategy do not differentiate between countries over the central and eastern European region. But the view of 'one size fits all' does not seem to work out. The individual strategies of the countries show this. We can find for nearly all alternatives an example within the region. (See Table 1.1.) A currency board was set up by Estonia with the Deutsche Mark (Euro) while Slovenia followed a managed float shadowing the Deutsche Mark (Euro) supplemented with a real exchange rate rule. The Czech Republic had to give up pegging the exchange rate to a currency basket composed of the Deutsche Mark and the US Dollar after a currency crisis in May 1997 and

has followed a managed float since then. Poland broke up with the peg to the US Dollar quite early, in 1991, and introduced a crawling peg, but established a relatively wide fluctuation band in 1995. This band was further widened from ± 7 to ± 15 percent until a free float was allowed for in April 2000 after some turbulences.

Table 1.1.: Exchange rate regimes in accession countries

Country	Period	Regime	Anchor currency
Czech Republic	12/90-05/97 05/97	Peg Managed Float	DEM (65%) + USD (35%)
Estonia	06/92-12/98 01/99-	Currency Board Currency Board	DEM EUR
Hungary	-03/95 03/95-04/01 05/01-09/01 10/01-	Adjustable Peg Crawling Band (1.9-0.2% monthly, $\pm 2..25\%$) Crawling Band (0.2% monthly, $\pm 15\%$) Target Zone ($\pm 15\%$)	Trade-weighted basket (until 12/91) USD (50%) + ECU/DEM (50%) (until 05/94) USD (30%) + ECU/DEM/EUR (70%) EUR (since 01/00)
Poland	01/90-10/91 10/91-05/95 05/95-04/00 04/00-	Peg Crawling Peg (1.8-1.2% monthly)* Crawling Band (1.2-0.3% monthly; $\pm 7-15\%$) Free Float	USD (-05/91) USD (45%) + DEM (35%) + GBP (10%) + FRF (5%) + CHF (5%) (until 12/98) USD (45%) + EUR (55%)
Slovenia		Managed Float	DEM (EUR) shadow + RER rule

* Additional exchange rate adjustments by: -12% (02/92), -8% (08/93), +6% (02/95)

The start of the transformation process in the Eastern Bloc is usually scheduled on the year 1989. Hungary was always seen as an outlier in reforms. Actually, Hungary has taken several steps for reintegration into the world economy well ahead of time. 1989 was the year when the reform process speeded up. As regards the modernization of the monetary and exchange rate policy, the country was the first within the bloc to unify the notation of

exchange rates of the domestic currency in 1981 and, in 1987, was the first to implement a two-tier banking system in which the central bank no longer assumed the duties of a commercial bank.

The case of Hungary is also quite special among transition countries with respect to inflation because price adjustments were always allowed for to a certain extent. Thus, in Hungary inflation accelerated but the country did not experience hyperinflation after the liberalization of product pricing. However, the long tradition of persistent moderate inflation generated lasting inflation expectations, which aggravate the reduction of the price increase for the central bank.

Hungary tried to keep on with the tradition of a fixed exchange rate system in the early transition phase, where corrections of the parity were possible, that is, an adjustable peg. This led to frequent adjustments of the exchange rate at irregular intervals, unpredictability of the exchange rate and to a loss of its function as a nominal anchor for prices as well as inflation expectations and twin-deficits. A change in the course of economic policy was inevitable. The solution was seen in the implementation of a so-called stabilization program. The main pillar of this program was the establishment of a new exchange rate regime, the crawling band system.

The introduction of the crawling band system aimed at combining the advantages of both fixed and flexible exchange rate regimes: maintenance of the international competitiveness of domestic products, predictability of the nominal exchange rate development, switching expectations from the backward looking adaptive sort to forward looking anticipation, increasing the planning certainty of economic activities, binding the monetary policy to a credible target to which inflationary expectations could be channeled in order to reduce inflation, and allowing for exchange rate adjustments according to the market situation within a narrow band.

The aim of the present study is to contribute to the dispute about the monetary and exchange rate policy alternatives for Central and Eastern European countries during the transition process and convergence to the European Union using the example of Hungary. The discussion gives a summary of the operation of the crawling band exchange rate regime in Hungary with respect to a wide range of economic indicators after it was gradually phased out by 2001 and was followed by a shadowing of the Exchange Rate Mechanism (ERM2). This includes a comparative analysis of two exchange rate systems according to theoretically based and defined criteria. The main focus of the study, however, centres on the topic of stabilization of the economy.

The stabilization program was introduced in Hungary in March 1995. The crawling band exchange rate system was a main pillar of this program. Therefore, the year 1995 is chosen as the 'leap year' and a hyphen will be drawn between 1994 and 1995. The adjustable peg regime is represented by data from 1990-94 and the crawling band is represented by data from 1995-2000. In 2001, substantial changes in the exchange rate system were again carried out. The composition of the study is as follows.

In Chapter 2, the economic developments in Hungary will be presented during the operation of central planning and in the early transition phase, that is, from 1946 to 1994 with special emphasis on the monetary and exchange rate policies as well as on external relations of the country. The discussion highlights the problems emerging from the history of the country and its experiences with inflation and devaluation of the domestic currency.

Chapter 3 gives a theoretical foundation to the decision making process which identified the exchange rate as a target variable for monetary policy and led to the establishment of the crawling band exchange rate regime in Hungary. Second, the implementation of this exchange rate system is reviewed on the basis of the theoretical background which provides a guideline to the determination of its parameters: the anchor currency, the initial central parity, the rate of crawl and the width of the band.

After a short overview of the general economic developments since 1995, Chapter 4 makes an assessment of the operation of the crawling band regime on the basis of an empirical investigation according to the criteria which are described in the second part of the chapter. They include the above mentioned targets and objectives of introducing the crawling band system. The achievements are analyzed in comparison to the adjustable peg with the aim of detecting the advantages of this regime. The analysis is focused on the development of inflation rates and exports, the sustainability of current account balances, the volatility of nominal exchange rates and international reserves as well as the development of the domestic interest rates.

The credibility of the commitment and ability of the central bank to keep the exchange rate within the announced band is difficult to measure in the absence of perfect capital mobility on which econometric testing methods rely so far. Therefore, a simple testing method will be developed for investigation of speculative pressure against the currency combining interest rate, exchange rate and international reserves variations. The credibility of the exchange rate announcement is discussed through an exploration of speculative pressure on the exchange rate.

Further, the exchange rate policy was a main pillar of the stabilization program which also included efforts to release the burden on the central budget. Therefore, the role of fiscal consolidation for disinflation and the current account balances should also be investigated. This is done in the last part of Chapter 4.

Chapter 5 discusses the prospects of Hungary for membership in the Economic and Monetary Union (EMU) based on the experiences and achievements of the period since the implementation of the crawling band regime but regarding also the actual shadowing of the ERM2. The considerations include the state of nominal convergence to the European Union. The next topic is the ability of the country to constitute an optimum currency area with the present members of the European Union with respect to the advantages and disadvantages of

forcing a rapid introduction of the common currency. Finally, the main institutional requirement of membership in the monetary union, that is, central bank independence is analyzed by calculating an index number on the basis of a qualitative valuation system.

Chapter 6 makes a summary of the results of the study and gives an outlook on future developments as well as topics for further research.

2. Developments before 1995

2.1 External relations and exchange rate policy

After the introduction of the new currency, the Forint, in 1946, Hungary pursued a very restrictive, centrally led international economic policy aimed at segmenting domestic and world markets. This target was achieved by creating a state monopoly on foreign trade and foreign exchange transactions. This happened within the framework of the nationalization process of all strategic industries (e.g. heavy industry, public utility companies) starting in 1946, when all big banks were nationalized and the assignment of all banking functions as well as all tasks dealing with foreign exchange to the central bank completed the one-tier banking system. Further steps in 1948/49 towards creating a foreign trade monopoly via specialized foreign trade companies, whose competence were assigned by the ministry of foreign trade, made it possible for the state to seize full control over the trade relations of Hungary. The decision-making authority was assigned to the minister of finance, who had the responsibility for creating plans in currency and foreign exchange matters, while the central bank assumed an executive function. The National Bank of Hungary (NBH) held the monopoly power over cross-border credit relations (raising or granting) and was uniquely authorized to hold foreign exchange and foreign assets. State-owned companies as well as private firms were obliged to transfer foreign exchange to the National Bank of Hungary and to ask the minister of finance for permission to assume foreign liabilities.

The exchange rate policy was focused on material balances, the exchange rate itself playing only a minor role. In order to serve the central plan targets, a system of multiple exchange rates was applied.³

³ See Havlik (1990).

The *official exchange rate* was initially calculated on the basis of fixed gold parities. The parity of the Forint was fixed arbitrarily at 0.7575 g of gold and resulted in an initial official rate of 1 USD = 11.74 HUF and 1 Ruble = 13.044 HUF⁴ which remained stable despite inflation differentials to trading partners. This aimed at de-integrating the Hungarian economy from the world economy, but this was to be loosened during the 60s. The segmentation between domestic and foreign trade and production was to be abolished through the linking of domestic pricing to world market prices. In 1968, the official exchange rates were calculated on a new basis which reflected the average expenses to produce a unit value of the foreign currency and fixed by 1 USD = 60 HUF and 1 Ruble = 40 HUF. Although this included all costs and taxes of all stages of production and costs of the foreign trade company, nearly one third of exports had still to be subsidized at this rate, while the price insensitive import demand could not be accommodated. Exporters with higher costs could count on reimbursements (e.g. of taxes) from the state. In connection with its aspiration to membership in the International Monetary Fund (IMF), the rate was officially named ‘foreign trade price multiplier’ in order to avoid the impeachment of establishing a multiple exchange rate system.

The *internal conversion rates* served to create an ex-post relation between foreign trade and domestic prices. They were applied by ministries and firms as ones of the most important planning instruments to assess the efficiency of foreign trade relations or to fix an efficiency target.

In 1957, discount payments on the exchange rate were introduced. Economic activities were divided into foreign trade and non-commercial activities. Different discounts for these two groups led to different exchange rates. The *commercial rate* was applied to settle foreign trade transactions and was calculated on the basis of average internal conversion rates. Foreign trade was completely segmented from the domestic economy by paying a supplement

⁴ See for example Hajdú (1994).

on export prices and skimming the import prices. In this way, an exporter obtained the same amount as if he had sold his products on the domestic market, and an importer had to pay the domestic price independent from the purchase price. After 1968, as the strict segmentation of domestic and foreign markets was loosened, exporter yields and importer costs were essentially determined by sales and purchase prices denominated in a foreign currency. Additionally, direct external relations of companies were allowed. The official rate lost its determination for settling transactions.

Since 1963, the double calculation of the exchange rates has been applied also for currencies which were members of the Ruble clearing system. The rates were counted as a ratio of gold parities, whereas the transferable Ruble, which was introduced in January 1964⁵ and its gold parity equal to that of the Soviet Ruble, was used in clearing goods flows. Firms whose costs to produce 1 Ruble value of exports were lower than the Ruble rate had to pay production taxes in order to prevent reorientation of trade flows from western industrial countries towards members of the Council for Mutual Economic Aid (CMEA).

The *non-commercial exchange rate* was used in tourism and private financial transfers. Its value amounted to about 50 percent of the commercial rate. It was calculated as a ratio of parities using a basket of goods consumed by tourists. This calculation provides the most realistic value for the currency and closer correspondence to global purchasing power than did the official and commercial rates. After 1968, an 'exchange rate with supplement' was calculated on the basis of purchasing power parity to the Deutsche Mark. The parities vis-à-vis other currencies were calculated on the basis of bilateral exchange rates fixed within the Bretton Woods System. The supplement resulted from the difference between the calculated rate and the official rate. In relations with member countries of the Council for Mutual Economic Aid, the determination of a non-commercial exchange rate was also based on a

⁵ At the same time, the Bank for International Economic Cooperation was founded.

calculus related to purchasing power parities since 1963. Although the applied basket was constructed on the basis of consumption expenditures, it oriented on the habits of a 4-member family of an embassy employee and tourist expenditure played a minor role. The value of the non-commercial rate was realigned if the cumulative consumer price index of either country since the time of the fixing was higher than 1.05. Transactions were reckoned up in transferable Rubles using a complicated mechanism which created a relation between the price level of consumer goods and traded goods of two countries on the basis of the Ruble and transmitted this to a non-commercial coefficient. This coefficient was used to count credits and debits on an account kept in transferable Rubles. This practice was first changed after the dismantling of the Council for Mutual Economic Aid, when all transactions were settled using free convertible currencies. The member currencies in the Council for Mutual Economic Aid could from that time only be sold and purchased at market rates and at the trader's own risk.

The notation of the Hungarian currency by the industrialized countries appeared in the so-called *free foreign exchange turnover*. The spreads between the rates of selling and buying were large. The central parity came to the black market exchange rates within Hungary at the closest which reflected the market value of the currency.

Since the implementation of the Foreign Exchange Codex II. in 1974, firms and households have been allowed to hold a restricted amount of foreign exchange, to assume foreign liabilities and to acquire foreign assets under permission of the authorities. Despite this, dealing with foreign exchange remained a state monopoly.

The Hungarian currency followed an appreciation trend until 1979. In 1976, for example, of revaluation of +12.5 percent was carried out and declared to have happened to foster exports, but in fact this measure must have been aimed at preventing inflation transmission to the domestic economy. From 1979, the non-commercial rate was depreciated

several times because of the increase in prices for those goods and services⁶ which were usually consumed by tourists. The commercial and non-commercial rates converged and the way to unified exchange rate notation was paved.

Nineteen-eighty-two was a significant year in the history of the Hungarian exchange rate policy. It was the date of accession of the country to the International Monetary Fund and the date of substantial changes in the course of exchange rate policy. Further revaluation of the currency, based on repressed inflation and indebtedness, was not possible anymore after it came to a debt crisis in 1981/82. Serving of foreign debt put a serious burden on the economy. Although this meant only a liquidity crisis and did not mean insolvency, reforms became inevitable. Maintaining solvency of the country and external equilibrium called for real depreciation in order to promote exports to earn free convertible foreign exchange. Steps to liberalize the economy, like the full liberalization of some prices in 1980 and unification of the US-dollar exchange rates on October 1st, 1981⁷, were acknowledged by the international financial institutions. However, they insisted on reestablishing macroeconomic equilibrium. Due to restrictive economic policy it came to a slow-down in growth, absorption fell and stores were partially sold. The accumulation of stocks slowed down but remained relatively high in international comparison.

The trade balance showed surpluses between 1982-85, but this cannot be traced back to a successful export promotion strategy. Worsening of the terms of trade soon brought about trade balance deficits. The currency depreciated several times by different amounts. Although these depreciations overcompensated the inflation fueled by the realignment of prices in

⁶ For example, prices in gastronomy were raised substantially in 1979 and turnover fell dramatically. This year is therefore called the ‘Waterloo’ of the gastronomy sector.

⁷ Hungary was the first in the region to unify the exchange rate notation in relation to the US Dollar. Multiple Ruble-rates remained in place until the dismantling of the Council for Mutual Economic Aid.

orientation to world market prices, the current account showed a closer correlation to import restriction measures. The poor export performance of the Hungarian economy in trade relations with industrialized countries was due not only to the scarcity of internationally competitive products and to the increase of production costs because of more expensive imports, but also to the segmentation of sales markets, and to the different profitability of sales in these markets. When calculated in domestic currency, trading within the ruble clearing system proved more profitable for firms than trading with industrialized countries. The corresponding profitability indexes⁸ show that economic motivation of firms for sales within the relation of the Council for Mutual Economic Aid was higher than in industrialized countries until 1986. Even domestic sales proved more profitable during 1985 and 1986. This led to a second problem, because the Hungarian economy built up claims vis-à-vis the other members of the Council for Mutual Economic Aid. Firms always got prompt payment for these exports from the state imposing an additional heavy burden on the central budget which were settled by credits on the international financial markets.

Trade relations with industrialized countries were asymmetric, that is, firms from the European Community were able to realize higher prices in their trade relations with Hungary than with other industrialized countries⁹. The scarcity of competitive products and the reliance of the Hungarian economy on imports from industrialized countries 'exposed' the country to world market conditions even more than the reliance on energy imports.

The exchange rate policy carried the whole responsibility in fixing the exchange rate proper to ensure external equilibrium. During the whole period there was an excess demand for foreign exchange and the authorities were not able to find a conversion rate to settle it.

⁸ See Baárné Nyitrai (1992), p. 29, Figure 2.

⁹ Other members of the Council for Mutual Economic Aid had to cope with even higher import prices.

There was no functioning foreign exchange market, all foreign exchange transactions being carried out centrally.

In 1987, a serious worsening of the balance of payments forced the authorities to pursue a consequent economic policy in order to increase exports to industrialized countries via improved international competitiveness of Hungarian products. This was achieved by a strong real depreciation of the currency and was supported by a restrictive monetary policy in order to reduce absorption and exports to other countries within the Council for Mutual Economic Aid. In 1989, restrictions for cross-border movements of Hungarian citizens were abolished. On impact, tourism spending increased and the services account turned into a deficit.

In 1989, foreign direct investment started on an upward trend. Although even earlier some joint-ventures had been founded with the participation of partners from the West, there was a lack of guarantees and a minimum of currency convertibility. The Act on Companies (1988/VI.)¹⁰ allowed for the founding of firms with a foreign share of up to 100 percent by special permission, while in cases of a foreign share of no more than 50 percent no special permission was necessary. Furthermore, it also allowed for the purchase of real estate, cooperation with the private sector as well as mergers with or acquisition of existing companies. The choice of the field of activities of the firms became nearly free from restrictions. Private companies were allowed to hire up to 500 employees. This opened the door for partners with higher financial power. A very important decision was to acknowledge reward to capital as a source of income. This made the acquisition of stocks and other corporation capital possible. The Act on Regulation of Foreign Direct Investment (1988/XXIV.) includes a guarantee by the state for the investment capital. This act ensures compensation of the foreign investor in case of possible nationalization, tax free import of

¹⁰ Also the western style company formations were introduced by this act.

investment goods as part of the association capital, free disposal of deposited foreign exchange and the right to cross-border profit transfers. This was a substitute for currency convertibility.¹¹ Engagement of foreign companies in Hungary was further facilitated by the confirmation of foreign trade as a basic right of each firm. Both acts were implemented in 1989. By this time, only a radical reform of property rights was still missing; although this act of transformation existed, but it had not yet been implemented in practice.

The targets of the exchange rate policy during 1987-89 corresponded to maintaining an external equilibrium, promotion of exports and approximate price stability. Therefore, exchange rate corrections were made in subsequence to compensate differentials between domestic and foreign inflation rates. From 1989 onwards, the policy to liberalize the economy speeded up and became clear in terms of abolishing administrative restrictions on prices, imports and to a certain extent abolishing restrictions on wages, in releasing monopolies and establishing market-based economic relations. The direction, the extent and frequency of exchange rate adjustments aimed at compensating losses in profitability brought about by realignments in relative prices and more importantly at making imports more expensive and reducing demand for foreign exchange. But continued nominal depreciation was not sufficient to bring about any sizeable real depreciation. In 1991, the exchange rate even appreciated by 12-13 percent in real terms, thus reducing the threat of a price-exchange rate-spiral, that is, the effect of depreciation generating new inflationary impulses. The primary inflation originated in the realignment of the price ratio following liberalization and abolishment of subsidies¹².

¹¹ By this, the Hungarian currency was in fact freely convertible for foreign investors. An official declaration of convertibility would not have made much difference for the attraction of foreign capital. [See also Hoch/Radnóti (1993).]

¹² At this point, it has to be mentioned that Hungary's position was still favorable in comparison to other countries of the Council for Mutual Economic Aid, as firms had had to consider developments of the world market prices in their product pricing strategy for a longer time.

The depreciation which is forced by inflation induces a secondary inflation, which can lead to a self-intensifying process. Although it has to be stressed that the depreciation itself did not create inflation, it was rather a consequence of inflation caused by monetary expansion. Nonetheless, since 1989, it has played an important role in product pricing because of import liberalization. The ratio expressing the effect of exchange rates on price increases was estimated at 40 percent in 1989, 70 percent in 1990 and in 1991 the ratio even amounted to 90 percent.¹³ Exchange rate policy was thus elevated to become an instrument of monetary policy¹⁴ and a tool to influence inflation expectations. The exchange rates were not to follow the trend of the inflation differential passively but were aimed at reducing inflation. The real appreciation following from the policy of stable or appreciating nominal exchange rates parallel to liberalization of imports and foreign exchange transactions was aimed at forcing structural change and a productivity increase in the early 90s.

The external value of the Forint has been calculated on the basis of a currency basket since 1980. Until 1986, the basket consisted of all currencies which had a share of at least 1 percent in settling exports during the preceding year. In 1986, the composition of the basket was changed to currencies which had a share of at least 1 percent in settling exports as well as imports. After the changeover in trade between members of the Council for Mutual Economic Aid from a Ruble based clearing system to US Dollar invoicing in 1991¹⁵, the share of the US Dollar increased undesirably. The composition of the basket was therefore fixed at 50 percent ECU and 50 percent US Dollar in December 1991 but in August 1993, the ECU was replaced

¹³ See Riecke (1991).

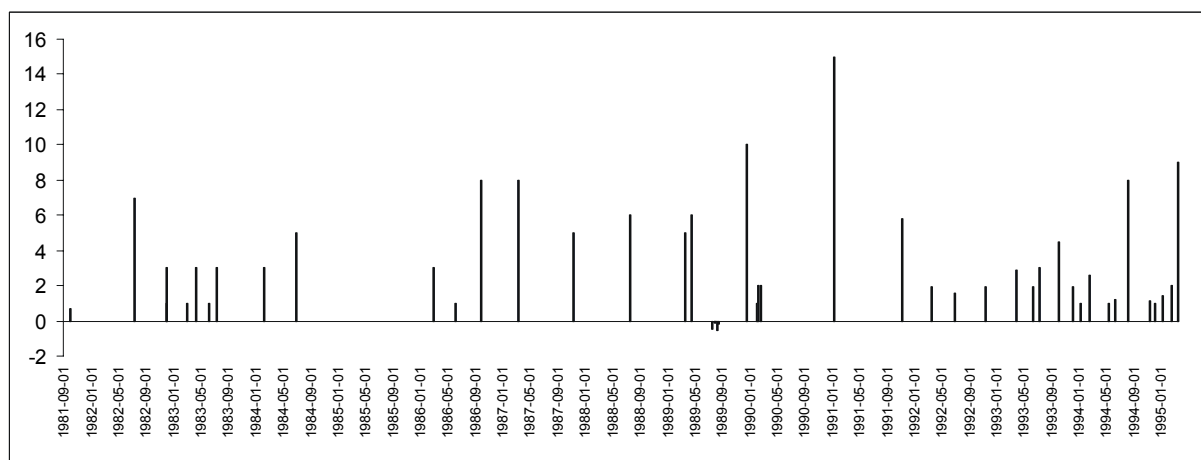
¹⁴ See also Várhegyi (1994).

¹⁵ This was the start of dismantling the Council for Mutual Economic Aid when trade relations between the member states dropped substantially.

by the Deutsche Mark because of the weak market position of the ECU. During the following years, the composition of the basket underwent further changes.¹⁶

In 1982, the terms of trade started to worsen so that the currency had to be devalued several times. Between 1982 and 1993 the currency was devalued by 223 percent in 31 steps. Forty-eight percent of devaluation fell into the period of 1991-93 in 10 steps. Up to March 1995, a further 32 percent depreciation followed in an additional 10 steps. Between January 1989 and March 1995, the currency depreciated by 146 percent. Figure 2.1. shows the exchange rate corrections between October 1981 and March 1995. Positive values indicate an increase of the exchange rate in the price notation, that is, depreciation. Looking at the data, we can also observe a slight revaluation in 6 small steps by 1.5 percent in July/August 1989.

Figure 2.1.: Exchange rate adjustments (in percent)



Source: National Bank of Hungary

Decisions on exchange rate adjustments were made mostly by the government. The National Bank of Hungary was authorized only to decide about a certain rate of change, which was successively increased to ± 5 percent per measure. Firms have had the possibility to hedge exchange rate risk by futures trades with the National Bank of Hungary since 1985,

¹⁶ See later. (Chapter 3.3., Table 3.1.)

and with commercial banks since 1989. The State Insurance Company has been authorized to reinsure exporters against exchange rate risks, but this possibility was not used until the late 70s.

As regards establishing currency convertibility at the early stage of transition, an essential problem was the lack of confidence in the Hungarian currency. The reason for this was that the domestic currency had to be devalued several times to compensate inflation differentials. However, no serious step to slow down domestic aggregate demand was undertaken. This, however, could have fended a depreciation spiral. There was no substantial depreciation either, which could have made exports competitive, so that export subsidies and other measures for promotion were still needed. In this situation, the draconian rules of dealing with foreign exchange were loosened in order to improve the general mood about the economic situation.

During the early 90s there was even a threat of creating a double-currency system. The devaluation had to be stopped and measures in order to raise demand for the domestic currency had to be taken to prevent this development. Antalóczy/Botos (1990) stressed that establishing full convertibility of the currency at this point would not have been an option. The liberalization of current account transactions, that is, capital flows connected to the movement of goods and services had priority. This means that while firms have to be supplied with foreign currency to pay for imports, far-reaching liberalization for households to purchase foreign exchange should be handled with caution, but they should be motivated to deposit their reserves on accounts kept by domestic banks by interest payments instead of purchasing goods abroad. This could help ease balance of payments problems. Import regulation must be conducted by instruments which are also applied by industrial states. On the other hand, foreigners should be allowed to hold balances in domestic currency accounts and be warranted to convert them to foreign exchange or else to goods at any time. The reinvestment of profits was to obtain preferential treatment in taxing.

Since the beginning of 1989, commercial banks have been authorized to administer foreign currency accounts of their clients. A restricted market for foreign exchange, where banks were authorized to purchase foreign exchange on behalf of their clients from the central bank, started to function. The holder of the account could use the balance for import payments. The authorization to raise international credit and to manage international liabilities remained in the hands of the central bank, but commercial banks were permitted to grant credits to their clients from the deposits on their own risk even when denominated in foreign currency. Foreign exchange did not have to be transferred to the National Bank of Hungary anymore.

We see that rigorous restrictions on foreign exchange transactions were loosened up gradually, but the liberalization speeded up from 1989 on. Although this is inevitable for the transition from a centrally planned to a market oriented economy, decision making authorities had to proceed carefully because of the vulnerability of the Hungarian economy, especially in such matters as balance of payments issues.

2.2 Inflation and monetary policy

Fighting inflation is one of the main topics in the convergence process towards membership of Hungary in the European Economic and Monetary Union. It is no prerequisite for accession to the European Union, it is a prerequisite for membership in the Economic and Monetary Union, that is, credible economic policy aiming at monetary stabilization is emphasized by the Commission. This means that Hungary should follow a monetary policy strategy which will lead to a decrease of inflation, nominal interest rates and to stabilizing the exchange rate of the Forint vis-à-vis the Euro.

The room for maneuver for the monetary policy practice in Hungary before the transition was influenced by five main factors which lay in the economic situation and

organization of the country¹⁷. They also show that the economic environment was very unstable.

Until 1968, all profits were centralized, that is, forwarded to the central budget, while investments and stock purchases were financed by sources from the central budget. This is the reason why firms were not interested in gaining profits. In 1968, this practice was changed. Financing of company activities have been based on profits since then, while subsidies from the central budget were reduced gradually. But still, a huge part of the profits had to be transferred to the central budget. Firms were forced to fight for preferential treatment, financial support, escape clauses and credits. Otherwise they raised their sales prices, because they did not see a chance to increase profits by higher production and sales quantities. Unfortunately, this behavior led to excessive price increases and speeded up inflation.

1. Biased profit distribution harmed the whole economy, because it led to misalignments in the allocation of resources and prevented structural change.
2. The supply of credits was not always sufficient to finance investment. There was an excess demand for credits which was not settled by interest rate increases.
3. These rigorous conditions released reactions by the firms which equally led to accelerated inflation. As far as raising sales prices was an option for the firms, they made use of this possibility. But in case this was prevented by fixed administered prices, firms just reduced their production quantities, as higher costs led to a drop in their profits. As an impact, scarcities forced the government to allow for an increase in administered prices.
4. Yearly changes in the course of economic policy abbreviated the planning horizon of the firms to merely 1 year instead of the desirable 5-10 years. In this case firms were not able to create a business strategy, their actions being merely adjustments to the frequently changing conditions.

¹⁷ See also Huszti (1987).

Within the one-tier banking system until 1986, the central bank had only two instruments at its disposal for regulating monetary flows, while the economic environment was quite hostile to the central bank. Its decisions and actions were mostly regarded as a barrier to economic development. Additionally, its monetary targets were usually countervailed by the system of taxes and duties applied by the fiscal policy. The monetary policy instruments of the central bank were direct regulation of credit or interest rate policy:

- In fact, the central bank had only the options of granting or declining a credit claim, controlling or sanctioning the appropriate use was not possible.
- An indirect regulation of credits and savings by interest rate policy was only a theoretical alternative. Demand for credits showed no correlation with the interest rate level but with the maturity of the credit. Furthermore, the interest rate policy was applied inappropriately, that is, credit rates constituted more a kind of duty than a regulatory instrument. Even deposit rates failed to support savings, as real interest rates were negative after the acceleration of inflation.

The Hungarian currency, the Forint, has experienced a loss of its purchasing power parity nearly over the whole period since its introduction in 1946. This tradition can be a reason for inertia in inflation expectations. It is therefore worthwhile to make a short assessment of the developments. For example, the purchasing power of the currency fell by 85.10 percent between 1946 and 1984¹⁸. Most of the losses, that is 58 percent, fell during the reconstruction period of the world economy from 1946 to 1952 when overall price increases occurred on the world markets. The relative prices of agricultural products increased in Hungary, while at the same time prices of manufactured goods rose in spite of administrative restrictions. Then until 1958, strengthened administrative restrictions on manufactures prevented an upswing of producer prices, which threatened as a consequence of stagnation in

¹⁸ See also Huszti (1987).

production level and compensated the effect of price increases of agricultural products on the overall price level. A decrease in consumer prices was to bring about an improvement of living standards. The overall index showed price stability and even a slight decrease in 1958. During the subsequent years, reconstruction in the agricultural sector and the acceleration of investment programs exhausted the financial resources of the economy, which made an increase in producer prices inevitable. As consumer prices did not follow this development, further increases were needed, but the spread between supply and demand could not be abolished. The absorption constantly exceeded the domestic production level by an increasing amount, mainly because of excessive investment activities, which tied resources in uncompleted projects and stock accumulation without an expansion of the supply of goods. The production costs increased rapidly and the labor productivity growth lagged behind. Between 1961 and 1967, the economic policy was additionally puzzled by the worsening of the current account imbalance while the terms of trade of the country were improved, contrary to the overall trend, and the external equilibrium became the main objective. However, a lack of technical development prevented a strengthening of export orientated production. After 1968, an orientation of domestic prices on the world market prices was to be made possible. The administrative restrictions were loosened and prices could be adjusted at least within a band. Following the oil crisis and the upward trend of world market prices, the currency was revalued in order to fend off transmission of the inflationary process to the Hungarian economy. This led to a further worsening of the current account position and the terms of trade, so that an increase in import prices could not be prevented in any case. It seemed necessary to subsidize production. Nevertheless, it soon became clear that the inflationary pressure could not be combatted and producer prices were raised. The consumer prices followed this trend soon afterwards, that is, from 1976 on. Imbalances caused by the overheating of the economy as a result of excess demand for investment peaked in 1978 and forced a radical solution. This was to be achieved by a reduction of the absorption on the one

hand and by a strengthening of the export orientation of the economy on the other. A new price mechanism aimed at the consistency of domestic and foreign prices and the external value of the currency. The first step to achieve this was the unification of exchange rates by continuously appreciating the commercial exchange rate and depreciating the non-commercial exchange rate, beginning in 1979. This kind of convergence of the exchange rates can be understood as a kind of anti-inflation policy, as only consumer prices rose, so that it did not have any strong impact on the overall price index.¹⁹ Nevertheless, worsening of the terms of trade required a depreciation of the commercial rate in order to support exports and slow down imports. The unified exchange rate thus followed a depreciation trend and the impact on inflation had to be accepted, although fighting of inflation always remained an issue of economic policy. This can be seen as the depreciation rate constantly lagged behind the rate which would have been needed to restore competitiveness.

From the above discussion, it is clear that the inflation in Hungary was caused by internal reasons and not by transmission from outside the country. The increase of the world market prices was substantially lower. The main reason was that resources were bound in uncompleted investment projects and in huge unsold stocks despite chronic scarcities. Therefore, supplies could not respond to price increases. On the other hand, purchasing power of the consumers was maintained by compensation of inflation. What is more, a policy aiming at improving living standards led to higher real wages. However, real wages were not sufficient to cover living expenses so that workers were usually involved in several occupations and real household income grew even faster than real wages.

The process of realignment of relative prices started in the early 80s after the reform of product pricing based on world market prices²⁰. Additionally, in the late 80s the tax system underwent a reform by introducing the concept of income taxation and value added taxes. In a

¹⁹ Calculated as the GDP deflator.

strongly monopolized and centrally conducted economy this provided companies with a possibility to increase their sales prices and inflation rose to two-digit rates. Since 1989, the process of realignment of relative prices has speeded up as a consequence of liberalization. Other causes such as increasing energy prices, abolishment of subsidies and compensation payments to the population have only temporary direct effects on inflation. However, the indirect effect via inflation expectations remains observable in the long run.

Yet, contrary to widespread opinion, it is not clear that the abolishment of production subsidies must inevitably cause inflation as Erdős (1989) points out. Subsidies may have no impact on the price level as far as they are financed by taxes. In this case, price level reducing effects will be equalized by the countervailing price level increasing effects. Producer prices will drop only in the case that financing is carried out by taxation of revenues and consumption. Consumer prices will not be affected; there will be merely an increase of the spread between producer and consumer prices. Also a change in the price structure may occur if not all goods are subsidized, as all other goods will become more expensive. The impact of subsidizing exports is not clear, but it seems certain that improving competitiveness by this measure can only be achieved because not all goods are subsidized. In the case that financing of the subsidies is not based on taxes, a price level increase is made possible by generating additional purchasing power via subsidies. According to these considerations, an inflation trend can be circumvented by the simultaneous decrease of taxes.

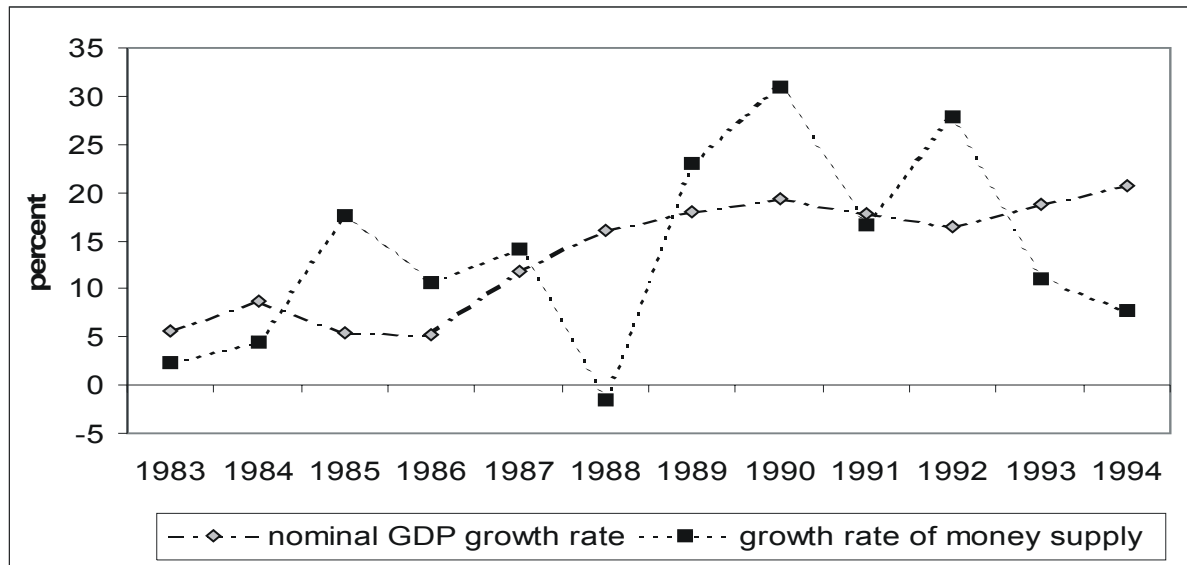
It must be stressed that even if the above argumentation seems to come to the implication that inflation in Hungary had reasons stemming from the real economy, inflation is always a monetary phenomenon and this is similarly true for centrally planned economies.²¹

²⁰ See also Baárné Nyitrai (1991).

²¹ Cassel (1987) provides a broad summary about the attempts to explain inflationary processes in centrally planned economies and shows that inflation is always a result from drifting developments of output and money supply.

Regarding the development of monetary aggregates, monetary policy can be seen as expansive between 1968 and 1982.²² During this period, the growth rate of the money supply exceeded economic growth, but the monetary overhang was partially slashed from 1983 by credit restrictions as can be seen in Figure 2.2. However, only the liquidity of firms was effected by this, the government sector experiencing no restrictions. Credits to the central budget were cheaper than to firms. This led to extensive financing of company activities by state credits, which were granted to rescue businesses from bankruptcy. Credits to firms became even more expensive while fiscal expenditure grew and countervailed the intended monetary contraction. On the other hand, the payment morals of firms loosened and an extended debt chain arose. This also countervailed the efforts of the central bank to pursue a restrictive monetary policy in order to reduce aggregate demand.²³ Firms solved their liquidity problems after credit restrictions by forcing their suppliers to grant them a credit. These, however, did the same to their own suppliers in the case of liquidity problems. The part of the economy where money supply was able to regulate demand grew smaller because of the indebtedness of firms to each other. Aggregate demand could grow without a change in the monetary base or the velocity of money turnover. The debt chain can be regarded as a kind of money creation which provides room for price increases. Buyers who paid their bill merely with a promise of compensation in the future were ready to accept any price. In many cases, cost reductions were spent on increasing wages rather than on disbursements, which in fact led to a growing money supply if in turn the suppliers of these firms did not restrict wage payments when having liquidity problems. Another negative implication of this process, which was quite significant between 1982-84 and again in 1988, was that a solvency examination did not take place and in many cases activities which produced no profits or even losses found a fake demand this way and were maintained.

²² See also Baárné Nyitrai (1991).

Figure 2.2.: Money supply and nominal GDP growth

Source: International Monetary Fund; own calculations

Nevertheless, according to empirical investigation²⁴, the relationship between monetary aggregates and inflation is quite weak in the case of Hungary. Granger-causality tests on the determinants of inflation defined by the consumer price index (CPI) were carried out for the period of 1990-98. The causality could be described by the following equation²⁵:

$$(2.1.) \quad CPI_t = \alpha_1 \Delta M2 + \alpha_2 \Delta P_{imp} + \alpha_3 \Delta W + \alpha_4 CPI_{t-1}$$

where

$M2$ = monthly observations for the broad nominal money supply

W = nominal average wages

P_{imp} = import prices (German wholesale price index adjusted for exchange rate changes of the domestic currency)

CPI_{t-1} = past inflation

α_i = coefficient ($i = 1, \dots, 4$)

²³ See Várhegyi (1990).

²⁴ See Brada/Kutan (1999).

²⁵ Reconstructed leaning on the explanations of Brada/Kutan (1999).

The results of the investigation show that the impact of past inflation was the main source of permanent changes in the inflation rate. This indicates that the main factor in inflation behavior is inflation expectations which are retrospective and high due to historical experience. Import price changes also have a significant but transitory effect on inflation. Compared to these two effects the contribution of nominal wage and broad money changes was small.

Moreover, the efficiency of monetary policy was restricted by the obligation of the central bank to finance budget deficit, which bound three times as much monetary resources as the financing of all firms through the banking system. On the other hand, the degree of monetization of the Hungarian economy was quite low as was the share of bank credits in firms financing, and the costs of amortization of credits could easily be passed through to the consumer. Raising of credit was therefore independent of market interest rates.²⁶ The repayment of state debt requires capital and is only possible if consumption expenditure slows down to provide the state budget with a high share of domestic income in the long run. However, in an environment of rapid currency devaluation, households tend to reduce their savings instead of building up and try to convert them to goods. In the case of a lack of supply on the domestic market, imports will meet consumer demand, causing a twin deficit problem.

From 1987, which saw the introduction of a two-tier banking system, the monetary policy of Hungary was dominated by an external equilibrium target. Since 1992, fighting of inflation became again a priority after inflation had accelerated to 35 percent in 1991²⁷. As a consequence, the increase of money supply was slowed down from 1993. The impact of this policy on inflation was supported by an increased aptitude to savings and recession which reduced consumption to a remarkable degree, by an exchange rate policy which resulted in strong real appreciation, by a new law of accounting which did not allow for booking doubtful

²⁶ See also Várhegyi (1991).

claims as revenues, and by company liquidations after the new bankruptcy law came into force, increasing the supply of production equipment and real estate. Yet the causes of inflation were not abolished.

To restrict inflation it is inevitable that the central bank has to seize control over the money supply, because a monetary overhang leads to price increases or to a devaluation of the currency to prevent current account deficits. From 1989, monetary policy also had to deal with the effects of capital inflows which forced the central bank to interventions in order to stabilize the nominal exchange rate, and consequently increase the monetary base and speed up inflation. The effects on the real exchange rate have to be fended by sterilization. Siklos/Ábel (1997a) show on the basis of a reaction function containing foreign claims, growth of real output, budget deficits and irregular devaluations of the currency that it was possible to sterilize the effects of capital inflows, but no earlier than late 1994.

2.3 Assessment of the monetary and exchange rate policy

Opinions based on empirical investigations into the monetary and exchange rate policy pursued during the whole period differing especially as regards the transition period from a centrally planned to a market economy beginning in 1989. The recommendations for exchange rate policy resulting from these considerations likewise differ. However, they all have in common the fact that they adjudge an important role to exchange rate policy in reducing inflation rates. Monetary policy is made difficult by the impossibility of forecasting money demand, by uncertainty about transmission mechanisms and by the increasing degree of openness of the economy.²⁸

²⁷ See Várhegyi (1993).

²⁸ See for example Neményi (1997).

The exchange rate policy was mainly applied as an instrument for achieving two stability targets at the same time: price stability and external equilibrium. The requirements which have to be met by exchange rate policy in stabilization programs can be threefold²⁹. First, the exchange rate has to be determined to support the integration of the economy into the world economy and the growth of exports as well as of the production level of tradable goods. Furthermore, exchange rate policy has to fight inflation and stabilize exchange rates on a level consistent with the domestic inflation rate, the stock of foreign exchange reserves and autonomous capital flows. These targets may collide in the short term. Price stabilization requires for exchange rate stabilization, but this can result in the deterioration of international competitiveness, that is, real appreciation and can be followed by high current account deficits as well as high interest rates in order to finance this deficit. In a system with fixed exchange rates, international competitiveness can only be improved by increasing efficiency of production. Exchange rate fluctuations have an impact on the central budget, current and capital accounts, and on inflation.

Considerations about the international competitiveness of the products of a country are usually oriented on differentials in price indexes to trade partners. The concept of the real exchange rate captures this. However, real exchange rates calculated on the basis of product prices can only be used if demand for the export goods of the country shows reactions to changes in prices and the production technology, and if factor endowments do not differ over countries. As a measure of product prices we can choose consumer price (CPI) or producer price (PPI) indexes:

$$(2.2.) \quad RER_{CPI} = \frac{CPI}{CPI_f} \cdot e$$

$$(2.3.) \quad RER_{PPI} = \frac{PPI}{PPI_f} \cdot e$$

²⁹ See Gáspár (1992).

The real exchange rate appreciates, that is, expresses deterioration of price competitiveness if prices increase faster at home than in the foreign country. In many cases the price indexes are biased by price changes of non-tradable goods, so that an overall index does not give the appropriate information about the competitiveness of the tradable goods of the country under investigation. Furthermore, if factor endowments or technology differ across countries, it is more suitable to calculate the real exchange rates based on unit production costs to investigate international competitiveness. This assumes the law of one price on the world market to hold. Lower costs indicate higher profits in producing a certain good and therefore higher competitiveness. In this case, factor endowments or production technology must be different, and comparative advantage substantiates international trade. However, it is difficult to measure costs other than labor costs so that unit labor costs (ULC) are compared:

$$(2.4.) \quad \text{RER}_{\text{ULC}} = \frac{\text{ULC}}{\text{ULC}_f} \cdot e$$

Another alternative would be to measure value added prices (PV) of traded goods output if traded goods produced by different countries are not homogenous:

$$(2.5.) \quad \text{RER}_{\text{PV}} = \frac{\text{PV}}{\text{PV}_f} \cdot e$$

This measure is a poor guide for competitiveness if a shift in demand preferences occurs. A shift of preferences to domestic products would increase their prices but this cannot be interpreted as a loss of competitiveness.

During the transformation process, factor markets undergo changes which have an impact on factor prices followed by technological changes as well as changes in product prices. In this case, none of the above mentioned measures can be used to estimate the development of international competitiveness. Lipschitz/McDonald (1992) propose a new concept which considers both prices as well as costs and create a measurement for competitiveness on the basis of profits. Assuming that only one factor of production exists,

this profit based indicator equals the share of labor in value added relative to competitors and is calculated as a ratio of relative changes of unit labor costs and relative changes of labor productivity:

$$(2.6.) \quad RER = \frac{RER_{ULC}}{RER_{PV}}$$

The profit based real exchange rate is independent from the nominal exchange rate while productivity and real wages themselves will depend on it. An empirical investigation was carried out for Hungary by Halpern (1996, 1997) using a data set from 1987-1995. The results of his calculations on the basis of profits show a deterioration until 1992 and an improvement in adjacent years resulting from falling unit labor costs since 1994 and increasing productivity since 1992 compared to competitors. This result contradicts the developments indicated by other measures for the real exchange rate based on prices or costs. The latter perform real appreciation and in this way a deterioration of international competitiveness. However, as different measures of real exchange rates provide different implications for international competitiveness, the reliability of this method may be doubtful. Even measures based on production costs, which should be the most proper ones cannot reflect the developments. The calculations take labor costs into consideration but no other costs such as energy. On the other hand, exact data about labor productivity growth are missing, and the rate is systematically overestimated. Based on the investigation of the developments of price and cost levels in Hungary during the 90s compared to the developments on the world market, Obláth (1997) warns of an interpretation of the appreciation of the real equilibrium exchange rate in a transition economy in the midterm as a practicable exchange rate policy strategy in the short term. This could lead to unjustifiable real appreciation. Concerning this aspect, he states the example of an overvaluation of the currency peaking in 1993, overcompensated, however, by the corrections during 1995.

Nonetheless, in a small open economy, the impact of exchange rate adjustments on the current account can merely be temporary so that depreciation of the currency cannot continuously maintain competitiveness. Initial export promoting effects will soon be countervailed by increasing costs of production but there will be a permanent effect on the price level. If taxes are not reduced to prevent the price increasing effect of the devaluation, export subsidies seem to be the only instrument to support exports.³⁰ Additionally, depreciation generates expectations of further devaluation, which will be built into the product pricing of firms as well as wage negotiations, so speeding up inflation. Devaluation expectation can even have an impact on trade flows, as exporters may tend to postpone their purchases in order to raise revenues in domestic currency, while importers may be moved to hastened purchases. Baár (1992) finds support for these theoretical considerations in the experiences of Hungary.

Halpern (1989) contradicts the widespread view that devaluations would have no effect on trade volumes in Hungary. He shows that during 1968-86, devaluation combined with import control had a negative impact on debt level and current account. The harmful effects of currency devaluation to the Hungarian economy are also stressed by Radnóti (1995). The import value will increase because of higher import prices. Exports, however, will not be supported by this measure. Hungarian exports consist of agricultural products and food to a large extent, but these fall under the discriminatory trade policy of the EU. An improvement in this field is therefore nearly impossible. On the other hand, demand for the export products of a country depends highly on the reputation of the country on the world market, which cannot be mended by frequent depreciation of the currency. This will rather be interpreted as economic weakness. Production is highly dependent on imports, so that production costs will increase and the competitiveness of Hungarian products will deteriorate.

³⁰ See also Erdős (1989).

Export prices cannot fall as desired otherwise the quality of the products will suffer from missing imports. That is why depreciation of the currency cannot bring about increased foreign exchange revenues.

Barabás (1996a) analyzes the factors which determine the export and import prices using a data set from 1992-94 with special emphasis on the impact of exchange rate changes and comes to the result that in fact on the one hand devaluation leads to a higher price competitiveness of Hungarian exports, but on the other hand, this effect will be nearly completely countervailed by an increase in import prices. The analysis is based on the determination of the prices corresponding to the relation of demand and supply on the markets. Exporters will make use of the devaluation of the domestic currency partly to increase their profits in domestic currency and partly to reduce prices denominated in foreign currency, if possible, in order to increase their sales amounts. This depends on the price elasticity of supply and demand. If supply was completely inelastic, i.e. at the production possibility frontier, a price reduction would not have an effect on sales and if demand was completely elastic, the suppliers would not be able to change their sales prices independently from their competitors. Concerning the size of the country and its insignificant share in the world market, one would assume a high elasticity of export demand. As regards the grade of specialization in exports, the effect is not clear. Elasticity of export supply rises with an increasing share of industry products and with a decreasing degree of openness. The result of this consideration is that the high share of agricultural products in Hungarian exports during the period of investigation and the relatively high degree of openness of the Hungarian economy result in relatively low elasticity of export supply. Normally, exporters are able to hand down extra profits achieved by cost reduction denominated in domestic currency at least partially to the foreign consumer so that export prices could fall denominated in domestic as well as foreign currencies. But the above mentioned cases are an exception to this rule. The calculations deliver further the result that a change in parity or in unit production costs,

approximated by unit labor costs, will have the same impact on export prices denominated in domestic currency. A devaluation of the currency or a reduction of the unit labor cost by 1 percent leads to a reduction of the prices by 0.5 percent. There is however a difference between these two effects. This lies in the shorter reaction lag, that is, positive results can be achieved faster by devaluation. The impact of the exchange rate change on import prices depends strongly on whether the imported good can be substituted by domestic production or is dispensable. If this is not the case, import prices will reflect the rate of devaluation to the full extent. In this way, depreciation of the currency makes especially energy and raw materials more expensive, while the price increase of consumer and investment goods will be weaker. Hungarian imports include a high share of energy, raw materials and intermediate products during the period of investigation, that is, 45-50 percent. Therefore, devaluation will most probably cause a significant increase in import prices. Furthermore, production relies to a high degree on imports so that this change will be reflected in producer as well as consumer prices. An exact calculation of this effect is not possible because of missing data, but an approximation shows a price increase by 4 percent if the currency is devalued by 10 percent. Since the period of the investigation, the international trade of Hungary has undergone a process of structural change. The results, however important for the assessment of the exchange rate policy during that time, cannot be extrapolated to the present.

Devaluation may fail the target of protecting domestic production and employment. Albeit some producers may lose their sales markets to imported goods through real appreciation, it has to be taken into account that the prevailing part of Hungarian imports consist of energy and raw materials which cannot be produced domestically, or investment goods of high technological standards which are needed for structural change in production and should therefore be supported rather than inhibited. In order to protect employment in certain branches, trade policy instruments like import duties should be preferred as far as special trade agreements allow for this. Exchange rate policy should rather serve price

stability and therefore be fixed. This way, producers will be forced to increase their productivity and induce structural change. In the short term, there will surely be a drop in the production level, but in the long run low inflation will provide the potentials for growth. Devaluation can be efficient in the short term, but the obsolete production structure may be preserved and the effect on inflation can be permanent. However, if a restructuring of production and an increase in productivity do not occur, a fixed exchange rate policy results in a strong real appreciation followed by high current account deficit and high interest rates in order to finance this deficit. Inflation will fall as a consequence of stable import prices and a slow-down of domestic demand. The cost of this would be a drop of production level, high unemployment and a loss of investment activity. The extent of the costs is independent from the duration of the process.³¹

Between 1982 and 1992, the Hungarian currency was devalued in nominal as well as in real terms³², but this could not bring about a substantial improvement of the current account even if a deficit first occurred in 1986. Current account surpluses were produced by a rigorous import permission system. The inflationary effect of the devaluation could not come clear until 1988 because of administrative price regulations. Since 1989, inflation has accelerated as an impact of liberalization. In order to slow down the inflation, devaluation should lag behind the rate of increase in the price level. The room for real appreciation of the domestic currency was given by strong devaluation in real terms during the preceding 8-10 years³³, loosening of trade restrictions against Hungarian exports, and reorienting of trade flows to industrial countries.

Finding the equilibrium exchange rate is a long-lasting process, as exchange rate policy has to be supported by monetary, fiscal and incomes policies. Devaluation can only be

³¹ See also Tarafás (1994).

³² See Baár (1992).

³³ See again Figure 2.1.

successful if it is accompanied by real wage decreases. This cannot be done without a consensus between income recipient groups. Devaluations which were carried out within the adjustable peg system until 1994 were not sufficient to improve the current account because they were not accompanied by restrictive economic policy. The impact of the depreciation of the currency on Hungarian exports is weak and will be eroded quickly by wage increases in this case.³⁴

The main problem of the exchange rate policy practice was that the measurements were ad hoc measurements, which made the forecasting of the official exchange rates impossible. In this situation, the devaluation risk could not be calculated by economic agents. Speculations about the next date of devaluation were widespread and there was a threat of speculative attacks against the currency. The economic environment in 1994 was characterized by persistent inflation expectations and monetary policy was distrusted. The international competitiveness deteriorated by real appreciation, which resulted in a non-sustainable current account deficit by nearly 10 percent of GDP. Furthermore, interest rates were very high and the interest payments on the state debt amounted to more than 7 percent of GDP. There was a threat that a debt spiral would arise resulting from increasing financing needs of the central budget, which is caused and followed by rising interest rates. Table 2.3. shows the increasing trend of deficits in both balances up to 1994.

Table 2.3.: Current account and budget deficits

Year	1991	1992	1993	1994
Current account balance as % of GDP	0.80	0.87	-8.96	-9.42
Budget balance as % of GDP	-3.81	-7.29	-5.72	-7.12

Source: National Bank of Hungary, Central Statistical Office

³⁴ See Gáspár (1995).

2.4 Evaluation of the exchange rate policy from an international perspective

In international economics literature, serious considerations have been made about the topic of stabilization in Central and Eastern European countries, most of which are striving for European Union membership. As Hungary is part of this geographic area, it is worthwhile having a look at empirical investigations and opinions about the economic situation of the countries in the region. By doing this, we can see whether Hungary has to deal with the same problems as the other Central and Eastern European countries.

Contemplating the developments in these countries, empirical analyses unanimously state real appreciation of the currencies. The opinions about this phenomenon are, however, various. While Koch (1997) rejects the thesis of seriously overvalued real exchange rates of the currencies, Brüstle/Milton (1997) see this as the main reason for the successive worsening of the current account positions of the Visegrád-States in the first half of the 90s, because price competitiveness was most decisive for the foreign trade of the region. Gabrisch (1997) shares this opinion and says that this development throws sand in the wheels of growth. However, he lists at the same time several other causes which can be held responsible for current account problems, for example market access barriers for products where a comparative advantage of the Central and Eastern European countries is supposed, and high import requirements of investment and modernization. Hoggarth (1997) points out that the worsening of the current account position can be traced back more to an increase in domestic absorption, dwindling demand on world markets and capacity bottlenecks in domestic production. Quite opposite to other opinions, Rusek (1996) finds no empirical proof for the validity of the traditional trade theory in the countries of the Central European Free Trade Agreement (CEFTA), with the exception of the Czech Republic where real appreciation and slowly accelerating industrial production could be held responsible for trade balance deficits.

These influences were completely absent in Poland, but could not be entirely denied in Hungary and Slovakia.

As regards the value of the currencies, the opinion that they were undervalued at least at the beginning of the transition period is widespread. The list of reasons for this undervaluation includes monetary overhang, dammed up demand for foreign currencies, lack of credibility of the new political authorities and uncertainty about the equilibrium real exchange rate.³⁵ This can be stated by the fact that the deficits in the trade balances of the Czech Republic, Hungary and Poland were lower than feared after the loss of eastern European sales markets.³⁶ Furthermore, by the far-reaching and fast liberalization of foreign trade, domestic firms were confronted with an overwhelming international competition. Depreciation of the currencies can be advocated in this situation in order to support exports and limit imports.³⁷ Stolze (1997) shows that the main reason for the undervaluation of the currencies lay in the systematic discrepancy of the relative prices in the transition and industrial countries. This stems from high transaction costs resulting from inefficiency of markets and institutions in Central and Eastern European countries.³⁸ With ongoing transformation of the economies, transaction costs will fall and the share of tradable goods will increase so that the real appreciation of the currencies can occur without a threat to the current account position.

Starting from the undervaluation of the currencies at the beginning of the transition process, there must be a real appreciation in the following, on the one hand as a correction of the undervaluation and on the other hand as an adjustment to the appreciation of the real equilibrium exchange rate. The appreciation of the real equilibrium exchange rate and the

³⁵ See for example Halpern/Wyplosz (1995).

³⁶ See Obláth (1994).

³⁷ See also Nuti (1996).

³⁸ See Dietz (1999).

rejection of the purchasing power parity criterion result from the special characteristics of the transition process.³⁹ First, a differential in productivity growth leads to a stronger price increase of non-tradables than of tradables.⁴⁰ Furthermore, quality improvements support the international competitiveness of the products originating from the Central and Eastern European countries and therefore gives room for higher prices of tradables. Stolze (1997), however, disagrees and points out that differentials between tradables and non-tradables in productivity growth do not exist, because deregulation of the economies brings about more efficient use of the resources in all sectors. Nevertheless, productivity differentials still exist between industrial and social services. Furthermore, there are still fields where pricing underlies administrative regulations. Changes in price level can be traced back more to a switch in subsidy and liberalization policy.

The exchange rate policy of the transition countries orientated obviously on the situation in the trade balance. Authorities were keen on fending a deterioration of the price competitiveness and current account imbalances because of real appreciation. Havlik (1996) supports this engagement and warns that real appreciation in the short term not substantiating in increased cost efficiency will also slow down economic growth. However, real appreciation cannot be avoided anyhow and continuous nominal depreciation merely fuels inflation.⁴¹

Additionally, huge capital inflows create a pressure for nominal appreciation and a commitment to an exchange rate target or, what is more, to nominal depreciation in order to restore competitiveness of exports necessitates interventions. As a consequence, foreign exchange reserves grow and countervail the efforts for fighting inflation. Nuti (1996) argues that although high nominal interest rates warrant positive real interest rates for domestic

³⁹ See for example Halpern/Wyplosz (1995), Havlik (1996) and Nuti (1996).

⁴⁰ This is the so-called Balassa-Samuelson effect. A detailed description will be made in Chapter 3.

⁴¹ See also for example Halpern/Wyplosz (1995).

savers and so encourage savings, they make domestic assets especially appealing for foreign investors and induce further capital inflows. Hoggarth (1997) states that monetary authorities in the region seem to spurn a nominal revaluation which, however, would not only help to abolish differentials in relative prices of tradable and non-tradable sectors to industrial countries but would also prevent further inflationary tendencies. According to Hoggarth, it would be difficult to reduce the inflation rate in the foreseeable future without allowing for nominal appreciation of the currencies. In the case of fixed nominal exchange rates, fast growth in tradable productivity will cause price increases in non-tradable production. Additionally, in order to prevent an acceleration of inflation, the sterilization of the effects of foreign exchange intervention on the money supply is needed. This is only possible by increasing domestic interest rates, which attracts more speculative capital inflow as a consequence. However differing in their solutions, both opinions make it clear that monetary policy authorities are not able to control nominal money supply, real interest rates and real exchange rate at the same time.

The investigations of the economic situations of the Central and Eastern European countries reveal that real appreciation is an existing problem throughout the whole area. Inflation differentials to trading partners have to be considered even if there is some difference in productivity growth and the equilibrium real exchange rate itself appreciates.

2.5 Summary

In this Chapter, it was shown that like other former socialist countries, Hungary introduced a policy of fixed exchange rates within a multiple rate system at the beginning of the socialist period. The policy was supported by rigorous restrictions on foreign exchange transactions as well as price supplements and surcharges on external trade in order to uncouple the economy from the world markets. Loosening of this policy occurred from the 60s, when foreign

currency prices of sales and purchases were reintegrated into the decisions of domestic firms, and in 1974, through allowing for limited foreign exchange transactions by the private sector. The exchange rate notation in relation to western industrial countries was unified in late 1981 in Hungary as first in the region. This happened by the convergence of commercial and non-commercial rates by depreciation of the non-commercial rate from 1979, when the appreciation trend was stopped. The Hungarian currency was devalued by more than 250 percent between 1981 and 1995 in order to compensate a deterioration of international competitiveness due to inflation differentials to trading partners which increased after the full liberalization of product pricing. However, this bears the threat of inducing a price-exchange rate-spiral, that is, the depreciation generates new inflationary impulses. Thus, the exchange rate policy can be an instrument of influencing inflation expectations, which proved to be an important factor in generating inflation in Hungary.

Current account issues have not been a serious topic because of rigorous import restrictions until the mid-80s. However, the reliance of the Hungarian economy on imports and the indebtedness of the country soon prompted the increase of export revenues to provide the economy with free convertible foreign exchange. After the liberalization of imports and cross-border movements, more attention had to be paid to the current account, though deficits have turned up only since 1993. Foreign investment capital started to flow in to a noticeable extent in 1989 after important regulations to foster domestic private sector activities as well as foreign engagements were implemented. Along with location advantages, this attracted foreign firms to settle in Hungary.

Although inflation is always a monetary phenomenon and is caused by a growth rate of money supply which does not correspond to the real growth rate of the domestic product, there are also some system specific factors which have an influence on the inflation rate. These factors are responsible for the difficulties Hungary has had in achieving price stability. Inflation rates until the late 80s seem to be strongly correlated to loosening of restrictions on

product pricing and administrative price adjustments. The fact that inflation was not fully repressed in Hungary and no serious stability-oriented economic policy was pursued to solve the problems which unavoidably lead to inflation, both made economic agents familiar with price increases and generated expectations for further adjustments. On the other hand, dammed up inflation was reduced so that inflation did not accelerate to extreme levels but peaked at 35 percent in the early transition period.

The application of exchange rate policy for achieving two targets - which are the external equilibrium and price stability - at the same time raises some further considerations. The experience of Hungary showed that on account of inflation differential to trading partners the fixed exchange rate regime was not able to maintain international competitiveness, though the applicability of the simple calculation of real exchange rates on the basis of consumer price indexes can be doubted in light of structural change and productivity improvements. Still, adjustments of the nominal exchange rate had to be carried out. But the price advantage was soon slashed by subsequent price increases calling for further devaluations of the domestic currency. This induced expectations for a devaluation trend of the Hungarian currency both externally and internally.

By 1994, it was clear that the economic policy strategy had to be rethought. Especially the exchange rate regime was to be changed in order to provide a better balance between internal and external issues. The decision for a new regime had to be based on theoretically founded considerations. These will be presented in the following chapter along with the description of the Hungarian authorities' answer to them.

3. Exchange rate regime change within the framework of the stabilization program of 1995

3.1 On the choice of an exchange rate regime for economies in transition

There is extended economic literature about the choice of an exchange rate regime that can meet the requirements which are posed by the specifics of transition. The debate is still not decided and there is further need for research in this area. In this chapter, an attempt will be made to gather opinions and provide a theoretical background to the decision of Hungarian monetary authorities to implement the crawling band regime. Therefore, the main focus will be on the topic of stabilization and less on the question of monetary integration of the economies with the member states of the European Union. The latter will be the subject of Chapter 5, where the possibilities of accession into the Euro area will be discussed. However, there may be some overlapping as the two questions are closely connected to each other.

Successful stabilization requires a strong nominal anchor or target. ‘A nominal anchor is a nominal variable that is fixed or limited to a predetermined path so as to stabilize the price level.’⁴² There are numerous alternatives for targets that can be followed as listed by Mundell (1999).⁴³ They can all be characterized by the targeted variable as ‘standard’. The three main ones will be discussed as follows: the commodity standard which targets the price level, the monetary standard which targets the money supply, that is, one of the definitions of the money supply, and the foreign-currency standard which targets the exchange rate vis-à-vis a particular foreign currency. Fixing one of these variables means letting the others float in accordance with market forces.

⁴² Lipschitz (1997), p. 124.

⁴³ Such drastic measures as currency reform in order to build up the monetary overhang, which is partially a cause for inflation will not be discussed here. This idea is advocated by Pieper (1995).

The case for a monetary standard rests on a close relationship between reserve money and money supply, a stable demand for money, the ability of the central bank to estimate and use the demand-for-money equation and the long-run growth rate, a close correlation between money supply and money income, and on the stability of price level if the money supply grows at the same rate as output. The implication of this target has to face several barriers in Hungary. First, it is impossible for Hungarian authorities to predict money demand which turned out to be quite unstable.⁴⁴ An estimation of the money demand shows significant influence of the output but no significant influence of the interest rate. This can be traced back to the fact that credit raising by firms is quite insensitive to interest rate changes. The reasons may be the expectations of the firms to be able to finance repayments through increasing export revenues. On the other hand, companies have the possibility to raise credits abroad. Via this, monetary policy measures of the central bank can be countervailed. Since 1991 domestic credits to firms have decreased but this is not the result of restrictive monetary policy. The inefficiency of the banking system results in a huge spread between interest rates for deposits and credits which seriously hinders the banks' work as financial intermediaries. Firms therefore seek other alternatives for financing and make it impossible for the central bank to seize control over monetary policy. The money demand of firms is also influenced negatively by its past values and positively by political and economic stability.

Second, in order to be able to follow a monetary target, the relationship between monetary aggregates and inflation has to be clear. However, as shown in the previous chapter, empirical investigation delivered arguments against this and identified the importance of past inflation and of inflation expectations based on this. The impact of nominal wages and broad money changes was relatively small. Third, Hungarian monetary authorities strive to achieve credibility. This requires them to fix a transparent target which can be easily understood by

⁴⁴ See Neményi (1997).

the public. Nevertheless, it is not possible to announce a credible monetary target in a depressed economy with a high level of debt because the costs of monetary tightening could be a further drop in income and increased financing needs resulting from higher interest rates.

Further, the country can choose to establish a commodity standard, that is, to follow an inflation target. The aim of this target is to stabilize one of the definitions of the price level or its growth rate, which can be for example the consumer price index, the wholesale or producer price index, a wage index, as well as an index including the prices of some particularly defined commodities such as tradable goods or gold. Transparency for the public favors the definition of a target based on consumer prices. The inflation target can represent a commitment of the monetary authorities to discipline as well as to reduction and convergence of inflation rates to the Euro-zone.⁴⁵ Inflation targeting aims at switching the price expectations and nominal indexation of prices, wages and interest rates from a backward-looking to forward-looking character. As we have seen earlier, in Hungary, one of the most crucial reasons for inflation inertia is that expectations are built on the basis of the observed path in the past. In order to change this, the central bank could define an inflation target to minimize the following quadratic loss function:

$$(3.1.) \quad L_t = \frac{1}{2} [(\pi_t - \pi^*)^2 + \lambda y_t^2]$$

where

π_t = the actual inflation rate in the period t

π^* = the inflation target

y_t = the output gap

λ = the relative weight on stabilizing of the output gap.

The advantages are that inflation targeting relies on discretionary measures which can be taken each time shocks occur to the domestic economy. Monetary authorities are enabled to

⁴⁵ See Spaventa (1996).

use all available information to determine the best settings for monetary policy.⁴⁶ The volatility of real money demand could also be reduced by lowering the risk of keeping money and therefore lowering the incentive of the population to currency substitution.⁴⁷ Furthermore, the target is highly transparent. The most serious problem with inflation targeting, however, is that it can induce higher instability of income and employment if it is rigorously followed and λ is small. Moreover, it is very difficult for a transition economy to implement this target, because inflation rates do not follow a steady path and are therefore hard to predict. Additionally, there is no generally-accepted way of making inflation forecasts. This increases the probability that the central bank will fail the target and lose credibility.⁴⁸ Additionally, the economies of Central and Eastern European countries underlie a significant continuous structural change which makes the output gap unstable and unpredictable.⁴⁹ Therefore, a Phillips-curve analysis cannot be carried out. According to these considerations, inflation targeting was not suitable for Hungary at this stage. Compared to the Czech Republic who implemented an inflation target after the crisis in May 1997, inflation has a long tradition in Hungary which makes a credible fixing of a target impossible. Poland introduced the inflation target after a crisis in April 2000, when the crawling band system was given up in favor of flotation. Both countries went through a crisis which has shown that the nominal exchange rate cannot be applied as an external restriction to bind the hands of the monetary authorities. This has not occurred in Hungary so far.

⁴⁶ See Mishkin (1999).

⁴⁷ See Orlowski (2000).

⁴⁸ See also Masson (1999). He also stresses the absence of developed domestic financial markets in the CEEC so that financing facilities from the central bank must still be used. This however does not apply for Hungary (see Chapter 4.4.).

⁴⁹ See also Orlowski (2000).

The foreign-currency standard means the fixing of the exchange rate or its rate of change. This requires⁵⁰:

- an appropriate stock of foreign exchange reserves to be able to defend the rate and to gain confidence,
- the choice of a foreign currency or a basket to which the exchange rate of the domestic currency should be pegged,
- a commitment of the central bank to buying and selling the designated currency at the fixed rate,
- that the effect of central bank intervention on international reserves is not sterilized by offsetting central bank operations,
- central bank independence (in particular, with no or with limited financing of budget deficits by the central bank),
- convertibility of the currencies,
- participation or assistance of the partner country and/or International Monetary Fund in order to build up confidence in the early stages of implementation.

Recommendations to solve the problem of price stabilization in transition economies range from quite flexible to the most restrictive alternative, the currency board, but all have in common that they assign this function to the exchange rate policy. It is widely believed that the Central and Eastern European countries do not have the potential to fight inflation by monetary policy instruments. Therefore, a leading foreign currency or gold could serve as a credible nominal anchor for monetary policy. Mundell (1991) suggests a fixation to a European currency. Because of the high uncertainties connected to an inflation or to a monetary target, the Hungarian monetary authorities chose the exchange rate as a nominal anchor for the stabilization of the economy. This, however, raises the question as to whether a

⁵⁰ See Mundell (1999).

fixed exchange rate or any form of exchange rate rigidity is viable for the country under analysis and draws special attention to the choice of an exchange rate regime.

The main requirements which have to be met for a well-functioning fixed exchange rate regime include that the economy corresponds to the criteria for an optimum currency area⁵¹: especially that it is small and open, foreign trade relations are focused on the areas to whose currencies the domestic currency is planned to be pegged, with similarity of inflation rates to these areas, and with adoption of institutional arrangements to assure credibility of the fixed rate commitment such as autonomy of the central bank or a ceiling on the fiscal deficit. If these are not met by the country, it should rather maintain a managed floating system.⁵² However, the criteria for the choice of an exchange rate regime in industrial countries do not strictly apply to transition economies.⁵³ Other criteria have equally to be taken into account. Especially the high rate of adjustment inflation, the uncertainty about the equilibrium real exchange rate and its implementation in nominal terms as well as the level of foreign exchange reserves and the necessity of a stable exchange rate in order to minimize risks when hedging instruments are lacking, play equally an important role.

In the discussion pursued in the previous chapter, we have seen that two main functions can be assigned to exchange rate policy in small open economies like the Central and Eastern European countries. First, the exchange rate can serve as a nominal anchor for domestic prices. Second, it has to achieve and maintain international competitiveness.⁵⁴ These two targets are conflicting, at least in the short term, in countries lacking financial discipline. Central and Eastern European transition economies are similar to developing countries with respect to credibility problems of the governments' commitment to financial discipline

⁵¹ The theory of optimum currency areas will be discussed in detail in Chapter 5.

⁵² See Williamson (1991).

⁵³ See Krzak (1994).

⁵⁴ See also Aghevli et al. (1991).

because of their long history of expansionary policies and high inflation. A permanently fixed exchange rate is only viable if the central budget does not have to rely on inflation tax. Furthermore, these countries are subject to strong balance of payments constraints so that exchange rate policy must aim at protecting competitiveness. A real exchange rate rule with nominal exchange rate adjustments in line with the differential between domestic and foreign inflation rates, however, can be destabilizing and generate hyperinflation because of a lack of nominal anchor for domestic prices in a small open economy. Moreover, the equilibrium real exchange rate is affected by various domestic and external real shocks. Therefore, maintaining a rigid real exchange rate target can even deepen instability. A solution can be to give priority to fighting of inflation in the short term, and in the midterm, after inflation has slowed down, current account considerations could be next on the agenda. Tarafás (1994) recommends focusing economic policy on the stabilization of producer prices instead of consumer prices. This would signal that stabilization of the exchange rate is possible without loss of competitiveness. An agreement on wages would still be needed to prevent elevating unit labor costs, but an upward trend in consumer prices resulting from abolishing subsidies and increasing of value added taxes as well as from realignments of relative prices of services aggravates wage negotiations.

We can also find claims for a currency board arrangement. Kath (1997) and Dornbusch/Giavazzi (1998) see a kind of policy outsourcing in this which is necessary because it is not possible for the governments of the Central and Eastern European countries to put through a stable macroeconomic policy. By the determination of the money supply through Euro coverage, the national economic policies would be subject to external restrictions posed by the European Central Bank. Dornbusch (1994) even argues for the complete abandonment of the national currencies which he names as an extravagance if a country has no appropriate institutional and political setting. Such countries should adopt the Deutsche Mark to emulate their stability. To solve the problem of lack of credibility of the

monetary authorities to pursue a consistent stabilization policy, Bofinger (1990), too, considers the possibility of assigning all monetary responsibilities to the European Central Bank, which in turn leads to the abandonment of the national currency. However, a premature one-sided introduction of the Euro, a 'Euroization' by a candidate country is definitively prohibited by the European Council of Finance Ministers (ECOFIN), as this could imply that it tries to bypass steps required by the Maastricht Treaty and grant the new member different treatment from that given to the initial members of the Economic and Monetary Union. Even the possibility of taking part in the exchange rate mechanism (ERM) is no alternative, because this would threaten other members of the system with inflationary pressure via interventions. Bofinger (1991) advocates the outsourcing of monetary and exchange rate policy to a supranational organization by the constitution of an Eastern European System of Central Banks. This system would, however, bear the same credibility problems as the national central banks do.

Schäfer (1993) rejects a peg because of restricted foreign exchange reserves and credit raising facilities of transition countries. That is also why a currency board would not warrant for sufficient money supply for the economy. Furthermore, the nominal exchange rate flexibility could take over the adjustment to a real exchange rate appreciation, which cannot be prevented because of ongoing structural change. Dornbusch (1994), too, considers the possibility of a stabilization of the nominal exchange rate, which could be achieved by a fixed exchange rate or a currency board arrangement. He also raises the idea of a multiple exchange rate system with fixed rates for current account transactions and flexible rates for capital account transactions, but rejects it because it would require a great deal of bureaucracy and would be hard to put through. As a compromise between international competitiveness and the fight against inflation he recommends the introduction of a crawling peg. This system, which can be supplemented by a fluctuation band (crawling band), is also supported by Davenport (1992) and Kempa (1998) in order to achieve a continuous adjustment toward a

fixation to the ECU or Euro. This arrangement is suitable for stabilizing exchange rate and inflation expectations via signaling a credible inflation target. Kempa (1998) moreover suggests a soft landing into the exchange rate mechanism (ERM2) through a gradually decreased depreciation rate of the central parity. Davenport (1992) points out that a fixation of all central and eastern European currencies to the Euro would reduce exchange rate fluctuation within the region and support economic relations between these countries. The disadvantage of the abandonment of a currency basket which reflects trade relations more closely can be neglected because of strong orientation of the Central and Eastern European countries to the European market and would even vanish with a deepening of their integration into the European Union.

Sachs (1996) recommends a mixed system suited to the special phase of the transition. A fixed exchange rate regime binds the hands of the government via the commitment to a clear monetary target as long as inflation rates are very high. After slowing down inflation, however, the strategy must be changed as the rigid exchange rate would hinder structural change.⁵⁵ If wages in US-Dollars begin to increase not only because of productivity growth but also because of internal inflationary pressure, hanging on to a fixed rate can cause overvaluation of the currency and can deteriorate the international competitiveness. Nevertheless, a free floating exchange rate would even lead to an overvaluation because of high capital inflows, which furthermore raise the threat of a currency crisis in a banking system with low capitalization. Resulting from this consideration, the implementation of a crawling band can again be recommended.

Wyplosz (1997) stresses that it is not possible and even not desirable to attain low inflation rates as long as adjustments in relative prices are not finished and an efficient tax system does not assure revenues of the central budget. Furthermore, the high frequency of real

shocks and the appreciation of the equilibrium real exchange rate requires far-reaching flexibility of the nominal exchange rate in case of downward rigid prices.⁵⁶ Therefore, a participation of the Central and Eastern European countries in the exchange rate mechanism (ERM2) would not be suitable. The implementation of an 'ERM3' would rather be viable with wide fluctuation bands, collectively negotiated adjustments of the central parities, restrictions on capital movements in order to defend the band, and a conditional guarantee declaration of the European Central Bank to give support. Capital controls are further strongly advocated by Cirera/Hölscher (2001) in order to reduce the risk of a currency crisis and exchange rate misalignments. On the other hand, this would mean a step back on the way to liberalization of capital flows ongoing in Central and Eastern European countries, particularly in Hungary in line with membership of the Organisation for Reconstruction and Development (OECD) as well as aspirations to European Union membership and would also be very difficult to justify.

Masson (1999) rejects the possibility of an early peg to the Euro and points out that asymmetric shocks, trend real appreciation and the vulnerability of transition economies to speculation require a more flexible exchange rate regime, which allows for nominal exchange rate adjustments. However, Kopits (1999) concludes on the basis of the criteria for an optimum currency area that the advantages of a monetary integration of the accession candidates with the European Union outweigh the disadvantages. Therefore, they should strive for a participation in the ERM2 and later in the Economic and Monetary Union. To achieve this, they should move to a fixed rate vis-à-vis the Euro which means replacing the currency basket by the Euro and widening the band. This could happen when the credibility of the economic policy is established by keeping the nominal exchange rate within a narrow

⁵⁵ See also Borensztein/Masson (1993). They also point out that a stable exchange rate provides an orientation value for the domestic prices of tradable goods.

⁵⁶ See also Ritter (2000).

band and by reduction of the inflation rates. Widening of the band would help averting potential for speculation as well as give room for the central bank to follow an inflation target in order to attaining convergence of the inflation and interest rates. Unfortunately, Kopits does not explain the strategy which would lead to confidence in economic policy.

While exchange rate policy has a crucial part in stabilization programs, Ohr (1996) and Theurl (1997) point out that the success of the transition and stabilization process does not merely rely on the choice of the exchange rate regime. The most important prerequisite is a consistency of exchange rate policy with monetary, fiscal, and income policies. Restrictive wage policy especially can prevent a real wage increase by a rate exceeding the productivity growth rate. Otherwise, competitiveness will deteriorate on the costs side, even if the advantage of the Central and Eastern European countries in unit labor costs remained for years.⁵⁷

It is remarkable that most recommendations about the exchange rate policy strategy in the European transition economies include a quite restricted exchange rate policy. There are further reasons for this additionally to its function as a target for monetary policy. First, it is desired to stabilize exchange rates or at least make it predictable in order to stabilize trade flows and increase inward foreign direct investment, because there is little possibility to hedge against exchange rate fluctuations on the quite underdeveloped financial markets of the Central and Eastern European countries. Second, there is a fear of large, speculative, short-term capital inflows induced by high yields expectations because of high interest rates in the Central and Eastern European countries, but they can easily be withdrawn ('hot money') in the case that the bad news spreads. While the inflows can lead to a substantial misalignment of the exchange rate and deterioration of the international competitiveness by overvaluation of the currency, they trigger a currency crises if they are withdrawn. Lastly, a fixed exchange

⁵⁷ See Havlik (1996).

rate can provide a nominal anchor for stabilization policy in case monetary policy is not credible and there is uncertainty about transmission mechanisms of the monetary policy measures. The exchange rate peg can serve as a tool of monetary policy and allows the central bank to borrow credibility from a foreign monetary authority. However, we have to keep in mind that in case of high inflation differentials to trading partners this cannot hold for a very long time period. Sooner or later, an exchange rate adjustment cannot be eluded. This, again, can destroy earlier achievements in enhancing credibility of the monetary authorities and can release speculations about the next date of realignment. In the worst case, the exchange rate adjustment will be anticipated by economic agents from the beginning, so that monetary authorities are not able to announce a credible fixed rate.⁵⁸ ‘The major flaw with fixed exchange rates is that credibility usually comes before – not after – policy making has been carried out.’⁵⁹ The exchange rate will then lose its aptitude as a nominal anchor for monetary policy. The case of Hungary until 1994 and also of the Czech Republic clearly shows this development. A crisis of the Czech Koruna in May 1997 forced the authorities to give up the previous strategy of fixed exchange rates. The Koruna was from that time allowed to float but still there were interventions to stabilize the rate (managed floatation).

The transition process clearly necessitates an exchange rate policy strategy which takes all special characteristics of the economic transition into account.⁶⁰ First, it is nearly impossible to fix the equilibrium real exchange rate because of the restructuring process to which the economy is underlying. Second, the inflation is fueled by several factors which are transition specific and the impact of which takes a long time to eliminate. These factors include for example the adjustment of relative prices to the developed countries which results from the adjustment of prices to the world market prices (for example energy and raw

⁵⁸ See also De Grauwe (1997).

⁵⁹ Colombatto/Macey (1996), p.197.

⁶⁰ See also Szapáry/Jakab (1998).

materials), raising of mark-ups for firms, liberalization of foreign trade, abolishment of subsidies, consolidation of commercial banks, and reform of the pension and healthcare systems. The inflation differential vis-à-vis the trading partners and the deterioration of the international competitiveness following from this transitional inflation makes it impossible to fix the nominal exchange rate in order to reduce inflation rates credibly. The result would merely be that speculations about the time of the next adjustment would arise as experiences of Hungary during 1989-94 have shown. However, a free or managed floating of the exchange rate would cause incalculable volatility of the real exchange rate and worsen the position of the domestic firms lacking instruments to hedge against the risks. It seems necessary to find a strategy for achieving macroeconomic stability which not only considers the characteristics of the transition economies but can combine the advantages of the two extremes: a permanent peg and completely flexible exchange rates. However, as we have seen with the example of the Hungarian economy until 1994, an adjustable peg, that is, the system of occasional changes of temporarily rigid exchange rates seems to be the worst solution: 'it provides neither the stability of expectations that a genuinely rigid and stable exchange rate could provide in a world of unrestricted trade and willingness and ability to adjust the internal price structure to external conditions nor the continuous sensitivity of a flexible exchange rate'.⁶¹ Because of the problems which may occur in a fixed or a flexible exchange rate regime, the Hungarian monetary authorities have tried, via implementing a crawling band system since March 1995, to combine the advantages of using the exchange rate as a nominal anchor and the maintenance of international competitiveness despite existing inflation differentials to trading partners.

⁶¹ Friedman (1953), p. 164.

3.2 Aims and characteristics of the stabilization program of 1995

The economic policy measurements introduced in 1995 were first of all aimed at prevention, because Hungary was regarded by the international financial press as the next candidate for a financial crisis after Mexico in 1994. The reason for this lay in the above described developments of the macroeconomic indicators, especially of the current account balance. Although it was seen by the authorities in late 1993 that measures had to be taken to improve the external position of the country, the proposal which was made by the Minister of Finance, László Békesi in 1994 to reduce real wages was not considered seriously. Békesi claimed for a real wage drop by 5 to 7 percent, but, unfortunately, he did not stress that this was to serve a correction of the real exchange rate distortion and restoring international competitiveness, that is, expansion of production. This communication problem hindered the attainment of a social consensus on the subject and the chance to act in time was gone.⁶² In 1995, the reputation of the Hungarian economic policy had to be improved by a whole set of measures which were bundled in a stabilization program elaborated by Lajos Bokros, the successor of Békesi.

With this stabilization program the government tried to apply simultaneous instruments in order to circumvent an indiscriminate contraction of aggregate demand to restore external equilibrium so that production would not suffer a serious drop. The measures were targeted at a restructuring of aggregate demand and production.⁶³ Although the central role of stabilization was given to the exchange rate policy, it was supported by a temporary import surcharge of 8 percent, by the reduction of the expenditures of the state budget and by administrative restrictions on nominal wages. The consolidation of the budget was needed to reduce the heavy burden of debt financing, because with a relatively high ratio of public

⁶² See also Obláth (1998).

⁶³ See also Kornai (1996).

activity⁶⁴ this could not be done by increasing revenues. If public expenditure drops, financing need and interest rates can be reduced resulting in a crowding-in of private investment as financial resources are set free. The foreign debt position will also be improved if less credit is raised on international financial markets. Reduction of state activity also included mass privatization of state owned companies which started at the same time.

The income policy of administrative nominal wage restrictions was aimed at hindering full compensation of inflation in wage negotiations so that real wages dropped. On the one hand, this was made necessary by a serious breakdown in production and employment during the early transition phase. On the other hand, consumption had also to be pushed back. In sum, the combined effect of these measures was to be the restructuring of aggregate demand towards more private investment and exports as well as towards less private and state consumption. Furthermore, the stabilization package included a thorough reform of the healthcare and pension systems as well as correction of energy prices towards world market prices. The description of these measures goes beyond the scope of this study. An analysis of the fiscal policy will be carried out in Chapter 4.4. from the perspective of its contribution to the performance of the monetary and exchange rate policies.

The exchange rate policy itself, which is the main subject of the present analysis, pursued several targets. First, it aimed at stemming inflation and devaluation expectations and establishing the credibility of the economic policy while maintaining international competitiveness. Second, it intended to ease the interest payment burden via financing the deficit through low interest rate long-term government loans. It is clear that this cannot be achieved without stemming inflation expectations. This target is therefore highly dependent from achieving the first target. Third, the exchange rate policy tried to serve for facilitating the determination of a monetary target. During the transition this is nearly impossible because

⁶⁴ 55 percent of GDP in 1993, subsequently reduced to 39 percent in 1997.

of the difficulties of forecasting the money demand, but the announcement of an exchange rate target makes this widely superfluous. Fourth, it was aimed to support the accession to the European Union via convergence to a peg to European currencies. It is difficult to follow all these targets at the same time. Therefore, the priority was given to inflation reduction as the ultimate goal of monetary policy in the long run. Hereby, the nominal exchange rate constituted an intermediate target.⁶⁵ However, the establishment of a crawling band exchange rate regime, which was introduced in March 1995, provides a possibility of keeping the balance between disinflation and competitiveness issues.

3.3 Theory and practice of the crawling band system

The crawling band system combines several exchange rate systems aiming at solving the inconsistency between fighting inflation via fixed exchange rates and maintaining international competitiveness. The central parity is continuously devalued in small pre-announced steps so that the development of the exchange rate can be forecasted quite properly, similar to a system of fixed exchange rates. However, a fluctuation of the exchange rate around the central parity is allowed for, and the central bank commits itself only to intervene on the edges of the band.

The reason for introducing this regime lies always in the attempt to stabilize the economy while a fixing of the exchange rate is not suitable because of high inflation rates. In this case, the crawling band enables the application of the exchange rate as a nominal anchor for fighting inflation, an increase of efficiency in forecasting of inflation rates, a stabilizing of the real exchange rate, and solving of balance of payments problems simultaneously to maintaining accountability of the exchange rate development and to hindering a permanent misalignment of the nominal rate from its fundamental value, resulting from capital

⁶⁵ Halpern/Neményi (1999).

movements by interventions of the central bank at the edges.⁶⁶ Of course, not all of these targets can be achieved concurrently with a single exchange rate regime. The implementation depends on the main focus of the specific country. In Hungary the ‘twin-deficit’ problem, that is, increasing current account and budget deficits played the major role.⁶⁷

The crawling band system is characterized by its parameters, which include the initial central parity, the rate of crawl, the currency or the composition of the basket to which to peg the central parity, and the optimal width of the band. The determination of these parameters must be based on very careful considerations, because a single deviation from the pre-announced course would destroy the confidence in the pursued economic policy. In the following section, the Hungarian crawling band system will be outlined leaning on Williamson (1996) who provides a manual for the choice of the parameters.

(a) Anchor currency or basket

The first step is to choose a currency or a basket of currencies to which the central parity should be pegged. The major role in this decision is devoted to the structure of the trade relations of the specific country. It depends on whether they are focused on one single currency area or spread over several currency areas. Fifty percent of trade flows pass for a ‘rule of thumb’. This means the actual share of the currency area in trade flows and not the share of the pertaining currency in settling trade relations, because experience shows that even if contracts are invoiced in a particular currency, prices in the currency of denomination tend to be adjusted as soon as the cross exchange rate of the currency of the third country is changed vis-à-vis the currency of denomination. Therefore, if a dominant trade partner or a dominant currency in a dominant currency area can be identified, the central parity should be

⁶⁶ See also Darvas (1998).

pegged to this currency. In the case that the trade relations of the country are more widespread, the choice of a basket consisting of 3 to 5 currencies in proportion to the weights in trade relations can be supposed. In addition to this, it would be reasonable for countries which are close competitors to each other on their main sales markets to unify their exchange rate determination, choosing the same currency basket (taking the weight in trade relations of all of them together into consideration) to peg their currencies to. This could be proposed to the accession candidates to the European Union, but it is not applied in practice.

Additionally to the trade flow criterion, the currency which is used in interventions to defend the exchange rate and constitutes the international reserves should be an anchor currency. In other cases, the US Dollar can be applied, if the country is not bound to some other country by financial flows such as international borrowing.

Following this consideration, because of strong orientation of the trade flows on the European Union (60-70 percent), Hungary should choose the German Mark (or the Euro since its introduction in 1999) as an anchor currency. Jakab (1998) proposes the reduction of the number of currencies in the basket in order to increase the transparency of the exchange rate policy measures of the central bank. The optimal composition of the basket results from the condition which minimizes the difference between the indexes of the nominal effective exchange rate and the exchange rate vis-à-vis the currency basket. The optimal share of the Euro (or ECU) in the basket lies between 90 and 100 percent depending on the length of the acquisition period. The calculation is based on weights of the ECU for estimating the Euro, and therefore they are systematically underestimated. In the long term Jakab suggests the choice of the Euro as an anchor currency. This also demonstrates the commitment to a convergence to the ERM2 in the midterm and to the EMU in the long term.

⁶⁷ See Table 2.3.

The composition of the basket to which the Hungarian currency was pegged was changed several times. The major criterion of the determination was the share of the currencies to invoice trade flows. The interventions were carried out exclusively in US Dollars, but since 2000 as the basket was replaced by the Euro, the Euro gained importance in these transactions. The composition of the basket is shown in Table 3.1.

Table 3.1.: Composition of the basket since 1990

From	To	Composition
Mar 90	Mar 91	11 currencies *
Mar 91	Dec 91	9 currencies *
Dec 91	Aug 93	50% USD+50% ECU
Aug 93	May 94	50% USD+50% DEM
May 94	Dec 96	30% USD+70% ECU
Jan 97	Dec 98	30% USD+70% DEM
Jan 99	Dec 99	30% USD+70% EUR
Jan 00	..	100 % EUR

*) determined by the share of the particular currency in Hungarian foreign trade

Source: National Bank of Hungary

The denomination in foreign trade and the share of the particular currency area can be seen in Tables 3.2. and 3.3.

Table 3.2.: Currency denomination in Hungarian foreign trade in percent of total

	Exports							
	1992	1993	1994	1995	1996	1997	1998	1999
USD	37.5	40.3	34.3	31	27.4	28.7	28.5	21.2
DEM	33	33.7	37.2	41	43.8	45.7	52.4	48.4
ATS	8.8	8.1	9	10.2	9.9	8.1	6.6	6.3
ITL	7.5	5.7	5.7	5	5.4	4.1	3.7	3.8
FRF	3.1	3.1	3.3	3.4	3.5	2.6	2.4	2.1
EUR	52.4	50.6	55.2	59.6	62.6	60.5	65.1	60.6
JPY	0.3	0.4	0.4	0.6	0.5	0.1	0.1	2.1
GBP	2.1	1.8	2.4	5.3	2.5	2.1	1.7	0.1
Total	92.3	93.1	92.3	96.5	93	91.4	95.4	84

	Imports							
	1992	1993	1994	1995	1996	1997	1998	1999
USD	33.8	40.1	34.3	33.1	32.9	29.4	27	22.5
DEM	31.8	29.8	33.2	35.4	36.2	39.3	44.5	42
ATS	14.8	12.1	13.1	11.9	11.4	10.3	9.2	7.1
ITL	4.5	4.2	4.8	5.1	5.2	4.4	4.4	3.9
FRF	2.2	2.2	2.4	2.8	3	3.0	3.5	2.8
EUR	53.3	48.3	53.5	55.2	55.8	57	61.6	55.8
JPY	1.2	1.2	1	0.6	0.4	1.2	0.8	1.6
GBP	2.2	1.7	1.9	2.1	2.3	2.1	1.9	0.6
Total	90.5	91.3	90.7	91	91.4	89.7	91.3	80.5

Source: National Bank of Hungary

Table 3.3.: Shares in Hungarian foreign trade in percent of total

	Exports			Imports		
	1997	1998	1999	1997	1998	1999
EU	71.22	72.95	76.20	62.76	64.11	64.40
USA	3.24	4.54	n.a.	3.76	3.86	n.a

n.a. = not available

Source: National Bank of Hungary

(b) Determination of the central parity

The most important decision in the constitution of the crawling band regime is the determination of the central parity of the currency. In this context, two components have to be set: the initial central parity and the rate of crawl. First, it has to be considered whether the current exchange rate could be the initial central parity. But this poses the next question which is the one of searching for the fundamental equilibrium exchange rate. The present state of knowledge does not provide a general rule but it seems plausible to observe the current account deficit which must not exceed a sustainable level. If the deficit were too high, this would undoubtedly lead to an indebtedness of the country and may be an important cause of currency crises.

The level of the current account deficit can be regarded as sustainable if the growth rate of the debt (D) does not exceed the growth rate of nominal GDP (Y) in the long term. From this condition it follows that the current account deficit (ΔD) as a percent of GDP must not surmount the growth rate of the nominal GDP multiplied by a sustainable debt ratio, which can be quantified by 40 percent of GDP as a 'rule of thumb'. To put it into an equation we get:

$$(3.2.) \quad \frac{\Delta Y}{Y} = \frac{\Delta D}{D}$$

$$(3.3.) \quad \frac{\Delta D}{Y} = \frac{\Delta Y}{Y} \cdot \frac{D}{Y} \quad \text{with } \frac{D}{Y} \leq 0.4$$

Nonetheless, not only the absolute value of the deficit is of importance, but it is crucial to establish how it is financed and what it stem from, respectively. The sustainable deficit may lie higher if there is foreign direct investment to cover it or the deficit arises from imports of investment goods and not from imports of consumer goods.

The initial central parity is calculated on the basis of the above considerations, i.e. the real effective exchange rate must be determined in a way that it corresponds to the average

level of the deficit in the midterm. This real exchange rate will then be translated to a parity vis-à-vis the anchor currency or currency basket. An initial devaluation of the currency should be carried out in order to revise past losses in international competitiveness. Future continuous devaluation will serve for maintaining competitiveness.

The main shortcoming of this method, which must be pointed out, is that the level of sustainable current account deficit increases if inflation accelerates and there is nominal GDP growth without growth in real terms. However, the concentration on the real growth rate could be too restrictive and may hinder imports of investment goods needed for restructuring the economy and substantiating future economic growth. The restriction of the current account deficit to 40 percent of the nominal GDP growth includes already a precautionary component to avoid excessive deficits.

Table 3.4. shows the corresponding values for Hungary between 1992 and 1994. It makes clear that during the last two years before the introduction of the crawling band, the current account deficit failed the sustainability criterion as it exceeded the safe level and it could not be financed by inward foreign direct investment. Therefore, an immediate depreciation of the currency seemed necessary and complying to this the currency was devalued by 9 percent.

Table 3.4.: Current account balances

Year	1992	1993	1994
Current account balance as % of GDP	0.87	-8.96	-9.42
Sustainable current account deficit as % of GDP	-7.11	-8.23	-9.20
Current account deficit as % of FDI	...	147.71	341.27

Source: National Bank of Hungary, Central Statistical Office; own calculations

(c) The rate of crawl

The next step is to set the most important parameter of the crawling band regime, that is, the rate of crawl. A pre-announced continuous devaluation of the currency is strongly recommended if the inflation rate of the country exceeds the inflation rate of the trade partners by more than the productivity growth rate during the catching-up process. Otherwise, an irrevocable fixing of the exchange rate should be carried out. The rate of crawl can be calculated by the following formula:

$$\begin{aligned} & \text{Inflation target} \\ & - \text{expected foreign inflation rate} \\ & - \text{estimated productivity growth differential} \\ & \text{increase of the exchange rate during the next year} \end{aligned}$$

Furthermore, it is important to consider the question how the central bank should react in case of real shocks. If the rate of crawl had to be adjusted upward, the population would get the signal that the inflation rate would increase in future. This could destroy previous achievements in stemming inflation expectations, but provide for room to increase the interest rate in order to weaken the domestic demand. Nonetheless, under no circumstances should this be postponed, and a moderate adjustment should be made possible by a prompt reaction. If the inflation rate increases the target or the forecast value, a less compatible exchange rate could be respected, as long as the position of the balance of payments allows for this. Otherwise the rate of crawl must again be adjusted and there have to be other instruments to reduce the inflation rate.

Differently from the above recommendations, several other methods were applied in international practice to fix the rate of crawl.⁶⁸ In some countries the calculations, which were based on the inflation rate, the current account balance, the development of the exports or the

⁶⁸ See Darvas (1998).

level of the foreign exchange reserves, were not published or carried out frequently. In other countries, the currency was continuously devalued by a pre-announced rate. This has been the case in Hungary since 1995. According to official statements, the rate of crawl was calculated by a formula similar to the above one. The difference is that the Hungarian monetary policy did not fix an inflation target. The determination of the rate of crawl was based on inflation forecasts in a way that the devaluation rate over the year did not compensate the inflation differential. Higher productivity growth in Hungary during the catching-up progress allows for and is forced by this strategy.

To be able to make a statement about this it is important to pursue some considerations about differentials in productivity growth followed by an appreciation of the real equilibrium exchange rate. These are explained by a stronger productivity growth in the production of tradable goods than in the production of non-tradable goods, the so-called Balassa-Samuelson effect. Balassa (1964) and Samuelson (1964) explained that during the catch-up progress, productivity increases in the tradable sector, which is mainly characterized by the manufacturing sector, resulting from restructuring and foreign direct investment accompanied by know-how transfer. The zero profit requirement indicates real wage increases in the tradable sector. Assuming homogeneity of work force, real wages in the non-tradable sector, such as services, must also be higher. Prices of tradable goods are tied to world market prices because of international competition. In absence of productivity growth or with a slower rate of growth in the non-tradable sector, prices of these goods must rise because of higher production costs. Then inflation results from the realignment of the relative prices of non-tradable goods. Following from this, the real equilibrium exchange rate will appreciate.

The average price level is composed of the prices of tradable and non-tradable goods:

$$(3.4.) \quad P = (P^T)^\alpha (P^N)^{1-\alpha}$$

In a competitive economic environment profits will be zero so that we get, assuming Cobb-Douglas production functions:

$$(3.5.) \quad Q^T = \frac{Y^T}{L^T} = \frac{W}{P^T}$$

$$(3.6.) \quad Q^N = \frac{Y^N}{L^N} = \frac{W}{P^N}$$

where

P = price level

T, N = tradable and non-tradable goods

α = share of tradable goods

Y = production in a sector

L = employment

W = wages

Q = labor productivity

The labor productivity ratio is expressed by the price ratio between tradable and non-tradable goods:

$$(3.7.) \quad \frac{Q^T}{Q^N} = \frac{W/P^T}{W/P^N} = \frac{P^N}{P^T}$$

$$(3.8.) \quad P^N = P^T \frac{Q^T}{Q^N}$$

Equation (3.8.) shows that if labor productivity growth in the tradable sector is higher than in the non-tradable sector, the ratio will increase and the relative prices of the non-tradable goods will rise.

Putting equation (3.7.) into equation (3.4.) we get:

$$(3.9.) \quad P = (P^T)^\alpha (P^N)^{1-\alpha} \left(\frac{Q^T}{Q^N} \right)^{1-\alpha} = P^T \left(\frac{Q^T}{Q^N} \right)^{1-\alpha}$$

The average foreign price level is composed as follows:

$$(3.10.) \quad P_f = (P_f^T)^\beta (P_f^N)^{1-\beta} = P_f^T \left(\frac{Q^T}{Q^N} \right)^{1-\beta}$$

where

f = foreign

β = share of tradable goods foreign

The real exchange rate is defined by:

$$(3.11.) \quad RER = \frac{P}{eP_f} = \frac{(P^T)^\alpha (P^N)^{1-\alpha}}{e(P_f^T)^\beta (P_f^N)^{1-\beta}}$$

$$(3.12.) \quad RER = \frac{P^T \left(\frac{Q^T}{Q^N} \right)^{1-\alpha}}{eP_f^T \left(\frac{Q^T}{Q^N} \right)^{1-\beta}}$$

where

RER = real (effective) exchange rate

e = nominal (effective) exchange rate of the foreign currency (price notation)

Equation (3.12.) shows that if the prices of tradable goods are equalized internationally, that is, purchasing power parity holds for tradable goods, the real exchange rate is driven by the productivity growth differential.

According to empirical work on estimating the extent of productivity growth in Hungary, which was carried out well after the implementation of the new exchange rate regime, it is clear that there is a positive correlation between the tradeables productivity and appreciation in the real effective exchange rate.⁶⁹ Quite differently, Coricelli/Jazbec (2001) split the sources of equilibrium real exchange rate adjustment to structural change and resource reallocation during the early phase of transition and to the Balassa-Samuelson effect in the later stages of transition. The estimates show various results. Official statements of the National Bank of Hungary claim that the average growth rate of labor productivity in the manufacturing sector amounts to 14 percent. However, Obláth (1997) calculates an average rate of 1.5 percent from 1997 on. Based on this result, the equilibrium real exchange rate would appreciate by 2 percent per year, and real wages could grow even faster without loss of

international competitiveness. Simon/Kovács (1998) base their analysis on the decomposition of the real exchange rate to a tradable component which indicates the relative price of tradables in a common currency, to a non-tradable component which represents the relative price of non-tradables to tradables home versus foreign, and to a component which results from the difference in weights. Rearranging equation (3.11.) follows:⁷⁰

$$(3.13.) \quad RER = \frac{P^T}{eP_f^T} \cdot \left[\frac{P^N / P^T}{P_f^N / P_f^T} \right]^{1-\alpha} \cdot \left[\frac{P_f^N}{P_f^T} \right]^{\beta-\alpha}$$

The results of their calculations for a data set between 1991 and 1996 state that the Balassa-Samuelson effect holds for Hungary. While the tradable component of the estimated equation merely fluctuated following nominal exchange rate shocks, the non-tradable component shows the increase in relative prices of non-tradables by an average of 4.7 percent per year compared to trade partners which can be fully explained by changes in relative productivity. The yearly growth rate of GDP/worker amounted to 5 percent over the period under examination. This gives room for a real appreciation of 3.3 percent per year according to the criterion of catching-up to the European Union in terms of GDP/worker now leveling to 32 percent and in terms of exchange rate leveling to 52 percent of the European Union measured by a consumption basket. Égert (2002a) estimated an impact of the Balassa-Samuelson effect on the inflation differential vis-à-vis Germany by merely 1.3 percent between January 1990 and February 1995. The productivity growth differential accelerated after May 1995 to over 5 percent with an effect by about 4.8 percent on the inflation differential between May 1995 and July 2000. Égert (2002b) uses quarterly data on the sample period of 1991:Q1 to 2001:Q2. The results of the estimation certify inflation rates associated with the Balassa-Samuelson effect as high as 4.3 to 4.6 percent in recent years, that

⁶⁹ See for example De Broeck/Sløk (2001).

⁷⁰
$$RER = \frac{P^T}{eP_f^T} \cdot \frac{(P^T)^{\alpha-1} (P^N)^{1-\alpha}}{(P_f^T)^{\beta-1} (P_f^N)^{1-\beta}} = \frac{P^T}{eP_f^T} \cdot \frac{(P^N / P^T)^{1-\alpha}}{(P_f^N / P_f^T)^{1-\beta}}$$

is 1996 to 2001, but the effect amounted to merely 1.2 to 2 percent in the first part of the sample. The higher values belong to individual estimates, the lower ones resulting from panel cointegration estimates. However, it is interesting to mention that real exchange rate developments do not prove to be driven by productivity differentials if the United States is used as a benchmark country as is the case in comparison with Germany.

After these considerations we can compare the data of inflation rates measured by CPI and exchange rate adjustment vis-à-vis the currency basket data over the years 1989 to 2000. In Table 3.5. we can see that the differences between the inflation rates and the exchange rate adjustments vis-à-vis the currency basket resulted merely in a fluctuation of the real effective exchange rate and no real devaluation or revaluation trend is observable.

Table 3.5.: Inflation (CPI), exchange rate adjustments vis-à-vis the currency basket and real effective exchange rate (RER)

	CPI (%)	Exchange rate adjustments (%)	RER (previous year=100)
1989	17.0	12.0	99.1
1990	28.9	16.4	99.8
1991	35.0	16.4	105.5
1992	23.0	7.9	99.6
1993	22.5	10.8	103.8
1994	18.8	15.6	95.3
1995	28.2	26.8	94.1
1996	23.6	19.0	103.8
1997	18.3	15.1	105.4
1998	14.3	13.8	96.3
1999	10.0	7.4	100.3
2000	9.8	4.5	n.a.
2001	9.2	-7.0	n.a.

n.a. = not available

Source: National Bank of Hungary, Central Statistical Office

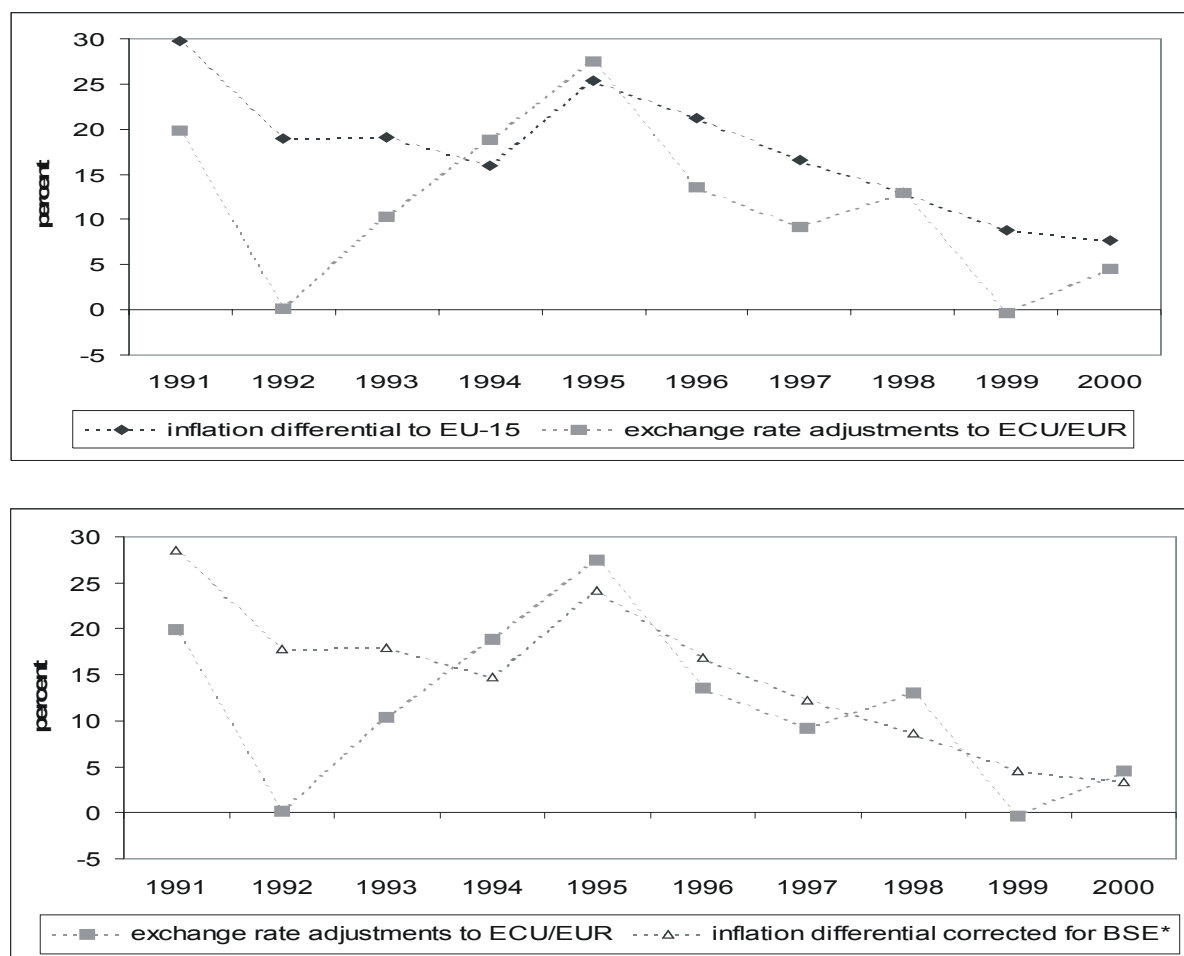
If the crawling band is applied to fight inflation, it is important to slow down the rate of devaluation as soon as inflation begins to fall in order to stem further inflation expectations. In Hungary this was carried out at irregular intervals as inflation over the preceding period was clear to slow down. Since the implementation of the crawling band regime, there has been no upward adjustment of the devaluation rate, which means that no serious real shocks have been identified. Table 3.6. shows the monthly rates of crawl since the introduction of the crawling band regime. It is questionable whether it was really warranted by the inflation data or was too quick with moderate but still two-digit inflation. The crawling band was nonetheless eliminated by October 2001 and the central parity is now fixed to the Euro. This decision leads to de facto but not de jure participation in the ERM2. The inflation rate has had to be kept within borders by the definition of an inflation target since Summer 2001.

Table 3.6.: The monthly rates of crawl

From	To	Monthly rate of crawl (in %)
1995-03-16	1995-06-28	1.9
1995-06-29	1995-12-31	1.3
1996-01-01	1997-03-31	1.2
1997-04-01	1997-08-14	1.1
1997-08-15	1997-12-31	1.0
1998-01-01	1998-06-14	0.9
1998-06-15	1998-09-30	0.8
1998-10-01	1998-12-31	0.7
1999-01-01	1999-06-30	0.6
1999-07-01	1999-09-30	0.5
1999-10-01	2000-03-31	0.4
2000-04-01	2001-03-31	0.3
2001-04-01	2001-09-30	0.2
2001-10-01		0.0

Source: National Bank of Hungary

The first part of Figure 3.7. shows the development of ECU/Euro rates vis-à-vis the Forint and the differential of the Hungarian inflation to the European Union average between 1991 and 2000. It makes clear that there has been a convergence in inflation to the most important trading partner, the EU, since 1995. Adjustments in the bilateral exchange rate were lower than the inflation differential during the whole period with the exception of 1994 and 1995. Fluctuations in the devaluation rate in the last three years result from the revaluation of the ECU to the US Dollar in the run-up to Economic and Monetary Union and the strong devaluation of the Euro in 1999 as well as the abandonment of the currency basket in favor of the Euro in 2000. The second part of the figure takes the effect of the productivity growth in Hungary into consideration using one of the most cautious estimations about the impact of the Balassa-Samuelson effect on the inflation rate [panel estimation, Égert (2002b)]. This calculation provides a more differentiated picture about the developments of the external value of the Hungarian currency vis-à-vis the common European currency and the excess inflation above European average inflation and productivity differential. We can recognize that the exchange rate adjustments from 1994 to 2000 were sufficient to countervail the inflation differential. This implies that there does not have to be any serious concern about competitiveness in relation with the most important trading partner of the country on the basis of consumer price inflation during this period. Admittedly, the productivity differential is measured compared to Germany, a core country within the European Union to which catch-up progress is still going on at the periphery. Thus, this effect is overestimated. Additionally, Germany usually has a lower than average inflation rate within the European Union, so that a higher inflation differential should be considered. However, the external value of the common European currency is determined by the economic situation of all members, which is to a certain extent represented by the average inflation rate.

Figure 3.7.: Inflation differential and exchange rate adjustments vis-à-vis the European Union

* BSE=Balassa-Samuelson effect.

Source: National Bank of Hungary, Eurostat, Égert (2002b); own calculations.

(d) The optimum band width

The optimum band width within which the exchange rate is allowed to fluctuate is determined by the characteristics and extent of the asymmetric shocks which affect the economy⁷¹ on the one hand. In the case of prevalent monetary shocks, the band should be kept narrow to provide the economy with the necessary money supply or to detract the excess money supply from the economy by interventions aiming at stabilizing the nominal exchange rate. In case of prevalent real shocks such as demand shocks which are not permanent, an exchange rate

realignment must occur to settle excess demand or supply by foreign trade flows. Therefore, the exchange rate must be allowed to fluctuate within a wide band. However, if a real shock has a permanent effect on the economy, the central parity has to be adjusted to the new situation otherwise it would come to a persistent deviation of the actual exchange rate from this parity.

On the other hand, the efforts of the central bank to pursue an autonomous monetary policy will be affected by a narrow band as it commits itself to intervene as soon as the exchange rate threatens to quit the band with corresponding impact on the money supply. In general, a fluctuation band of $\pm 7-10$ percent provides the central bank enough room for maneuver but is narrow enough to bind its hands by restrictions on exchange rate fluctuation, because this band is not wide enough to characterize the system as an essentially flexible regime.

The band is declared as wide if the extent of permitted fluctuations to one edge is higher than the rate of crawl. Within the framework of the Hungarian crawling band system, the actual exchange rate is allowed to fluctuate by ± 2.25 percent around the central parity which can be described as a narrow band. The reason for choosing such a narrow band lies in the difficulties for the monetary authorities to estimate and forecast money demand as mentioned earlier. The aim of the central bank was to increase the confidence in the monetary policy by a strong commitment to keep the exchange rate within the band. With increased confidence the band may be widened, as happened in 2001. Table 3.8. presents the fluctuation bands since 1992.

⁷¹ See Sutherland (1995).

Table 3.8.: Fluctuation bands

Starting date	Band width
1st July 1992	± 0.3 percent
1st June 1994	± 0.5 percent
5th August 1994	± 1.25 percent
22nd December 1994	± 2.25 percent
4th May 2001	± 15 percent

Source: National Bank of Hungary

The country is undergoing a transition process which is coupled with permanent real shocks. Restructuring the economy and increasing productivity raise persistent and continuous changes in supply so that the adjustments in the real equilibrium exchange rates must be respected permanently with no effect on the optimum band width. The nominal exchange rate must follow this development, but inflation rates have to be taken into consideration.

In order to increase the credibility of the band it has to be symmetric.⁷² In this case, the probability of exchange rate fluctuations in both directions, i.e. re- or devaluation, will be the same. This requirement is widely regarded by monetary authorities worldwide. The Hungarian crawling band system was also set up in this way.

3.4 Summary

In this chapter an overview of the criteria for the choice of an exchange rate regime for transition economies was given. We have seen that the main difficulty in this decision is that during the 90s the exchange rate had to meet at least two targets at the same time: the stabilization of prices and the current account equilibrium. These two targets are conflicting at least in the short term in countries lacking financial discipline. Proposals which were made during the early 90s focused mainly on a certain degree of exchange rate fixing to or even a

Currency Board based on a stable foreign currency such as the US Dollar, the Deutsche Mark or the ECU/Euro. A floating rate regime was widely rejected because of the vulnerability of the economies against international capital flows.

After it became clear that a fixed exchange rate regime cannot meet the requirements of the stabilization of prices and external equilibrium and the phenomenon of a ‘twin-deficit’ became more and more striking, the Hungarian authorities introduced a stabilization program in 1995. Contrary to the recommendations which were presented in the economic literature at that time, they chose to implement a crawling band exchange rate system in order to combine the advantages of the fixed and flexible exchange rate regimes.

The third part of this chapter introduced the criteria for the determination of the parameters of a crawling band regime, that is, the initial central parity, the rate of crawl, the width of the fluctuation band and the currency or the basket of currencies to which the central parity should be pegged. The configuration of the Hungarian system was confronted with these criteria and shown to fit well to the guidelines. This substantiates the successful functioning of the system, which will be revised according to the degree to which it meets its targets in the following chapter.

⁷² See also Kopits (1995).

4. The operation of the crawling band regime in Hungary

4.1 Overview of general economic developments

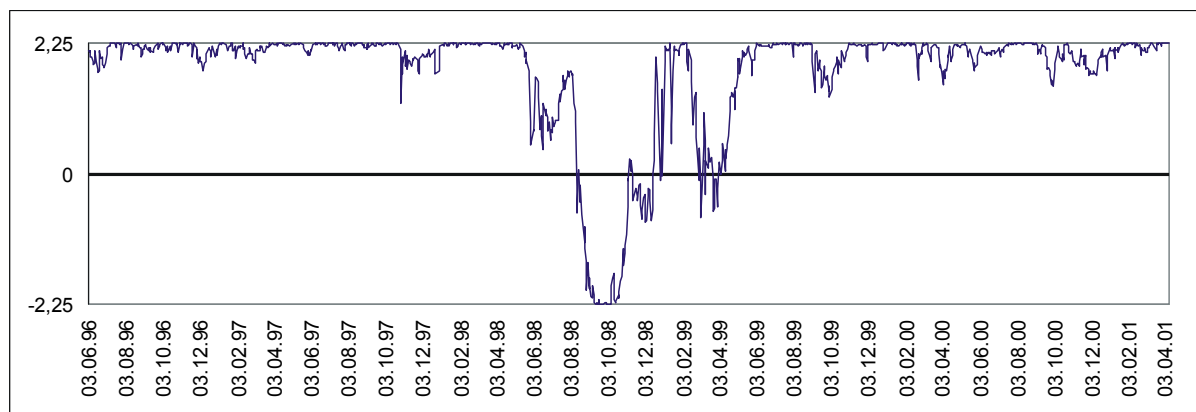
Parallel to the implementation of the crawling band regime, impetuous discussion arose about the advantages and drawbacks not only of the new exchange rate policy but also of the other economic policy measures which were included in the stabilization package. According to a widespread view, the new course of economic policy significantly contributed to the stabilization of the Hungarian economy. Nonetheless, there are also critical voices. In the following section the achievements of the stabilization efforts will be reviewed.

The main part of the stabilization program is represented by the exchange rate system as described above. This system binds the hands of the central bank, who cannot set its own monetary targets. The aim of this restriction is to establish credibility of the pursued policy. However, there is still room for flexibility which can be used for active interest rate policy in order to encourage domestic savings and prevent a withdrawal of capital inflows. Figure 4.1. demonstrates that the central bank was able to keep the exchange rate within the band. This fact and a tendency to increasing savings show the increased confidence in the Hungarian currency.⁷³ The high participation rate of foreign investors in the privatization process of state owned enterprises is a further clear sign of reputation improvement in the Hungarian economy and economic policy. Privatization not only speeded up the restructuring process of the production (mainly by foreign owners who brought new know-how and increased productivity), but additionally, this provided the central budget with huge revenues. Depending on the disposition of these revenues, the effects can be different, but all mean an

⁷³ This was supported by the introduction of currency convertibility corresponding to the requirements of the International Monetary Fund on 1st January 1996 through the 'Currency Act'.

improvement of the economic environment for investment. For example, if the privatization revenues are used to service external debt, the position of the country in credit ratings will improve and the country risk premium will drop resulting in the possibility of reducing the debt and interest rate burden.⁷⁴ The Hungarian government decided to take this route, although during impetuous discussions about this topic the idea of investing the revenues in infrastructure and offering a better technical environment for private investment was also strongly supported.

Figure 4.1.: The exchange rate band



0 = central parity, +/- values mean revaluation/devaluation.

Source: National Bank of Hungary

Although it seems that the credibility of the monetary policy has been achieved, inflation inertia has still remained. This can be traced back mainly to reasons which are specific to the transition process and have not yet disappeared. It will take a long time to abolish the effects of these and requires a speeding up of the reform progress to gain the confidence of the population.⁷⁵ The main problem, however, seems to be the adaptive (backward-looking) expectations about the future development of the inflation rate. Furthermore, the role of the so-called gray-economy is still important in Hungary and this

⁷⁴ See Kornai (1996).

makes official statistics less reliable concerning domestic demand and real growth.⁷⁶ Often, the crawling exchange rate regime itself will be made at least partially responsible for inflation. The reason for this reproach lies in the pricing behavior of firms which build in the devaluation rate of the central parity into their product prices. However, firms are able to raise their sales prices only if they are in a monopolistic position independent from the exchange rate system. Furthermore, the rate of crawl is adjusted to the expected inflation for the next period, therefore, the exchange rate policy can rather be seen as an active instrument for fighting inflation.⁷⁷

Yet still, the measures of the stabilization program were drastic. As already mentioned in Chapter 3, it would have been possible to avoid them by the implementation of a real wage reduction one year earlier, that is, in 1994. In 1995, however, the nervousness of investors and creditors following the Mexican crisis forced the Hungarian authorities to exaggerated reactions. Although measured by prices and production costs the international competitiveness of Hungarian products improved, the domestic demand shrunk promptly and substantially. Thus, not only consumption but also investment and import substituting production suffered a drawback resulting in a stagnation of the GDP during the first two years of stabilization.⁷⁸ The hesitation of the government in implementing a new exchange rate regime or any other policy measure made a recession inevitable as the stabilization policy was carried out via an unprecedented shrinking of the domestic demand and real income⁷⁹ and a

⁷⁵ See also Szapáry/Jakab (1998).

⁷⁶ See Neményi (1997).

⁷⁷ See also Erdős (1998).

⁷⁸ See also Obláth (1998).

⁷⁹ Freezing of the nominal wages in times of high inflation rates and reducing social security expenditures.

fuelling of inflation by a concurrent increase in energy prices. Matolcsy⁸⁰ (1997) criticizes the pursued economic policy strategy in nearly all points. He argues that the measures were based on a mistaken diagnosis of the economic situation of Hungary and the reasons for the balance of payment imbalances were not sufficiently analyzed. First, it is not proven that experienced economic growth in 1993-94 caused trade account deficits, as there was no improvement in the balance between 1989-92 where GDP shrank. Hence, an interdependence between growth rates and trade balance is not unequivocally verified for Hungary. The worsening of the trade account position could be traced back to the drop in agricultural and industrial production levels and hereby to the drop in export supply and not to an excessive growth of imports. That is, the current account deficit was most probably not caused by expanding absorption. Second, the fast liberalization of foreign trade, the reduction of the subsidies and the new bankruptcy law confronted Hungarian firms with intensive international competition and forced them to an abrupt structural change. Third, the situation was aggravated by real appreciation of the currency calculated on the basis of unit labor costs, increasing devaluation expectations⁸¹ and tax minimizing behavior⁸² of the firms, as well as the political uncertainty in the election year of 1994. Nonetheless, Matolcsy's arguments are not able to defeat the chosen strategy in all details.

⁸⁰ To tell the whole truth to the reader, it has to be mentioned that Matolcsy is a ministerial member (Economic Affairs) of the government set up by the Young Democrats Union (FIDESZ) and the Smallholders Party (FKgP) that followed the social-liberal government after the election of 1998. The stabilization package was introduced by the social-liberal government during the period 1994-1998.

⁸¹ It was already mentioned in Chapter 2 that firms tend to displacements of imports and exports in time in the case of devaluation expectations in order to maximize revenues and minimize costs in domestic currency. This could be seen in the case of exports but not in the case of imports in 1993-94. [See Matolcsy (1997).]

⁸² Imports are overvalued and exports are undervalued in order to minimize profits in accounting.

Looking at the macroeconomic data of Hungary we can state that after some years of recession during the early phase of transition, the economy seemed to recover in 1994 and the growth rate of GDP was again positive. This fact could give room for the presumption that the economy has found its way back to a growth path. The data about the first quarter of 1995 showed the continuation of the growth process. Nevertheless, the recovery stopped in 1995 when expansion was slowed down by the restrictive economic policy measures, even though the growth rate of GDP remained positive. As shown in Table 4.2., by 1997, the painful reforms seemed to be bearing fruits with growth rates near to 5 percent since that year. This trend may be stopped by negative developments on world markets in 2001, which cannot be influenced by the Hungarian authorities. Still, the Hungarian economy grew twice as fast as the European Union, that is, by 3.8 percent.

Table 4.2.: Growth rates of GDP

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
-3.5	-11.9	-3.1	-0.6	2.9	1.5	1.3	4.6	4.9	4.2	5.2	3.8

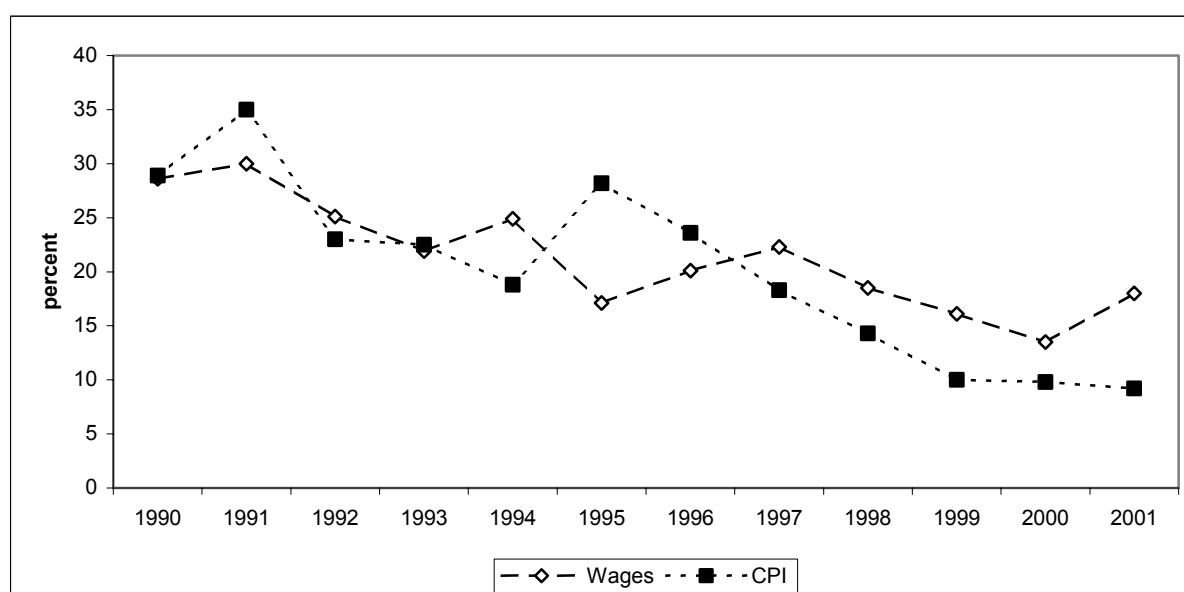
Source: Central Statistical Office

Unemployment ratios have been quite high since 1992, but they exceeded the average unemployment rate of the European Union only in 1992 and 1993. Although real wages have been increasing again since 1997, when the nominal wage increases overcompensated the consumer price inflation, the trend to decreasing unemployment has not stopped yet and the ratio is now substantially lower than in the European Union. The number of unemployed sank by more than 10 percent to 5.7 percent in 2001. Even fears of slowing down economic growth or, as shown below, deteriorating international competitiveness did not come true. Table 4.3. and Figure 4.4. present the unemployment ratio since 1992 and the relation between the nominal wage growth and consumer price index since 1990.

Table 4.3.: Unemployment ratios

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
H	9.8	11.9	10.7	10.2	9.9	8.7	7.8	7.0	6.4	5.7
EU-15	9.2	10.7	11.1	10.7	10.8	10.6	9.9	9.2	8.4	7.6

Source: Central Statistical Office, EUROSTAT

Figure 4.4.: Average wages and CPI

Source: Central Statistical Office, National Bank of Hungary

The external debt position of the country has even improved substantially over the last six years and international reserves of the central bank provide a security for foreign trade partners to cover import expenditures for several months. Nonetheless, this ratio lay below the desired level equivalent to approximately six months' imports. Table 4.5. shows the debt service ratio which is indicated as a ratio of the midterm debt repayment and net interest payments (TDS) to goods and services exports (XGS) and the coverage of imports (IMP) by international reserves where short-term debts of the National Bank of Hungary are subtracted (NRES).

Table 4.5.: Debt service ratio (percent) and reserves coverage of imports (month)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
TDS/XGS	46.2	29.7	28.1	34.6	43.1	35.8	33.2	25.9	16.5	16.3	12.9	11.1
NRES/IMP	0.1	4.4	5.4	7.3	6.8	9.2	6.9	4.8	4.6	5.5	4.3	4.0

Source: National Bank of Hungary

The increase in international reserves follows from substantial capital inflows (both direct investment and portfolio capital) and the need to intervene at the strong edge of the exchange rate band resulting from the appreciation pressure on the Forint, rather than from current account surpluses. From 1991 Hungary experienced increasing foreign direct investment inflows which peaked in 1995 as the privatization process of state owned companies was speeded up. Inward direct investment was lower afterwards but has remained relatively stable since then. (See Table 4.6.) An increasing part of these flows went into green-field projects (94 percent in 1998). During the early phase of transition, Hungary attracted most of the investment capital coming to the region but in 1997, the country was overtaken by Poland. Yet still, its leading role in terms of per capita stocks was maintained throughout the whole period.

Table 4.6.: Inward foreign direct investments (million USD)*

1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
14	187	311	1,459	1,471	2,339	1,146	4,453	1,983	2,085	1,935	1,941	1,683	2,443

*Since 1999 published in EUR. Calculation fo USD-values using yearly average EUR/USD-rates (IMF).

Source: National Bank of Hungary

New investigations on competitiveness⁸³ show that since 1997, a trend to improvement of the current account has started throughout Central and Eastern Europe. While for the other

⁸³ For example Podkaminer et al. (1998).

countries the reasons are not clear, it may result from administrative trade barriers, Hungary definitely shows a tendency to improvement in international competitiveness in spite of real appreciation vis-à-vis the Deutsche Mark resulting from foreign direct investments and transformation of its manufacturing industries. According to Jakab/Kovács (2000), the observed real exchange rate movements of tradable goods are induced mainly by supply shocks, the exchange rate policy not having much influence on them. This validates the existence of the Balassa-Samuelson effect. Dibooglu/Kutan (2000) support the point of view that real exchange rate movements are driven by real factors, such as productivity shocks, similar to industrial countries. Gains in competitiveness, in which respect Hungary outperforms all other Central and Eastern European transition countries according to the rankings of the World Economic Forum are the result of productivity increases as well as a change in the export structure performed by high share of machinery, electronics and other manufactures as shown in Table 4.7.

Table 4.7.: Manufactured exports of Hungary

Exports (% of total)	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Manufactured goods*	16.07	16.20	16.60	17.43	17.76	13.38	12.44	11.50	10.79	10.59
Machinery and transport equipment	20.87	24.18	25.70	25.63	25.57	45.08	51.94	57.21	59.84	57.56
Miscellaneous manufactured goods	20.20	17.55	17.80	16.19	17.88	13.48	13.16	12.98	11.60	12.83
Manufactured exports total	57.14	57.93	60.10	59.25	61.21	71.94	77.54	81.70	82.23	80.99

* classified chiefly by material

Source: OECD; own calculations

There is also much criticism of crawling bands in general, some of which apply to exchange rate target zones as practiced by the exchange rate mechanism (ERM) in Europe but

some of them attack only the crawling version of the exchange rate band.⁸⁴ In the following, a list of arguments will be assessed and applied to the working of the crawling band system in Hungary.

The first one focuses on the choice of the central parity. We have seen that this should be determined in a way that is consistent with the equilibrium exchange rate taking inflation differentials to trading partners into consideration. However, there exists a high grade of disagreement in economic literature as to where this equilibrium rate should be situated. According to this, Hungarian monetary authorities seem to seek for a rate which serves for sustainable current account balances. This was expressed by an initial devaluation of the parity at the time of the introduction and by the rate of further permanent devaluation.

The second argument is that monetary authorities may withstand needed parity changes. As we have seen in Hungary, the exchange rate has stuck to the stronger edge of the band which could have meant an incentive to a faster reduction of the rate of crawl than actually happened. The market itself did not demand devaluations in the dimension as carried out.⁸⁵ Each time before the next step to lowering the rate, there were speculations about this issue, which condensed in large fluctuations in the daily market rates, reflecting high uncertainties about future developments. If expected adjustments in the crawling rate did not follow, this hesitation of the central bank president and of the finance minister was interpreted as a sign for potential devaluation or a slowdown in inflation reduction. In the end, lowering of the rate of crawl was in fact carried out.

Third, the possibility that the band could be moved in response to speculative pressure can be rejected for Hungary, because in contrast to large capital inflows the downward adjustments of the central parity were first realized when there was a clear sign on inflation reduction in order not to jeopardize international competitiveness. Hungarian monetary

⁸⁴ See Williamson (1996).

authorities tried to act cautiously and to keep a balance between the current and capital accounts. This caution may have prevented a sharp deviation of the exchange rate from its fundamental value.

However, the fourth fear, that the exchange rate could get stuck at one of the edges of the band and the system could become a de facto fixed exchange rate regime, applies fully to Hungary. The experiences since March 1995 have shown that observed exchange rates of the US-Dollar⁸⁶ rested at the strong edge of the band nearly over the whole period and made the system into a de facto fixed exchange rate system. High interest rate differential which was maintained in order to encourage savings and reduce domestic demand by active interest rate policy⁸⁷ also induced speculative capital inflow and a pressure to nominal revaluation. The central bank was forced to interventions in defense and to buy foreign currency. Doing so, the international reserves of the country undergo a continuous upward trend and in return increase the domestic money supply. This can fuel the inflation process so that the central bank makes efforts to sterilize the effects of the interventions on the monetary basis. An examination of the monetary basis reveals that it expanded by a moderate rate, while the domestic component steadily shrank and the foreign component grew, even though the foreign exchange which was purchased during the interventions of the central bank was partly used to repay credits and sink costs of sterilization. Since early 1997, the interest rate premium has fallen to 3-4

⁸⁵ See also Jochem/Sell (2001) who find this practice questionable.

⁸⁶ The market rate of the US-Dollar was observed until the end of 1999 and was counted as an un-weighted average of selling and buying rates of ten commercial banks with the highest turnover where the two highest and lowest values are cancelled in order to avoid a strong bias.

⁸⁷ The central bank pursued this by repurchase arrangements (repos) and reverse repos with commercial banks. In this way fixed interest bearing securities were dealt. The experience showed that the National Bank of Hungary was very cautious in omitting a drop in interest rates. This could first happen when the observed inflation rate was reduced compared to the

percent which is less than the risk of a depreciation of the Forint within the bandwidth of 4.5 percent. Yet still, capital inflows kept on. This states the confidence of the market in the policy of the central bank, but nevertheless, non-speculative capital flows have also played an important role in the above described development. The share of interest rate sensitive inflows, however, dropped but did not disappear. Furthermore, it is important to stress that interest rate sensitive capital inflows do not necessarily mean ‘hot money’, a meaningful part of it is bound in long term company assets. The costs of the sterilization can be estimated by the following equation⁸⁸:

$$(4.1.) \quad C = - \sum_{t=0}^T \Delta NDC A_t \left(\sqrt[12]{\frac{1+r_{d,t}}{(1+r_{f,t})(1+\Delta e_t)}} - 1 \right)$$

where

$\Delta NDC A_t$ = cumulative change of the net domestic currency assets of the National Bank of Hungary (NBH) during t periods

$r_{d,t}$ = weighted average of the interest rates paid by the NBH on its reverse repos, deposit facilities, and bonds and the weighted average of interest rates on government securities

$r_{f,t}$ = average effective yield paid by the NBH on its foreign currency bonds issued to borrow capital from abroad

Δe_t = the rate of depreciation of the Forint against the currency basket

T = number of periods (months)

The negative sign is obviously taken because in the balance of payments statistics of the National Bank of Hungary, a negative change in the international reserves indicates an increase in their stock. Calculations over the period of May 1995 to December 1997 show that

antecedent period. Following from this, the ex post real interest rate lay above the ex ante rate based on backward inflation data.

⁸⁸ See Szapáry/Jakab (1998)

the total yearly costs of sterilization amounted to about 0.16 percent of GDP, but would have been higher if the central bank had not been able to use the foreign exchange purchased during interventions to reduce the external debt of the country.

The fifth issue is that bands would be susceptible to speculative attacks or other capital flows. Although it cannot be denied that there is interest rate induced capital inflow, even the withdrawal of a part of this capital during the Russian crisis from the region in August 1998 did not cause much trouble in defending the weaker edge of the band, so that an unscheduled devaluation could be prevented.

The sixth charge, that the band could be made too wide to influence the exchange rate does not apply to the Hungarian crawling band regime, which allows the exchange rate to fluctuate around the central parity by merely ± 2.25 percent. But the scope of monetary policy for domestic stabilization purposes will be reduced by implementing a target zone on the exchange rate in comparison with floating exchange rate systems. It is completely true for Hungary's narrow band, but this was actually intended by the monetary authorities. Defining a narrow band binds the hands of the central bank who had a low rate of credibility for pursuing a stabilizing monetary policy. There is still, however, some scope for maneuver.

Finally, it is feared that an accommodating exchange rate policy would destabilize the price level. It is true that the permanent devaluation of the domestic currency validates inflation, but defining the rate of crawl lower than would be needed to compensate inflation and reducing this rate over time helps to combat inflation as we will see later in the case of Hungary.

4.2 Assessment criteria and transmission mechanisms

In the following, a system of criteria will be described which allows for a thorough investigation of the crawling band regime. The first step is to recall that the crawling band

regime is applied by countries which have high inflation rates and current account imbalances, as is the case also for Hungary, to solve the inconsistency problem between using the exchange rate as a nominal anchor for stabilization and maintaining international competitiveness. The criteria can be derived from these targets. They include the development of the related macroeconomic data. Williamson (1996) chooses the inflation rates, the growth rate of exports, volatility of exchange rates, international reserves and of interest rates. We must add a further criterion to these which is the development of the current account balance. This measure plays a crucial role in estimating the equilibrium real exchange rate for fixing the central parity, but is neglected by Williamson in his later analysis.⁸⁹ In the following, the reason for the choice of these performance measures and transmission mechanisms will be described.

(a) Inflation performance

There are two reasons for investigating the inflation performance of the country during the maintenance of crawling central parities. First, the continuous devaluation of the currency can be an engine for inflation. Empirical research on the determinants of Hungary's inflation behavior states that the impact of exchange rate changes on the inflation rate through raising import prices is, albeit positive, only transitory. Nevertheless, the fact that devaluations are carried out permanently provide fuel to the inflation engine again and again. Second, lowering of the inflation rate by channeling inflation expectations via the announcement of the exchange rate target for the next period is one of the declared targets of introducing the crawling band system.

⁸⁹ See Tavlas (1998).

(b) Growth rate of exports

It is very important to fix the exchange rate in a way that the international competitiveness of domestic products does not deteriorate. From the preceding chapters we know that there is a trade-off between the costs and benefits of a strong exchange rate. The benefit lies in controlling inflation but the costs of this are that a loss in competitiveness can hinder economic growth. This results from a diminishing demand for domestic products and a balance of payments constraint which alongside others, belong to the determinants of growth. One measure we can apply to judge whether exchange rate policy is appropriate is the growth rate of exports, since this rate is closely related to the level of the exchange rate and good export performance is the precondition for sustainable current account balances. Especially for small open economies, exports are the main driving force for economic growth. Furthermore, a sustained growth requires increasing imports, and exports are needed to finance them.

(c) Current account balance

The current account balance is widely regarded as a very important indicator to determine whether there is a threat of unsustainable economic development in a country. According to economic theory, the long run external equilibrium should be characterized by a current account equilibrium. A current account deficit means that resources from the rest of the world have to be involved to finance domestic demand and the country becomes indebted. Therefore, this can be a signal for a threatening currency crises. However, if the country is able to attract foreign direct investment it will be possible to run current account deficits as long as they can be compensated by the inflow of investment capital. According to some other opinions, long term portfolio capital inflows or long-run credits can also be a possible way of

financing the deficit. Nonetheless, it is difficult to give a proper definition about what is long-term portfolio investment which cannot be withdrawn easily. What is certain, the current account deficit should by no means be financed by short term speculative capital inflows ('hot money').

(d) Volatility of the exchange rate

Throughout the world we can observe that monetary authorities are keen on implementing an exchange rate regime which can serve for the highest grade of exchange rate stability at least to currencies of trading partners. The reason for this is to minimize exchange rate exposure in order to facilitate efficient allocation of resources. This exposure results from the time span between the time of the decision or contract and the realization of revenues. Risk averse exporters or investors appraise expected revenues less than certain revenues. Therefore, the effect of the risk will be the same as if there were taxes on exports or direct investment. This will lead to a sub-optimal value of exports and direct investment. Although there exist several instruments to hedge against this risk, a perfect assurance is never free of charge, and can even turn out to be sub-optimal for the economy as a whole in the case that the forward rate does not equal the realized future spot rate. Furthermore, if there are costs of entry or exit, we can observe a hysteresis in the economic behavior of firms, that is, in the case of exchange rate fluctuations they will keep waiting before they enter the market or leave it. The consequence of exchange rate volatility is therefore inefficiency in resource allocation and reduction in GDP growth, so that from this point of view a stabilization of the nominal exchange rate is desirable.

Additionally, exchange rate volatility can increase the volatility of the GDP. This would happen in the case of monetary shocks. However, if there were temporary demand shocks affecting the economy, the ability of the nominal exchange rate to adjust would switch

expenditures between domestic and foreign products and absorb the fluctuations in aggregate demand and stabilize the GDP.⁹⁰

(e) Volatility of international reserves

It is a classical argument in favor of exchange rate flexibility that changes in demand or supply of foreign exchange can be settled by price variations (the exchange rate) rather than through interventions on the foreign exchange market with corresponding adjustment in the level of international reserves. In case of a relatively fixed exchange rate system where the ability of the exchange rate to absorb variations in demand or supply of foreign exchange is limited, the volatility of international reserves will indicate pressures on the exchange rate. As regards the crawling band, this measure can be used to investigate whether the central bank was forced to carry out substantial interventions to defend the edges of the band.

(f) Volatility of interest rates

Changes in the domestic interest rate also indicate pressure on the country's currency. Interest rates can be increased in order to induce capital inflows or stop outflows and prevent a depreciation of the currency. The opposite case will be accompanied by lower interest rates. Nevertheless, flexibility of the exchange rate enables the central bank to have better control over the interest rate. Thus, if higher flexibility of the exchange rate allows for influencing the interest rate in a way that promotes domestic stability, variations cannot be interpreted as a disadvantage of the exchange rate arrangement. Interest rates can be raised by the central bank in order to encourage domestic savings and reduce aggregate demand if inflation speeds up.

⁹⁰ See Sutherland (1995).

Lowering of the interest rate aims at stimulating investment and reducing debt service costs. Hence, the ability of the central bank to pursue an autonomous monetary policy is widely regarded as an advantage of flexible exchange rate systems. Therefore, the results must be handled with caution.

(g) Credibility of the exchange rate policy

There is another indicator to investigate pressures on the domestic currency, which relies also on interest rate changes. This is the index to detect speculative pressure. The absence of speculative pressure can be regarded as an important measure of sound economic development, which makes a country less vulnerable to speculative attacks. If pressure emerges, the response of the economic policy can be to change interest rates to influence capital flows, to make a direct intervention on the foreign exchange market which will lead to a variation in international reserves, or to allow for a change in the exchange rate. Therefore, the index is composed of the changes in the exchange rates, the changes in the interest rates and the changes in international reserves and is calculated as a weighted average of these three values.⁹¹

4.3 Comparison of two different exchange rate regimes in the 90s

Williamson (1996) makes an assessment of the crawling band system by a comparison of several countries which implemented a wide range of exchange rate regimes but no currency board. The results of his analysis using a data set of 1992-95 show that no regime could outperform the other according to the criteria described in the previous part of this chapter and good performance of the countries which implemented the crawling band can rather be

explained by their strong fundamentals. In the following, the comparison of the crawling band with the adjustable peg will be carried out for Hungary using the same criteria to show whether Hungary was successful in eliminating the problems which appeared during the early phase of transition. Therefore, it must be questioned whether the problems were specific to the adjustable peg and could be solved by implementing a new exchange rate regime.

It seems reasonable to make an investigation of the crawling band after it was phased out in 2001 by widening the fluctuation band to ± 15 percent in May and stopping the crawl of the central parity in October. The data pool includes two sub-periods with nearly the same length: the adjustable peg will be investigated during the period from January 1990 until March 1995. As the data set is composed of yearly or monthly data it is difficult to make a cut by March 15th, 1995, the date of the introduction of the new regime. Therefore, the second period begins with April 1995 and ends in December 2000. In the case of yearly data the cut will be made between 1994 and 1995.

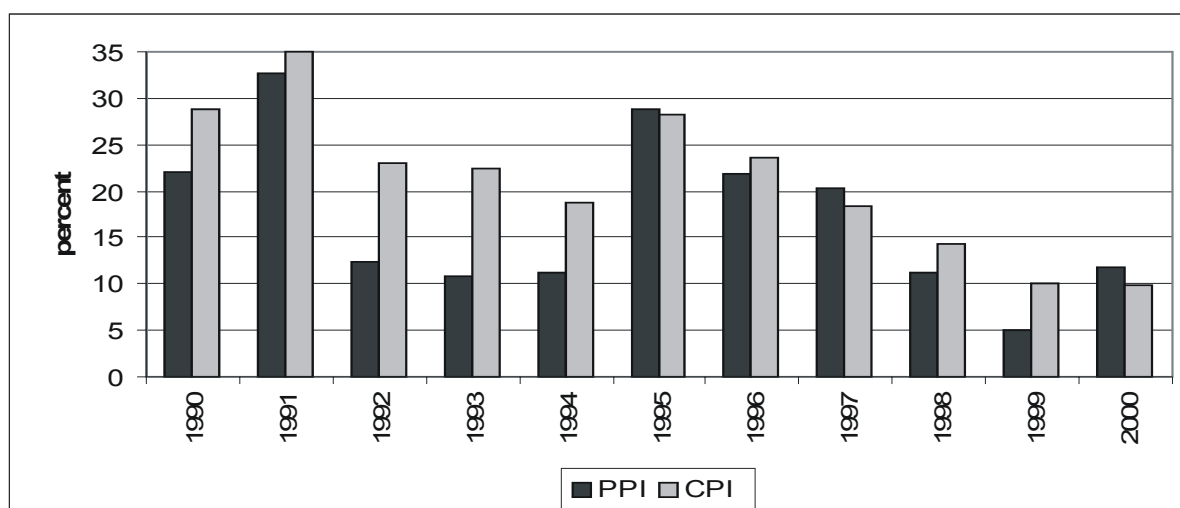
The data source combines several institutions which publish economic data about Hungary. The reliability of the data sources is assumed. Unfortunately, in some cases, values from different sources do not correspond to each other exactly, albeit the data set published by international organizations such as the International Monetary Fund is based on reports of the member country's data collecting institutions. Therefore, Hungarian (e.g. primary) resources will be exploited as far as possible.

(a) Inflation performance

After the abolishment of subsidies and remaining administrative restrictions on prices in 1989 both consumer and producer prices increased sharply. The inflation measured by the

⁹¹ See Eichengreen/Rose/Wyplosz (1995).

consumer and the producer price indexes peaked in 1991. Both indexes lay over 30 percent in this year. Therefore, combating inflation gained more attention after 1992. As a result, increases in both consumer and producer prices slowed down until 1994. After introducing the crawling band system, the trend to inflation reduction suffered a set back and both consumer and producer price inflation speeded up to nearly 30 percent again. This can be traced back to the initial devaluation of the domestic currency by 9 percent and the subsequent continuous depreciation of the central parity according to the rate of crawl which resulted in a devaluation of the currency vis-à-vis the currency basket by 26.8 percent during 1995 as well as to the impact of other measures included in the stabilization program such as an increase in the still administered energy prices by 50 percent. From 1996, inflation again began to slow down gradually with producer and consumer price indexes following quite a similar shape. The decrease in producer prices, however, was not straight. By 2000, it seems that the aptitude of the crawling band regime to help inflation reduction was exhausted. Further disinflation needs additional economic policy measures or even a change in the exchange rate regime. Figure 4.8. illustrates the above explained developments on the basis of yearly data published by the Central Statistical Office of Hungary. Data from the International Financial Statistics publication of the International Monetary Fund are published in terms of relation to a base year and must be transformed to the year-to-year form. This calculation results in similar data for the consumer price index but producer price indexes differ slightly.

Figure 4.8.: Consumer and producer price indexes

Source: Central Statistical Office

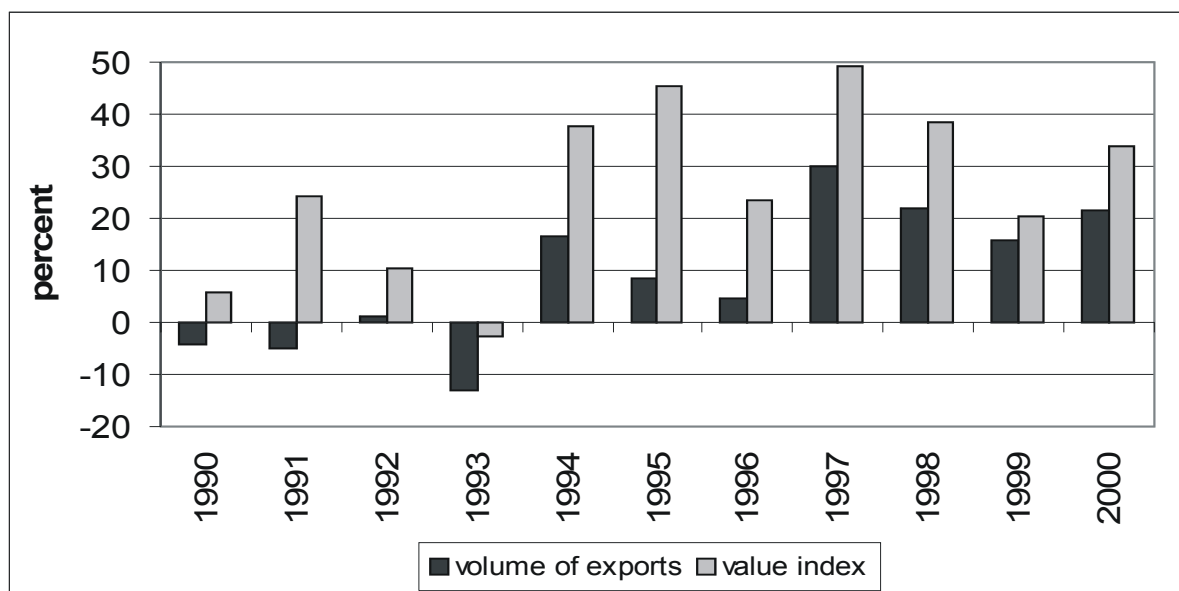
To sum up the above discussion, while the producer price index was subject to higher volatility, the inflation measured by the consumer price index underwent a slow but nonetheless continuous reduction after the initial set back. The index arrived at a moderate but still two-digit level of 10 percent by 1999. The perspectives for further decrease during 2000 were destroyed by the developments in domestic food prices and in world market oil prices as well as the strength of the US Dollar vis-à-vis the Euro, so that one-digit inflation rates could still not be achieved. The consumer price increase amounted to 9.8 percent which comes very close to 10. It is clear that the crawling band cannot support further disinflation and a change in the exchange rate policy is needed that gives more room for autonomy of the monetary policy.

(b) Growth rate of exports

During the early years of transition the volume of exports dropped as indicated by negative values of the volume index. The sharpest reduction was experienced in 1993 when even the value index was negative. This trend was halted by 1994, and exports have grown by varying

rates since then. The good export performance can, however, barely be the result of the introduction of the new exchange rate regime, which happened one year later. In the following two years the volume growth of exports slowed down but increased sharply again in 1997 as an impact of the speed-up of the privatization process and the start-up of production of the privatized as well as new companies mainly with foreign participation. An upswing of economic growth can also be dated to this year which demonstrates that growth in Hungary is in the first line export led. Figure 4.9. demonstrates the volume and value indexes of export growth on the basis of yearly data from the Central Statistical Office. There is no data available on a monthly frequency. International Financial Statistics deliver the same data for the volume index but no data for the value index. The indexes are calculated on the basis of national currency units, so that value indexes embody also changes in foreign trade sales prices which do not equal to consumer or producer price inflation.

Figure 4.9.: Export volume and value indexes*)



*) Based on national currency units.

Source: Central Statistical Office

According to the above descriptions, the growth rate of exports would state a change in the developments from 1994 rather than 1995, so that a direct connection to the shift in the exchange rate policy cannot be drawn.

(c) Current account balance

Current account deficit is a source of indebtedness of a country. Therefore, it is worthwhile taking a look at the development of the current account balance. We recall that the determination of the initial central parity based on the consideration whether the actual exchange rate at the time of the introduction of the new regime served for a sustainable current account deficit or an adjustment of the rate was necessary. In evaluating the successfulness of the exchange rate policy we can proceed in the same way using the same formula to calculate the maximum sustainable level of the current account deficit and to compare them with the actual values.

The following analysis exploits data from Hungarian resources. Balance of payments data is published on a regular monthly basis by the National Bank of Hungary. The data, available in the International Financial Statistics are calculated using reported values in national currency units and average commercial Dollar rates and differ from figures of the National Bank of Hungary. The methodology of the balance of payments has changed internationally during the period under investigation. The member states of the International Monetary Fund agreed on modifications in the system of the balance and published them in a manual⁹² in 1993. The reason was to create more conformity with the System of National

⁹² Balance of Payments Manual, 5th edition, International Monetary Fund, Washington D.C., 1993.

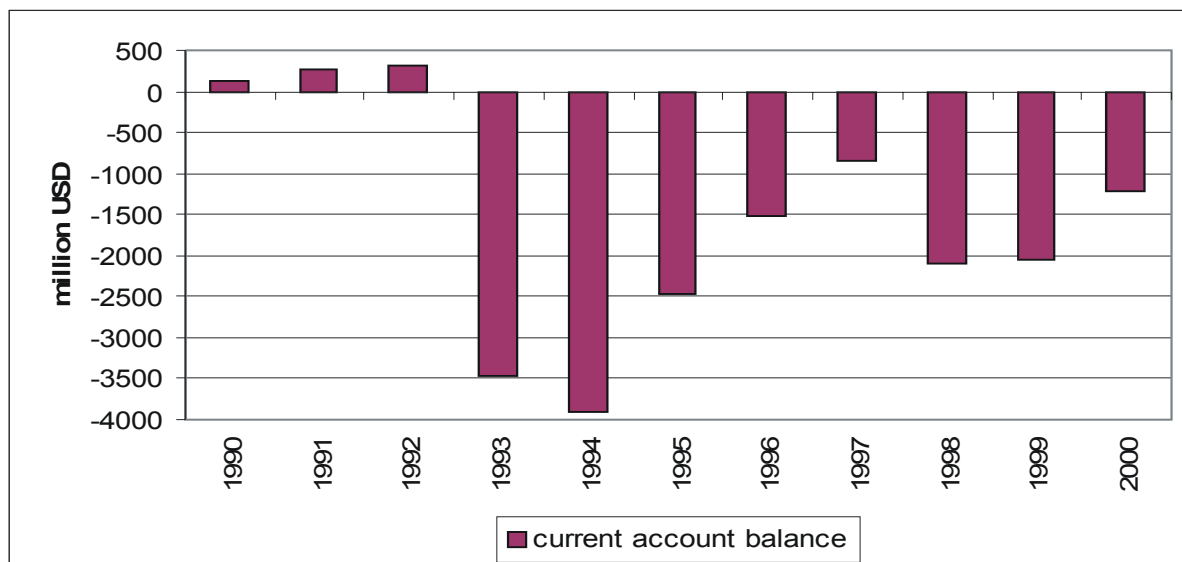
Accounts.⁹³ Hungary implemented the new system in 1996. The main difference which is important for this analysis is the change in current account reports which do not include capital transfers according to the new method. To put the data into the same framework for the entire period under investigation and establish comparability, I added capital transfers to the current account balance in the period beginning with 1996. The data were listed in US Dollars until 1998. Since 1999, all figures are published in Euros. GDP data are published by the Central Statistical Office. I used period average exchange rates, which are calculated from central rates weighted by workdays by the National Bank of Hungary, to express current account data in national currency units in order to calculate current account to GDP ratios. The ratio of current account to foreign direct investment was calculated on the basis of the published figures directly in foreign currency units (US Dollar or Euro). The period average exchange rates published by Eurostat were employed to express Euro values of the current account in US Dollars.

As demonstrated in the first part of Figure 4.10., current account balances have been negative since 1993 and have not yet turned into a surplus since then. Strikingly, the current account deficit grew in 1994 in spite of export growth. This can obviously be traced back to a sharp growth of imports and substantiates the introduction of the temporary import surcharge in 1995. The second part of the figure shows the development of the terms of trade, calculated as a ratio of export and import price indexes, where negative signs indicate worsening. The terms of trade underwent fluctuations so that no trend to worsening or improving can be identified during the period of investigation. A correlation to the current account in terms of improving or worsening the balance is not recognizable either. For example in 1993 and 1994, the current account balances worsened while Hungarian exporters achieved higher sales price

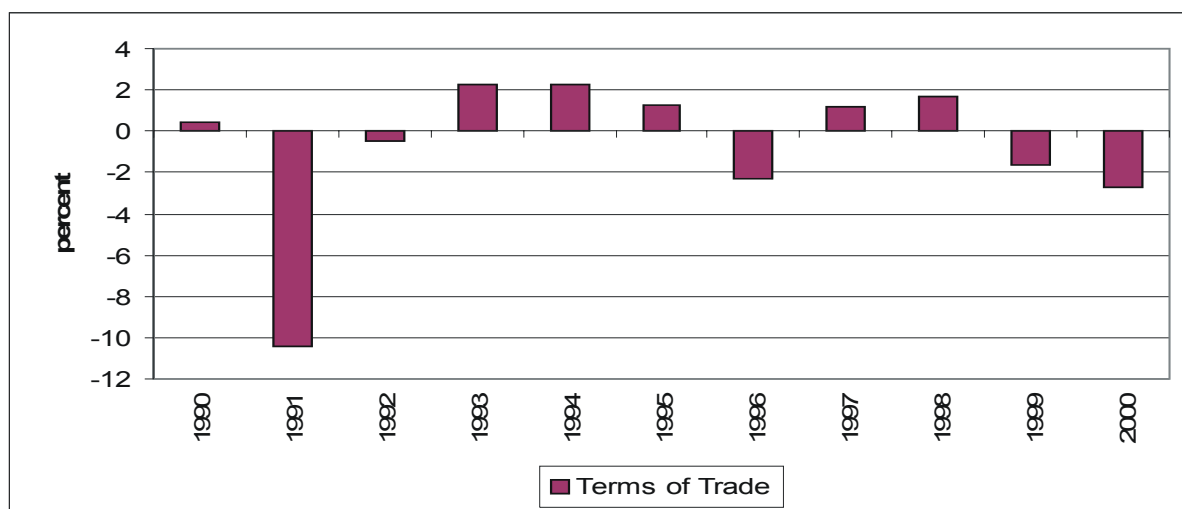
⁹³ The System of National Accounts (SNA) was created and published together by the United Nations Organization, the International Monetary Fund, the World Bank, the Commission of the European Union, and the Organization for Economic Co-operation and Development.

increases as foreign exporters did for their sales to Hungary. In 1996, the relationship was reciprocal.

Figure 4.10.: Current account balance and terms of trade changes



Source: National Bank of Hungary



Source: Central Statistical Office

Table 4.11. presents the current account balances as a percentage of GDP and inward foreign direct investment. The calculations concerning the sustainability of the current

account imbalances using equation (3.3.) indicate serious problems for 1993-94.⁹⁴ In these two years, the current account deficits exceeded the sustainable levels. Additionally, inward foreign direct investment (FDI) was not sufficient to finance these deficits. Since 1995, current account deficits have remained at a sustainable level, where 1997 was the best year. The figures worsened in 1998-99, but in 2000, improvement set in again.

Table 4.11.: Current account balances

Year	Current account balance* as % of GDP	Sustainable current account deficit as % of GDP	Current account deficit as % of FDI
1992	0.87	-7.11	..
1993	-8.96	-8.23	147.71
1994	-9.42	-9.20	341.27
1995	-5.55	-11.45	55.69
1996	-3.37	-9.12	76.55
1997	-1.84	-9.56	50.88
1998	-4.44	-7.24	143.84
1999	-4.29	-5.18	104.54
2000	-2.67	-5.21	72.04

* including capital transfers

Source: National Bank of Hungary, Central Statistical Office; own calculations

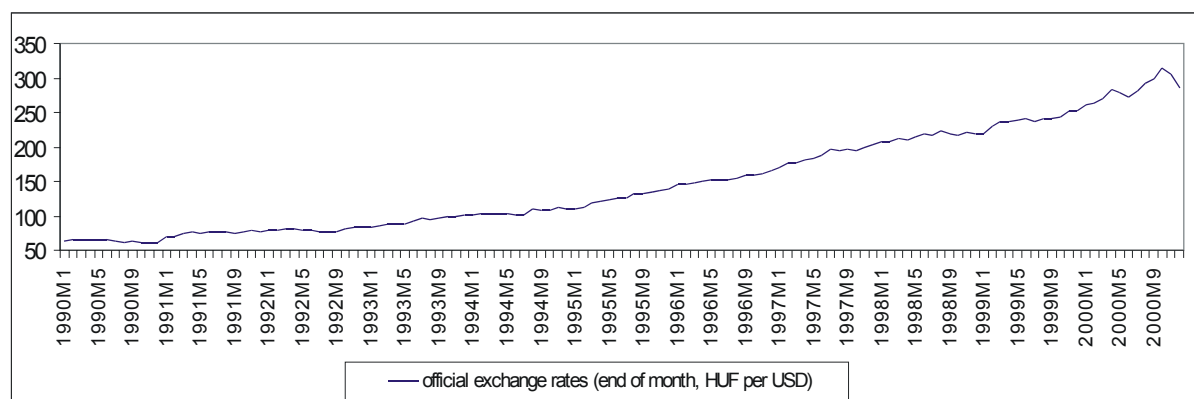
To sum up the discussion we can state that, as regards sustainability, 1995 brought a significant change in current account balances. Deficit ratios have remained on sustainable levels since then. Nonetheless, it is justifiable to question whether the rapid reduction of the rate of crawl jeopardized international competitiveness. Still, we have to keep in mind that there is a trade-off between combating inflation via stabilization of the exchange rate and maintenance of international competitiveness. The crawling peg can be a method to find a

⁹⁴ See also Chapter 3.3.

balance between the two targets, but it cannot guarantee a rapid solution. On the other hand, we have seen in the previous chapter that the growth rate of exports has been positive since 1994, so that exports have not signaled unsustainable exchange rate policy. As shown in Chapter 3.3, exchange rate adjustments plus productivity growth were sufficient to countervail the inflation differential vis-à-vis the European Union.

(d) Volatility of the exchange rate

The first indicator of volatility is the volatility of the exchange rate. As we have seen in Chapter 2, the domestic currency was devalued in several steps at irregular intervals within the adjustable peg system. Between January 1990 and February 1995, the rate was devalued in 23 steps, eight times alone in 1994. The extent of correction varied from time to time. This made the exchange rate incalculable and the peg lost its function to deliver exchange rate stability or constitute a nominal anchor for the economy. The new regime meant to change this, and actually, the central parity was depreciated by a pre-announced monthly rate on a day-to-day basis and since then there has been no unscheduled devaluation. Figure 4.12. shows the development of the exchange rates of the Forint vis-à-vis the US Dollar over the last decade.

Figure 4.12.: Official exchange rates at the end of each month

Source: International Monetary Fund

The volatility of the exchange rate is measured by the standard deviation of the monthly changes in the natural logarithm of the end-of-month official exchange rates against the US Dollar. This measure demonstrates the cumulated percentage changes in the rate during one month and eliminates day-to-day fluctuations. The data set supporting the calculations is available in the International Financial Statistics of the International Monetary Fund. The results of the calculations and the index value in the last column of Table 4.13. show that the volatility of the exchange rate decreased by 23 percent with the shift from the adjustable peg to the crawling band. The reason for this is that in spite of being able to fluctuate by ± 2.25 percent around the central parity and despite substantial reduction of the rate of crawl, the exchange rate rested nearly all the time on the strong edge of the band and the main source of exchange rate changes was the devaluation of the central parity against the currency basket and the fluctuations of the cross-rate between the basket currencies. The exception is the Russian crisis beginning in August 1998. During this period, the exchange rate temporarily reached the weaker edge of the band.⁹⁵ The May 1997 Czech crisis and the peak of the Asian crisis in October 1997 did not cause much turbulence on the Forint market: the exchange rate was devalued within the band but did not even reach the level of the central

⁹⁵ See again Figure 4.1.

parity. In the first half of 1999, the strong position of the Euro in the start-up phase and the lowering of the rate of crawl moved the exchange rate inside the band and hit the central parity. In the second half of 1999, the exchange rate moved back to the strong edge, but volatility increased.

Table 4.13.: Standard deviation of changes in exchange rates

January 1990 – March 1995 (S₀)	April 1995 – December 2000 (S₁)	Index (S₁/S₀)
0.028	0.021	0.77

Source: own calculations

As already mentioned, the central parity of the Forint vis-à-vis the US Dollar depends on the rate of crawl and the cross-rate between the Dollar and the other currency in the basket, which altered during the period of investigation, mainly between the Deutsche Mark, ECU, and Euro. Orlowski/Corrigan (1999) derive the highest sensitivity of the Dollar rate to changes in the Dollar rate of the Deutsche Mark, in the case of the Forint among the currencies of the Czech Republic, Poland and Hungary. Using the decomposition method for exchange rate fluctuations made by Mikolasek (1998), the context can be captured by the following equation:

$$(4.2.) \quad \left(\frac{HUF}{USD} \right)_1 = A \left(\frac{HUF}{USD} \right)_0^{1-b} \left[\left(\frac{HUF}{DEM} \right)_0 \left(\frac{DEM}{USD} \right)_1 \right]^b$$

where

A = rate of crawl

b = weight of the Deutsche Mark in the currency basket.

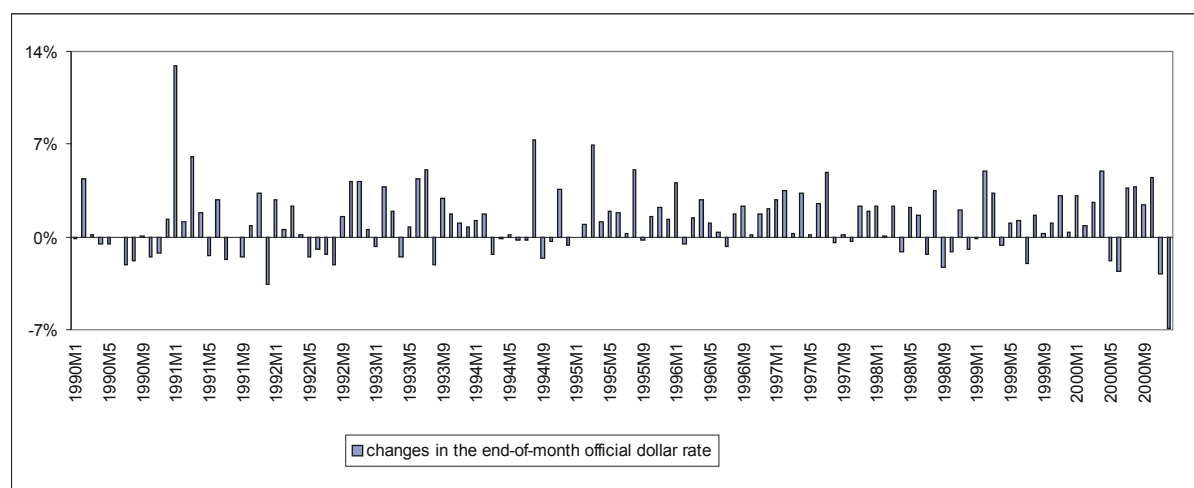
Reformulating (4.2.) we get:

$$(4.3.) \quad \left(\frac{HUF}{USD} \right)_1 / \left(\frac{HUF}{USD} \right)_0 = A \left[\left(\frac{DEM}{USD} \right)_1 / \left(\frac{DEM}{USD} \right)_0 \right]^b$$

From equation (4.3.) we can see that changes in the central parity are driven by the rate of crawl and by changes in the exchange rate of the Deutsche Mark vis-à-vis the US Dollar. The risk connected to the development of the central parity stem from the volatility of the Mark-to-Dollar exchange rate, which cannot be influenced by the Hungarian monetary authorities. They merely have control over the rate of crawl (A) and the composition of the basket (b). To put the figures from different basket compositions into the same framework, the ECU and the Euro rates can be replaced by the Dollar rate of the Deutsche Mark. An investigation on the basis of the available monthly data from 1990 to 2000 for official Dollar rates of the Deutsche Mark and the Forint reveals that there is a clear sign for a positive correlation between the two figures which is shown by the correlation coefficient amounting to 0.648⁹⁶. This means that 41.93 percent of the dispersion in Forint to US Dollar rates over the whole period can be explained by variations in the Deutsche Mark to US Dollar rates. During the operation of the crawling band regime, the value amounts to 0.881⁹⁷ which means 77.60 percent of fluctuations in the US Dollar rates are determined by fluctuations of the Deutsche Mark to US Dollar rates. The revaluation periods of the Forint against the US Dollar usually occurred in revaluation periods of the Deutsche Mark. Figure 4.14. demonstrates the changes in the end-of-month exchange rates of the Forint.

⁹⁶ Own calculations.

⁹⁷ Own calculations.

Figure 4.14.: Percentage changes in the end-of-month official US Dollar rate

Negative signs indicate a revaluation of the domestic currency.

Source: International Monetary Fund; own calculations

It could be of interest to investigate the effect of the widening of the fluctuation band to 2.25 percent in both directions, which in fact happened earlier than the introduction of the new exchange rate system, that is, in December 1994. The results of the comparison of the sub-periods January 1990 to December 1994 and January 1995 to December 1999 show the same direction as above, but the volatility of the exchange rate during the first sub-period is decreased and increased in the second sub-period, probably due to the devaluations which occurred in the first three months of 1995. Then the reduction in the volatility is only 20 percent as indicated by the index value in Table 4.15. Yet still, the widening of the fluctuation band has proven not to be a source of increased exchange rate volatility.

Table 4.15.: Standard deviation of changes in exchange rate

January 1990 – December 1994 (S ₀)	January 1995 – December 2000 (S ₁)	Index (S ₁ /S ₀)
0.027	0.022	0.80

Source: own calculations

In summary we can say that the new exchange rate regime, that is, the announcement of the rate of depreciation for at least several months in advance improved the predictability of the future exchange rate of the Forint for the economic agents, even though fluctuations were not completely eliminated.

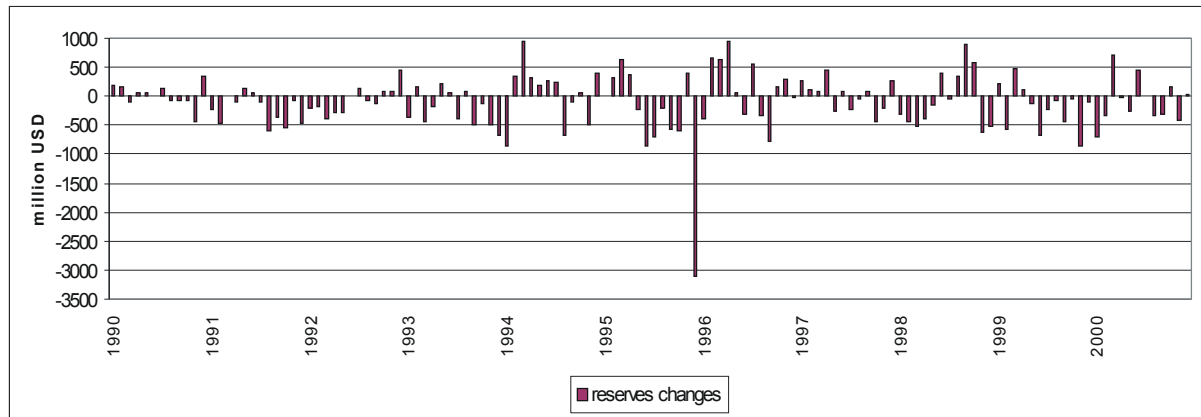
(e) Volatility of international reserves

The second measure of volatility is the volatility of international reserves. This measure is the most striking one as regards pressures on the currency. According to the theory, a country which does not have a substantial stock of foreign exchange at its disposal to defend the exchange rate any time should choose an exchange rate regime which offers higher flexibility of the exchange rate to adjust to market conditions. This is especially true if devaluations of the domestic currency are expected. In this case, the country will not be able to establish a credible peg. On the other hand, interventions to prohibit a revaluation of the currency will either increase the monetary base and jeopardize monetary policy targets to keep inflation rates low or else will cause high cost of sterilization. Allowing for flexibility of the nominal exchange rate facilitates the elimination of this problem, but bears the threat of misalignments of the rate through speculation.

In the first part of this chapter, the costs of foreign exchange market interventions have already been presented. Figure 4.16. demonstrates the monthly changes of the international reserves of Hungary in US Dollar terms corresponding to the method of the balance of payments statistics of the National Bank of Hungary. Therefore, negative values indicate an increase in international reserves. The weight of the changes lies at a glance on the increase side, which fact may be quite surprising considering the frequent exchange rate adjustments. Obviously, December 1995 is an outlier, when there was a foreign direct investment inflow of

USD 3217 million as a result of realizing huge privatization revenues and this may have played a crucial role in the increase of international reserves by USD 3120 million.

Figure 4.16.: Changes in international reserves*



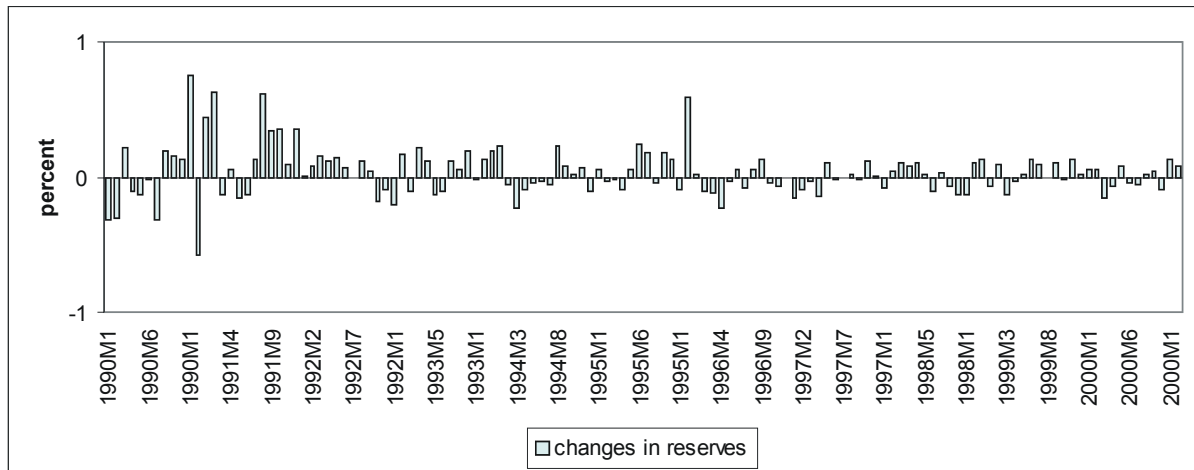
*Since 1999 published in EUR; USD-values calculated using monthly average exchange rates. Negative values indicate an increase in international reserves.

Source: National Bank of Hungary, International Monetary Fund

Another surprising fact is that the amplitudes of reserve changes increased remarkably up to 1994 and did not fade away after the fluctuation band was widened to ± 2.25 percent. This contradicts the theory which tells us that higher exchange rate flexibility spares international reserves but supports the results of Siklos/Ábel (1997a) who identify a shift in foreign exchange market intervention practice in late 1994. At this point again, we must recall that during the operation of the crawling band regime, the exchange rate rested nearly all the time close to the strong edge of the band making the regime to a de facto crawling peg regime. Earlier, the exchange rate was simply adjusted several times instead of interventions on the foreign exchange market. Within the crawling band, the central bank was forced to intervene in order to keep the exchange rate within the band otherwise the announced exchange rate policy would have to be changed and this would have meant a loss of credibility.

We can also recognize some turbulences which were caused by the Russian crises. The central bank was forced to intervene in order to prevent the exchange rate from leaving the band in the second half of 1998. Yet still, interventions in order to defend the weak edge of the band do not seem to be substantial. As an impact of the Russian crisis, the reserves declined by about 1.5 billion US Dollars between August and October 1998. The National Bank of Hungary reported total interventions amounting to 2.5 billion US Dollars. The reason for the difference lies in the increase of foreign exchange deposits of commercial banks with the central bank. This obviously demonstrates that changes in international reserves do not always provide sufficient information about foreign exchange interventions. Moreover, this can be also carried out by for example drawing on credit lines which would not affect the level of the reported international reserves either.

The volatility of the international reserves was calculated on the basis of relative monthly changes. Williamson (1996), who compares the performances of several different countries with different exchange rate regimes, chose to adjust the data to the financial size of the country by applying the monetary aggregate, M0, as a measure for the size. I have neglected this correction because this study investigates only one single country, that is, Hungary. If we have a look at the figure of percentage changes in international reserves (see Figure 4.17.), we can state that the volatility of the reserves declined by 47 percent after the shift in the exchange rate regime (see Table 4.18.). While the changes in reserves rather increased in absolute terms, the reduction in volatility stems partly from the subsequent accumulation of reserves. In December 2000 the stock of international reserves amounted to about USD 11 million and was more than ten times as high as in January 1990. This is again a proof for increased confidence of the market in the Hungarian economic policy. Strikingly, the accumulation of foreign exchange stocks in the balances of the central bank emerged also during the operation of the adjustable peg, when frequent devaluations were carried out.

Figure 4.17.: Percentage changes in international reserves

Source: International Monetary Fund; own calculations

Table 4.18.: Standard deviation of percentage changes in international reserves

January 1990 – March 1995 (S_0)	April 1995 – December 2000 (S_1)	Index (S_1/S_0)
0.11	0.06	0.53

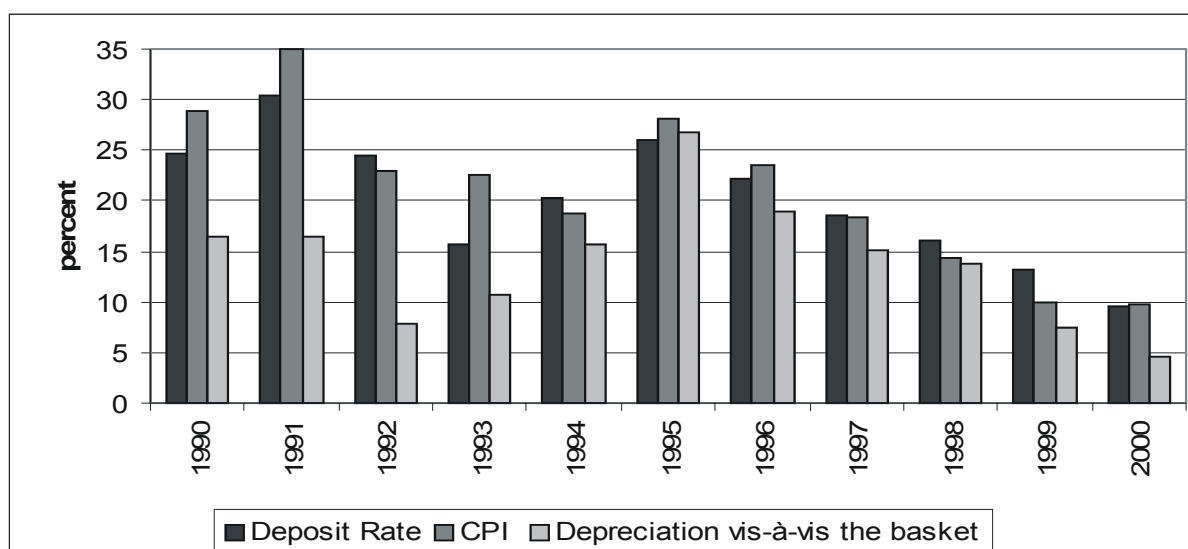
Source: Own calculations

In sum, the new exchange rate regime led to less volatility in international reserves in Hungary, although the amount of changes, that is, in absolute terms was larger than earlier. The increased activity of the central bank on the foreign exchange market may be the result of several factors such as the lasting deficits in the current account and sensibility of the exchange rate to capital flows. The new regime was in this sense even more restrictive than the peg, which was adjusted frequently and in the end did not mean any commitment by the monetary authorities.

(e) Volatility of interest rates

During the period of investigation, interest rates in Hungary were relatively high. The main reason for this must be the high indebtedness of the state. As it can be seen in Figure 4.19., the high rates, e.g. yields on deposits, were in most cases not sufficient to compensate inflation and secure positive real interest rates in order to encourage savings. Real interest rates turned positive in 1997 and in the following years. Nevertheless, in 2000, the market must have hoped for a further reduction in the inflation rate, but such expectations were disappointed by the actual developments. On the other hand, the depreciation vis-à-vis the currency basket was, with the exception of 1995, lower than the deposit rate, so that foreign investors could achieve positive yields after converting their returns to the original currency. However, capital did not flow in observably during the first half of the decade because functioning capital markets were lacking.

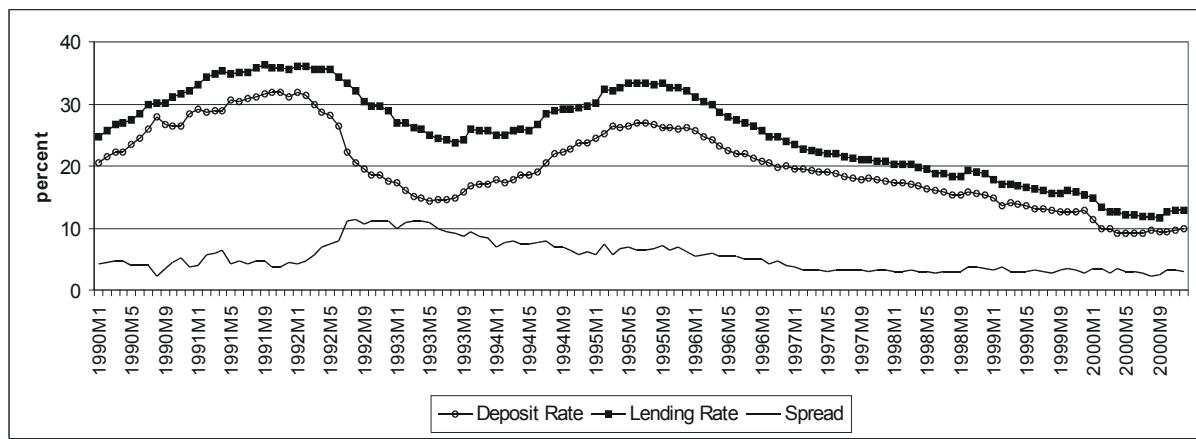
Figure 4.19.: Deposit rates, consumer price index and depreciation



Source: National Bank of Hungary, International Monetary Fund

Besides the high level of interest rates, the spread between deposit and lending rates is also relatively high. This is the result of a lack of competition and inefficiency in the banking system, high reserve requirements⁹⁸, and high losses of banks resulting from bad loans, though with the decreasing level of the interest rates, the spread has been narrowing, thus reducing the profits of the banks. (See Figure 4.20.)

Figure 4.20.: Interest rates



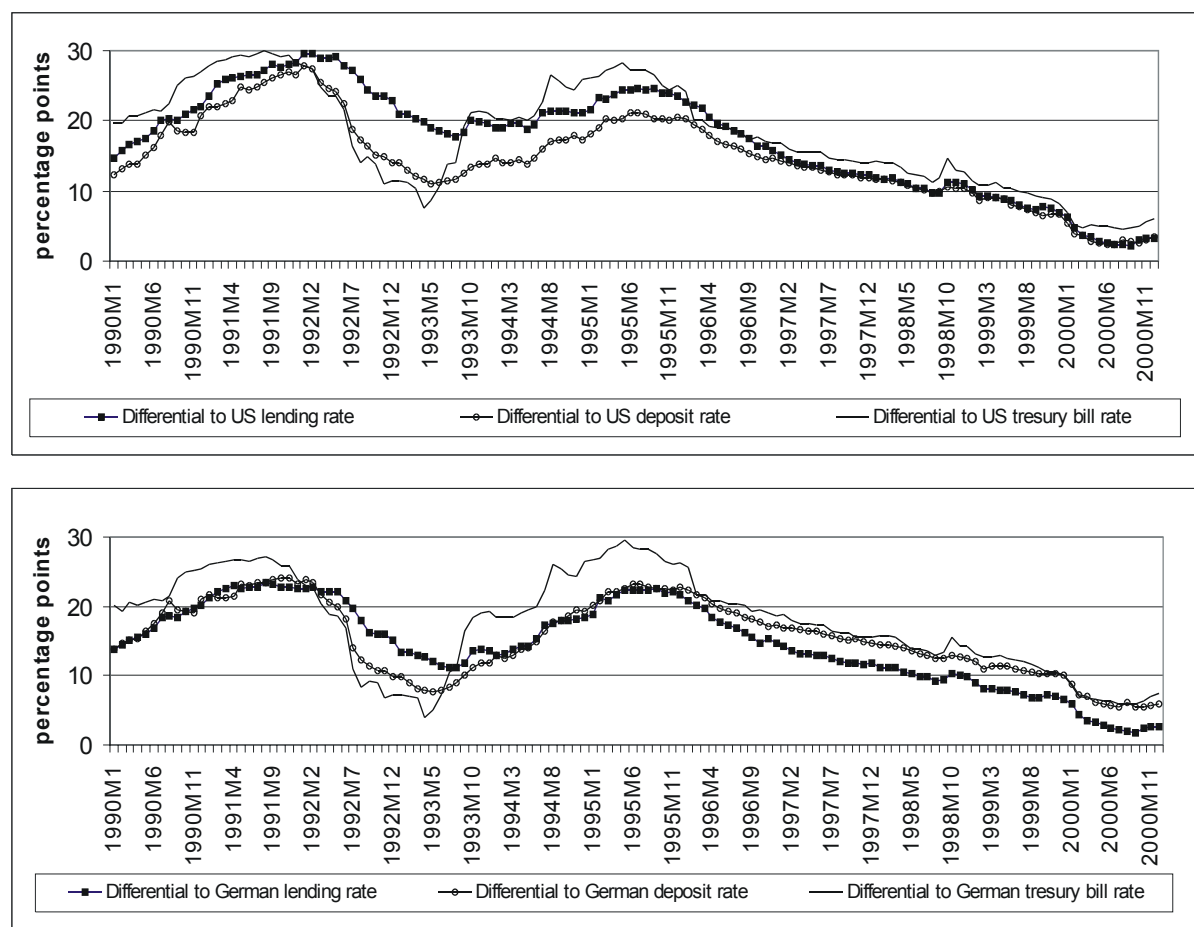
Source: International Monetary Fund; own calculations

As we have seen in the previous chapter, it is not possible to make a general statement about interest rate changes on the basis of theory. The exchange rate regimes implemented by Hungary did not allow for autonomous monetary policy, even though the widening of the fluctuation band provided the possibility to influence the interest rate to some extent by repurchase arrangements (repos) and reverse repos. This was used by the central bank to keep interest rates on a high level in order to encourage savings and capital inflows or to prevent outflows. As a result, the exchange rate got stuck to the strong edge of the band. The central bank was forced to intervene and then sterilize the effects of the interventions on the monetary base. It becomes clear from the activities of the central bank at a glance, that since 1995 the

⁹⁸ 11 percent in the second half of 2000.

main target of the monetary policy must have been to reduce inflation. Therefore, there remained no room for interest rate reduction in order to stimulate investment and economic growth. Interest rates follow the shape of inflation throughout the investigated period and show a similar increase in 1995, but real yields on deposits became positive no earlier than 1997.

The volatility of interest rates can be measured on the basis of their differentials to the corresponding interest rates of industrial countries which demonstrate a high grade of economic stability. This means that the interest rates of the country must be regarded in relation to other countries which play an important role on international financial markets as well as for Hungary and are stable economies. Resulting from the role of the US Dollar and the Deutsche Mark (or Euro) in the composition of the currency basket, which as we have already seen reflects by and large the denomination structure of the country's foreign trade during the period of investigation, the differentials to US and German interest rates will be taken for the calculations. The application of US interest rates in the analyses is supported also by the intervention practice of the National Bank of Hungary, which carried out these transactions in US Dollars until 1999. The exchange rate differentials, which are demonstrated in Figure 4.21., show similar shape for both currency areas and seem to be strongly correlated to Hungarian interest rate figures. Corresponding correlation coefficients are close to one and range from 0.947 to 0.988.

Figure 4.21.: Differentials to US and German interest rates

Source: International Monetary Fund; own calculations

The measure of volatility is calculated as the standard deviation of the monthly changes in the interest rate differentials. The results demonstrated in Table 4.22. clearly show a decrease in the volatility of all yields but lending rates, whereas the figures are quite similar for both currency areas. The convergence to German interest rates was the sharpest. The volatility of differentials to both deposit and treasury bill rates fell by more than 60 percent. The reductions in the volatility of deposit and treasury bill rates vis-à-vis the US Dollar rates were not that striking, still, they amount to about one third. Furthermore, it is remarkable that the volatility of differentials in lending rates increased, but this is completely imputable to the developments of the year 2000, when volatility of all rates but the differential to US treasury bill rates increased. A relatively sharp fall in interest rates in Hungary was experienced in this

year indicating revaluation pressure on the domestic currency following the abandonment of the basket in favor of the Euro. At the end of the year, the fact that the disinflation progress had virtually stopped became visible and the central bank tried to counteract this. The case of lending rates is remarkable in the sense that their differential to the other currency areas was relatively stable during the adjustable peg. After the initial increase in the first few months of the new regime, there was the most distinct reduction in these rates.

Table 4.22.: Standard deviations in monthly changes of interest rate differentials

	January 1990 – March 1995 (S₀)	April 1995 – December 1999 (S₁)	Index (S₁/S₀)
Differential to US lending rate	0.04	0.07	1.78
Differential to US deposit rate	0.11	0.07	0.67
Differential to US treasury bill rate	0.10	0.06	0.67
Differential to German lending rate	0.05	0.07	1.46
Differential to German deposit rate	0.10	0.04	0.39
Differential to German treasury bill rate	0.14	0.05	0.35

Source: own calculations

The results of the above considerations can be summarized as follows. The decline in the inflation rates was accompanied by a decline in interest rates after the increase in 1995. Compared to the adjustable peg, interest rate volatility was substantially lowered during the crawling band regime. The increase of the volatilities in 2000 cannot necessarily be interpreted as a negative phenomenon, but rather as an intention of the central bank to pursue an autonomous monetary policy.

(f) Credibility of the exchange rate policy

A lot of research has been done in economic literature on the investigation of the credibility of exchange rate regimes. Testing methods to analyze the credibility of an exchange rate band to hold are based on the validity of the uncovered interest parity. Empirical analysis on the expectations for the exchange rate to remain within a declared bandwidth can easily be carried out on the basis of forward exchange rates. Assuming that the interest parity criterion holds, futures contracts provide information about the expectations of the participants on the foreign exchange market. According to theoretical considerations, if the market is efficient and investors form rational expectations, the forward rate contains all available information and there is no further opportunity to earn an unusual profit by arbitrage. The forward rate can then be used as an estimate for the future exchange rate. Analogously, the credibility analysis of the crawling band can be made by a comparison of rates to which contracts were closed and the extrapolated edges of the band on the basis of the rate of crawl which was announced for the subsequent period. If the forward rate lies between the upper and lower edge of the projected band, it can be concluded that participants in the foreign exchange market believe in the ability of the central bank to keep the exchange rate within the band, taking also the continuous depreciation of the central parity into account.

However, empirical investigations in industrialized countries deliver little evidence for the suitability of forward rates for the analysis. Possible explanations for the large size of prediction errors in the forward rate were summarized and combined by Frenkel/Levich (1975). The results show that interest parity holds if there are no transaction costs, risk premia or capital market imperfections. Transaction costs and less than infinite elasticity of demand and supply on foreign exchange markets lead to a neutral band around the traditional interest parity band within which points can be interpreted as equilibrium points where there is no profitable arbitrage. Frankel (1980) stresses that rejection of the hypothesis of market

efficiency means the necessity to find an alternative predictor which performs consistently lower errors than the forward rate.

Now, it is clear that the first step to investigate the credibility of the crawling band must be a proof of the assumption of validity of the uncovered interest parity, which is obviously not the case for Hungary. Based on an analysis of a data set of 1995, Barabás (1996b) points out that because of high transaction costs as well as underdevelopment and imperfection of markets the forward rate is not suitable to illustrate expectations about the future exchange rate. Although this is characteristic for countries who pursue a crawling band regime, this is not characteristic for the exchange rate system itself. In Hungary, inefficiency of the institutional environment and markets play a crucial role. By 1995, domestic stock jobbers did not have enough capital at their disposal and foreign investors were restricted in participating in futures contracts over foreign exchange or in purchasing government bonds. Furthermore, they maintained a wait-and-see policy also because of skepticism over the monetary policy. In addition, restrictive monetary policy was carried through by raising reserve requirements and interest rates in order to secure positive real interest rates consistent with an inflation rate higher than the rate of announced continuous depreciation, in order to encourage domestic savings, while Hungarian households preferred savings in foreign currencies. The unsuitability of the forward rates as an estimate for the future exchange rate implies that if forward rates fall out of the projected band, that is, holding Forint-assets offers yields which exceed the foreign interest rate by far more than the rate of crawl, this cannot be explained merely by risk premium requirements for an unscheduled devaluation of the currency.⁹⁹ Barabás also states that approaching the date when contracts have to be executed, forward rates tend to move towards the band, but he rejects the explanation that an unscheduled devaluation is becoming less possible. According to this, forward exchange rates

⁹⁹ See also Darvas (1996).

outside the extrapolated band should be derived from lasting high interest rate differentials exceeding the pre-announced rate of crawl.

Svensson (1991) applies interest rate differentials which embody the expectations about re- or devaluations in the future to test the credibility of exchange rate bands. Again, this method relies on the validity of the uncovered interest parity. However, in the case of imperfect capital mobility as we can observe in the Central and Eastern European countries the interest rate differential cannot deliver appropriate information about the exchange rate expectations. The reason for this lies in the appearance of risk premium additionally to the expected change in the exchange rate. Unfortunately, the two dimensions cannot be observed separately for empirical testing, although data concerning the emission of foreign currency debt could have served as a proxy for the country risk. The spread between the offered yield on a country's foreign currency debt and the London Interbank Offered Rate (LIBOR) excludes an exchange rate risk premium and could therefore be a good measure for the country risk. On the other hand, emissions occur at irregular intervals, in irregular quantities and with different maturity so that the spread must also meet liquidity criteria.

Looking at the above considerations, we might ask whether an analysis of this kind is suitable for investigating the credibility of the commitment of the central bank to keep the exchange rate within the fluctuation band. The lesson we can draw from them is that we have to find another method to make an assessment about the crawling band exchange rate regime in Hungary. Considerations about the sources of exchange rate risk have already been described by the equation 4.2. First, there is a risk of changing the central parity. Second, there is a risk that the exchange rate fluctuates within the band and a risk that it leaves the band. The discussion about the credibility of the exchange rate policy concentrates on the possibility of leaving the band, that is, on the expectations that the domestic currency will be devalued by more than officially conceded. The investigation of Mikolasek (1998) on a data set from the introduction of the new regime to July 1997 which also relies on the uncovered

interest parity¹⁰⁰, and is based on a method using stochastic differential equations to capture all risks of exchange rate changes, shows that there was a turning point in the credibility of the crawling band system in September 1996. The period before this date was determined by devaluation expectations, but the second period was characterized by revaluation expectations.

In the case that the current exchange rate does not correspond to the situation on the foreign exchange market, agents on the market will make transactions which lead to a corresponding adjustment of the exchange rate. This can be repelled by the central bank via direct interventions to settle excess demand or supply on foreign exchange markets. By this, the international reserves of the central bank will change. At this point, we have to recall that changes in international reserves do not always provide sufficient information about foreign exchange interventions. Yet still, variations can be observed. Another alternative can be the variation of domestic interest rates in order to have an indirect influence on the demand for the domestic currency via a redirection of international capital flows. The activities of the central bank to defend the exchange rate of the domestic currency can be observed in the increased volatility of the international reserves or domestic interest rates. Otherwise, the nominal exchange rate has to be changed to correspond to the market situation, resulting in an increased volatility of this variable. Combining these three possibilities in the case of a speculative pressure on the exchange rate of the domestic currency, a pressure index can be composed to detect these processes, which enables us to make a conclusion about the credibility of the stability of an economy and its currency. Eichengreen/Rose/Wyplosz (1995) suggested a method to detect a pressure on the exchange rate which uses the alternatives for monetary authorities to handle the pressure and created an index based on the changes of the key variables. Thus, the index is composed of the changes of the exchange rates, the changes

¹⁰⁰ Mikolasek (1998) remarks that the results would not be modified significantly by taking a

of the interest rates and the changes of international reserves and is calculated as a weighted average of these three values.¹⁰¹ Weights must be used, because conditional volatilities are not equal. An un-weighted average of percentage changes may be driven by variations of one variable, for example the reserves, and may therefore deliver biased results. The authors claim that the literature does not give a guide to the determination of the weights, but they do not do this either.

I calculated a similar index leaning on these considerations and exploiting monthly data from the International Financial Statistics of the International Monetary Fund. The reference country is the United States, because official Dollar rates are readily available in the statistics. Interest differentials are, therefore, calculated against US treasury bill rates. As a speculative attack on the currency can be met by the monetary authorities increasing the interest rate, devaluing the currency, that is, increasing the exchange rate, and by interventions which lead to a decrease of the international reserves, the sign of changes in the reserves must be altered so that a positive change indicates an intervention in order to support the exchange rate. By doing this, all measures to handle a crisis lead to an increase in the value of the index. The mean of the pressure index should be nil in the long term if the economic policy is sustainable. This indicates that interventions and corrections are balanced on the whole and the central bank does not have to carry out drastic measures. As suggested by Eichengreen/Rose/Wyplosz (1995) an exchange market crisis is characterized by a pressure index which is at least two standard deviations above the mean. If we observe high values in close proximity to each other, that is, within two quarters to each side, they are counted together, so that they will indicate one single crisis. Expressing the index according to the

risk premium into consideration, if the premium is modeled as a linear function of the risk.

¹⁰¹ Bayoumi/Eichengreen (1998) constructed a pressure index using information on exchange rate volatility and interventions in order to capture the magnitude of shocks to the foreign market.

above consideration in terms of the standard deviation from the mean, the value 0 means that the pressure index is equal to the mean. The value 1 indicates that the pressure index equals to the mean plus standard deviation which shows that the observed variables were merely subject to normal fluctuations. The critical value is 2. Figures above this value indicate a pressure to devalue the domestic currency vis-à-vis the US Dollar. Eichengreen/Rose/Wyplosz (1995) provide no guidance about whether a speculation on the currency to revalue can be identified by negative values of the index which would mean that the interest rate was reduced in order to stop capital inflow, foreign exchange was purchased by the central bank or the exchange rate appreciated in order to settle excess demand for the domestic currency. Figures below -2 can be interpreted as a revaluation pressure, that is, market forces appreciate the economic performance of the country and corrections in the exchange rate system are needed in order not to jeopardize monetary targets.

Now, let us turn to have a closer look at the data which were analyzed in the previous parts of the chapter. Table 4.23. demonstrates the mean values and the standard deviations in the relative changes of the variables. It can be seen that the mean of changes in the interest rate differential is not significantly negative, not even on the 20 percent level. This signals that the interest rate did not play an important role in supporting the exchange rate policy in Hungary. As mentioned earlier, this cannot be surprising because the central bank endeavored to serve the disinflation target by keeping interest rates high, exceeding inflation rates. The standard deviation of this variable is, however, relatively high and is close to that of the reserves changes. The reductions of the yields followed after sharp increases resulting in a high volatility of this variable. Mean exchange rate changes were significantly positive on the 1 percent level which corresponds to the devaluation trend by about 1.1 percent per month over the period of investigation. As we have seen earlier, the volatility of the exchange rates is relatively low and was reduced during the crawling band regime supporting predictability. International reserves have been gradually accumulated at a rate of about 1.7 percent monthly

over the period on the whole as is demonstrated by the mean value, which is significantly positive on the 5 percent level. The high volatility of this variable is a proof for extended intervention activity of the central bank on the foreign exchange markets. The data also demonstrates that the usage of weights is justified by the different volatilities of the variables.

Table 4.23.: Mean values and standard deviations

Variable	Mean	Standard deviation (S)
Exchange rates (E)	0.01148 (0.01)	0.0246
Interest rates (I)	-0,00871 (--)	0.0830
International reserves (R)	0,01663 (0.05)	0.0892

Significance levels in brackets.

Source: own calculations

One of the most crucial points of the calculus is the determination of the weights, because the results are not robust to this decision. The major requirement is that variations in the index should not vary predominantly with the variations of one of the figures. The weights should be determined in a way that they balance the variations in the figures. Therefore, they have to be reciprocal to them. First, we can use the arithmetic average of observations which is applied as an estimate for the mean value of a sample. Another possibility of determining the weights used to calculate the pressure index can be the volatility defined by the standard deviations.

The main shortcoming of the method is its ad hoc character with respect to the determination of the weights for the calculation of the average of interest rate, exchange rate and reserves changes. The results and implications about the timing of speculative pressure on

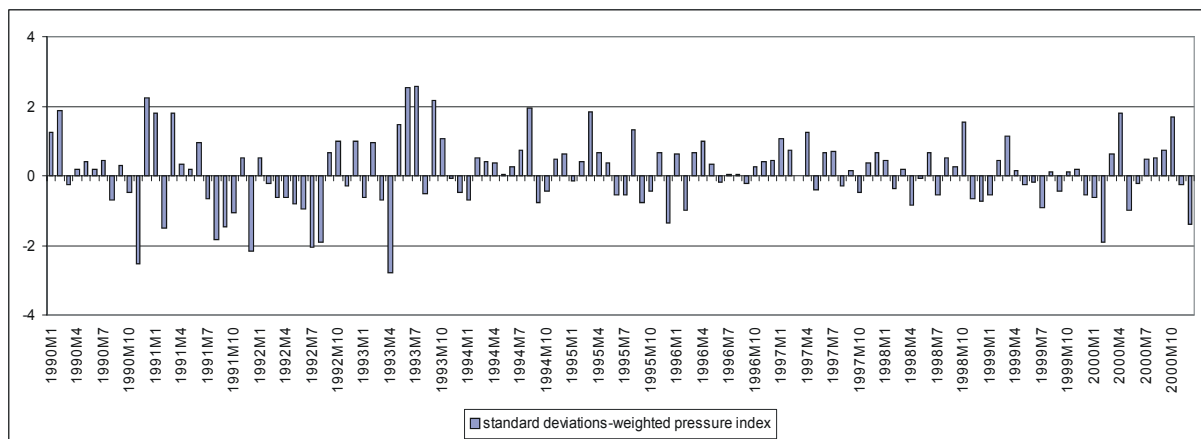
the exchange rate depend heavily on the way the pressure index is calculated. Using standard deviations as weights results in the least fluctuations in the index values. Therefore, the calculation of the pressure index based on standard deviations seems to be the most suitable. This is also the index which meets the requirement that it does not vary predominantly with the variations of one of the key variables. All figures have about the same strength in influencing variations of the index values.

Figure 4.24. shows the deviations of the pressure indexes (PI) from their mean in terms of their standard deviation calculated using the standard deviations of the figures expressed by the following equation:

$$(4.4.) \quad PI = \frac{\frac{1}{S(E)}\hat{E} - \frac{1}{S(R)}\hat{R} + \frac{1}{S(I)}\hat{I}}{\frac{1}{S(E)} + \frac{1}{S(R)} + \frac{1}{S(I)}}$$

The arithmetic averages of the indexes are not significantly different from nil, therefore, the calculations rely on mean values equal to 0.

Figure 4.24.: Deviations of the pressure indexes



Source: International Monetary Fund; own calculations

The composed pressure index, as presented in Figure 4.24., detects turbulences during the adjustable peg, but the figures show a smoothing impact of the shift to the crawling band

regime. The indexes indicate potential crises in February and December 1990. Comparing this with the information provided by the National Bank of Hungary about exchange rate adjustments, we can see that the currency was actually devalued by 1 percent on January 31st, by 2 percent each on February 6th and on 20th, 1990. After December 1990, that is, early January 1991, the currency was devalued by 15 percent, which was the largest devaluation since the unification of exchange rates in late 1981. In the second half of 1993 and in August 1994, the emergence of unsustainable current account deficits and budget deficits caused turbulences on the foreign exchange market and increased the frequency of exchange rate adjustments. These two periods lay outside of the two-quarters surroundings from each other so that they should be analyzed separately. In July and September 1993, where the index shows strong pressure against the domestic currency, devaluations by 3 and 4.5 percent, respectively, were carried out after smaller devaluations throughout the whole year. Nearly the same happened in 1994. Actually, in August 1994 there was a sharp devaluation by 8 percent. Negative values are quite surprising in light of the strong devaluation of the Hungarian currency during the operation of the adjustable peg. They may indicate that corrections were stronger than forced by the market in order to be able to keep the exchange rate on the new level for a longer time. The index does not signal a contagion by the Russian crisis in 1998 which forced the National Bank of Hungary to substantial interventions on the weak edge of the band. The developments demonstrated clearly that foreign investors still think of Central and Eastern Europe as a bloc. This event led to panic reactions and a loss of credibility throughout the whole area. Required risk premia lifted the interest rates in Hungary for 3-months maturity by 4-5 percentage points to 20-21 percent.¹⁰² Nonetheless, the figures of the pressure index underpin the statements of Hungarian monetary authorities that the crawling band system could be operated without noteworthy pressure on the exchange rate to

¹⁰² See also Szapáry/Darvas (1999).

devalue to rates outside the announced band or increase the rate of crawl. The turbulences in 2000 stem from speculations about the change in the exchange rate system which emerged from the obvious exhaustion of the disinflation progress experienced in the previous years.

4.4 The role of fiscal consolidation

The second part of the stabilization program was fiscal consolidation in order to support the achievement of the targets aimed by the exchange rate policy. At the startup of transition, deficits of the central budget emerged and became significant. This was first of all the result of diminishing revenues of the central budget because of a sharp drop in production and bad taxpayers' morale in the arising private sector. At the same time the structure of revenues shifted to indirect taxes such as value added taxes, as consumption expenditures did not drop that sharply as income and tax evasion possibility was limited, and to import duties and taxes resulting from increased imports after liberalization. On the other hand, expenditures could not really be reduced after subsidies were eliminated in 1990-91, because social and administrative expenditures were substantial and rigid.

Furthermore, high interest rate payments appeared in the balances of the central budget after the Central Bank Act (1991/CXXIX.) introduced a ceiling to central bank financing of government expenditures of initially 4 percent of expenditures, which rate was later reduced to 3 percent. In 1991, the activities of the central bank were restricted in correspondence to standards in industrial countries.¹⁰³ The competences of the central bank and the government were redefined. While the fiscal policy remained in the hands of the government, the determination of the monetary policy was assigned to the central bank. Instructions of the government did not have to be followed any more. This was a substantial change in the relationship between the government and the central bank, which no longer grants credit to

the government and raises no credit on behalf of the government abroad. In this way, the central bank gains better control over the domestic money supply, but the government budget itself is confronted with higher costs of debt service. Earlier, there was a special arrangement between the government and the central bank. This arrangement named the central bank as the debtor and the government was granted a credit in domestic currency equal to the value of the raised foreign debt. This was advantageous because the central bank earned a good reputation in international capital markets and was able to get more favorable conditions than the government. The central budget was relieved from interest payments but the value of the debt rose by the devaluation rate of the domestic currency.¹⁰⁴ The shift in financing methods, however, did not increase the expenditures of the central budget, the new system delivering only better transparency. Maintaining the old financing system would not have solved but hidden the deficit problem in the balances of the central bank.¹⁰⁵

According to the widespread view in economic literature, government budget deficits which indicate higher expenditures than revenues of the budget can be made responsible for internal and external imbalances ('twin deficit' problem). First, they contribute to excess aggregate demand and therefore increase prices. Second, they can fuel inflation through a monetization of the deficit and increase the money supply. But even financing via tax revenues (mainly indirect taxes) increases prices, as tax payments will be transmitted to sales prices and will be paid mainly by the consumer. This leads to a widening spread between producer and consumer prices, but also to a persistency in inflationary expectations as long as financing needs of the budget are high. Third, budget deficits are made responsible for current account deficits. According to the keynesian view, current account deficits are equal to budget

¹⁰³ See Csikós-Nagy (1997).

¹⁰⁴ See also Gáspár (1997).

¹⁰⁵ See also Barabás/Hamecz/Neményi (1998).

deficits if domestic savings are used and are sufficient to finance private investment. This context can be described by the following simple equation:

$$(4.5.) \quad (X - M) = (T - G) + S - I$$

where

$(X - M)$ = current account balance (exports (X) minus imports (M))

$(T - G)$ = budget balance (revenues (T) minus expenditures (G))

S = domestic savings

I = private investment

Fourth, increased demand for borrowing raises interest rates and high interest rates discourage real investment (crowding-out). Thus, it is important to investigate the structure of the deficit in Hungary to detect these effects.

In order to make an assessment about the demand effects of fiscal activities, the development of the components of expenditures and revenues must be viewed, because especially payments on state debt play a crucial role in them. Until 1994, the statistics reported gross budget deficits (D_b) and delivered no appropriate information about the additional financing need or about the impact of the expenditures on aggregate demand, because expenditures included debt repayments as well, although, debt servicing payments have no or limited influence on aggregate demand. Hence, using published data of gross budget deficits lead to an overestimation of the inflationary effect. Therefore, the data from the official statistics have to be corrected for this item:

$$(4.6.) \quad D_b = E + I_n + A$$

where

E = primary deficit

I_n = gross interest payments ($I_n = I_d + I_t$)

I_d = interest payments received by domestic lenders

I_t = interest payments received by foreign lenders and the central bank

A = repayment (amortization of credits)

Since 1995, the Government Finance Statistics (GFS) System has been applied also in Hungary. Accordingly, the reported deficit excludes debt repayment and thus shows changes in state debt. However, it still includes interest payments which consist of payments to domestic and foreign lenders and has limited influence on aggregate demand. Only interest payments to domestic agents (firms and households) contribute to aggregate demand but not payments to foreign agents or to the central bank. As regards payments to domestic lenders, a compensation for the effects of inflation on the value of the capital have to be subtracted from these yields. This part of interest revenues to domestic companies and individuals does not contribute to demand, if domestic lenders are free from money illusion and aim at preserving the real value of their capital. This assumption is reasonable and seems to apply to Hungary. Adjusting for inflation we get the operational deficit (D_o):

$$(4.7.) \quad D_o = E + I_t + I_r$$

$$\text{with } I_r = I_d - \left[B - \frac{B}{1+P} \right]$$

where

B = domestic state debt

P = inflation rate

The contribution of the budget deficit to aggregate demand is given by the adjusted operational deficit (D_{ok}) which includes only the primary deficit and the real interest payments (I_r) to domestic lenders:

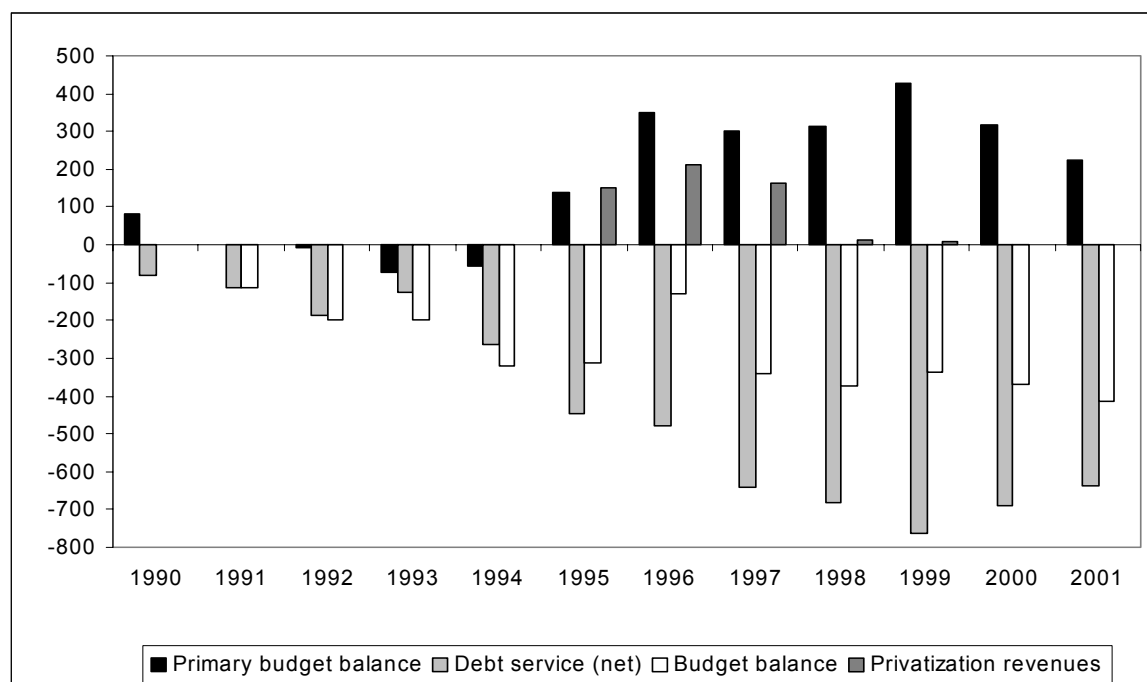
$$(4.8.) \quad D_{ok} = E + I_r$$

Equation 4.8. shows that only a deficit in the primary balance and real interest payments to domestic lenders increase aggregate demand. A positive primary balance, which is not compensated by real interest payments, evolves a contractive impact. Calculations of Obláth (1995) for the adjusted operational deficit show a steady reduction of this value and even a change to surplus in 1994, so that the hypothesis that budget deficits contributed to overheating of the economy by increasing the aggregate demand could not be confirmed.

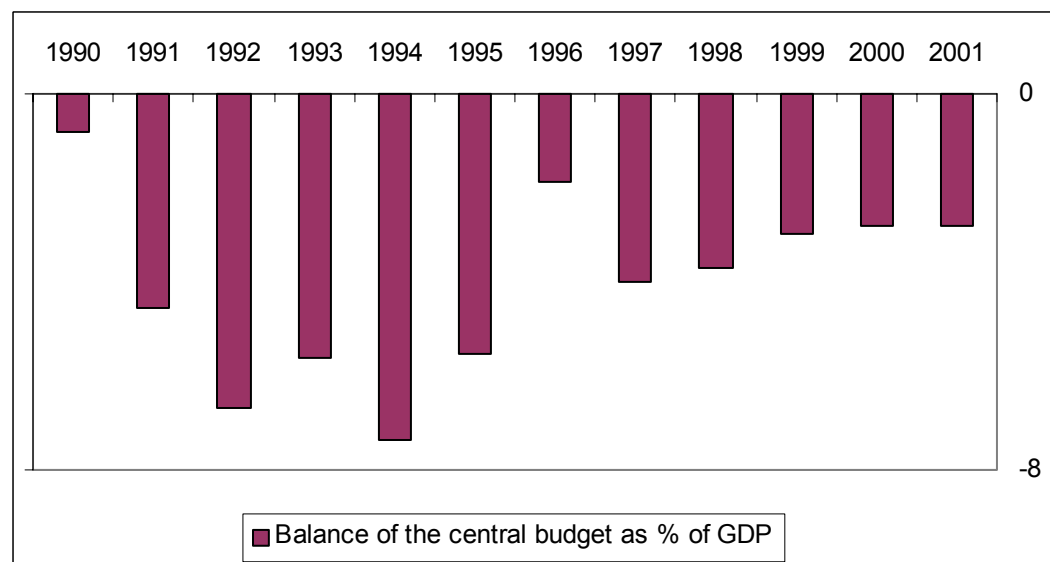
Quite the opposite, the data revealed a contractive impact. Regarding the primary balance it delivers contradicting results. We can observe a worsening in 1991-93 due to negative social and welfare effects of the macroeconomic developments. In 1994, the trend was stopped. There was a serious tightening in budgetary expenditures in 1995. The primary balance has been positive since then. On the other hand, debt service expenditures increased continuously, and can be seen in growing absolute values. This was the result of the shift in financing for a bulk of budget deficits from central bank credits (monetization) to the financial market in the early years. While in 1993-94 the ceiling of central bank deficit financing was injured, since 1997 there has been no need for central bank financing.¹⁰⁶ A further factor in the state debt increase was the conversion of bad loans of state owned banks to government bonds. Adjustments in the nominal exchange rates worsened the situation additionally. Until 1994, the government received compensation for the currency devaluations carried out by the central bank through granting an interest free credit facility. These credits were converted to interest bearing credits after 1995.¹⁰⁷ Figures 4.25. and 4.26. show the composition of the central budget and the budget deficit ratio to GDP. The budget balance shows a hidden loosening of the fiscal policy from 1997 on, which is not expressed by the primary balance.

¹⁰⁶ See Barabás/Hamecz/Neményi (1998).

¹⁰⁷ See Siklós/Ábel (1997b).

Figure 4.25.: Components of the central budget (in HUF billions)¹⁰⁸

Source: National Bank of Hungary, Ministry of Finance; own calculations

Figure 4.26.: State budget deficit ratio

Source: National Bank of Hungary, Central Statistical Office; own calculations

¹⁰⁸ Until 1994, no privatization revenues were reported. Privatization revenues were subtracted from budget revenues after 1995.

As regards the nominal state debt ratio (b) as a percentage of GDP, this grows if a part of the primary debt ratio (d) is not compensated by seigniorage revenues (s), by high real interest rates (r) and by consolidation of debtors and banks (nd)¹⁰⁹:

$$(4.9.) \quad \dot{b} = (d - s) + b(r - \dot{y}) + nd$$

Thus, the main problem lies in the level of real interest rates which exceed the growth rate of real income (\dot{y}), and in the consolidation measures. There was a significant change in net indebtedness from 1994 to 1995: indebtedness increased relative to GDP in 1994, but since 1995 the ratio has decreased. The gross state debt ratio was reduced substantially from 86.5 percent in 1995 to 56.7 percent of GDP in 2000. (See Table 4.27.) This development can be traced back to an improvement of the primary balance and to the speed-up of the privatization process, the revenues of which were to a substantial part used for repayment of external debt accumulated during the 80s, and positive economic growth rates since 1994. The assignment of privatization revenues for repayment in 1995 was a precedent, as in other years it has been used to finance expenditures. Moreover, real interest rates, which were constrained by the policy of sustainable disinflation, became the major obstacle.¹¹⁰

Table 4.27.: Gross public debt as a percentage of GDP

1995	1996	1997	1998	1999	2000	2001
86.5	72.6	63.7	62.1	60.9	56.7	54.0

Source: National Bank of Hungary, Ministry of Finance

The problem of high nominal interest rates is a vicious cycle. On the one hand, they are needed to assure positive real interest rates in order to encourage savings. On the other hand there is a problem with high interest rates for state indebtedness which is twofold. First,

¹⁰⁹ See Obláth (1995).

¹¹⁰ Halpern/Neményi (2000).

interest rates grow as a result of high budget deficits and increased demand for borrowing. Second, high interest rates create a heavy burden on the central budget and contribute to further debt accumulation. In the case of Hungary, interest payments sunk gradually from 9 percent in 1995 to 5.5 percent of GDP in 2000.¹¹¹

Contrary to the widespread view, seigniorage revenues have not played a more important role in deficit financing than they have in developed countries since 1992.¹¹² (See Table 4.28.) Since financing through central bank borrowing did not take place from 1997 on and primary balances are positive, budgetary expenditures should have no significant effect on inflation.¹¹³

Table 4.28.: Seigniorage revenues in percent of GDP

1994	1995	1996	1997	1998	1999	2000	2001
-0.6	1.3	1.4	1.0	1.2	1.3	1.0	0.9

Source: National Bank of Hungary

As we have seen, the views about the role of budget deficits differ. If they result from debt service expenditures, they do not contribute to current account deficits. However, an interdependence between budget and current account deficits cannot be rejected for the Hungarian data.¹¹⁴ Figure 4.29. shows a slight positive correlation between the two deficits between 1991-2001, while the first two years of the period were outliers with current account

¹¹¹ Source: National Bank of Hungary.

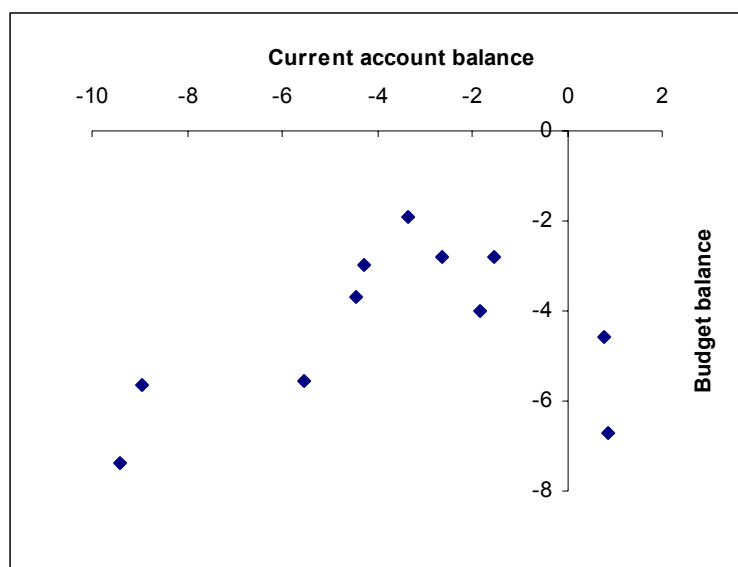
¹¹² See also Neményi (1999).

¹¹³ Laski (1995) analyses the interdependence between deficit spending and inflation. The model concludes that in a case where there is free production capacity and labor force in the economy, deficit spending does not necessarily increase inflation as quantity adjustments should prevail. In Hungary, the unemployment rate is relatively low and decreasing, but still, there is no full employment.

¹¹⁴ See Gáspár (1998).

surpluses and state budget deficits. The corresponding correlation coefficient amounts to 0.329¹¹⁵. The relationship between the two deficits is weak in Hungary during the period of investigation. Merely 8 percent of the current account deficit can be explained by the deficit in the central budget. Excluding the outliers from the estimation, however, delivers stronger results. The value of the correlation coefficient, 0.837¹¹⁶ proves a strong positive correlation between the two balances on the data from 1993-2001. About 70 percent of current account deficits seems to be caused by budget deficits in this period.

Figure 4.29.: Current account and budget balances as a percentage of GDP 1991-2000



Source: National Bank of Hungary; own calculations

To sum up the above discussion, the results are not clear cut. It seems proven that budget deficits did not have a direct effect on inflation while the impact on the current account balance cannot be fully rejected. But it is straightforward that if fiscal consolidation contributed to stemming of inflationary expectations, which are, as shown in preceding chapters, the main driving force in the inflation process, fiscal consolidation supported the

¹¹⁵ Own calculations.

¹¹⁶ Own calculations.

success of monetary and exchange rate policy. It can be stated that fiscal policy did not countervail the targets of monetary and exchange rate policy in the first years of the program, although in 1997 a loosening of fiscal discipline could be observed.

4.5 Summary

In the preceding chapter a thorough empirical analysis of the crawling band exchange rate regime was carried out, concentrating on the operation period between 1995 and 2000. The aim was to give an answer to the question whether the change in the course of economic policy, that is, of the exchange rate policy in particular, was successful.

First, a short review of the developments of selected macroeconomic indicators was presented. Real growth rates of GDP as well as real wage developments show a substantial improvement in the economic situation. After two lean years stemming from the restrictive measures of the stabilization program, the economy began to expand with relatively high rates and the population participated in this by increasing real wages accompanied by gradually decreasing unemployment ratios. The external debt of the country was reduced. This progress was substantially supported by inward foreign direct investment and revenues from the privatization of state owned companies. Now, credit rating institutions, such as Standard & Poor's, classify Hungarian financial assets in the investment category (A-). Foreign direct investment also helped the restructuring process of the economy. The international competitiveness of the manufacturing sector improved, too, and the country grew from a traditional exporter of agricultural products to an exporter of mainly manufactured goods. More than 80 percent of exports are made up from this group at present.

In the next part of the chapter, a system of assessment criteria was set up, which demonstrate to what extent the targets aimed at by the establishment of the crawling band system were reached. This exchange rate regime is usually implemented by countries which

have relatively high inflation rates accompanied by current account imbalances. Therefore, it is applied to provide an anchor for the domestic economy via the nominal exchange rate and maintain international competitiveness in cases when neither a peg nor a floating rate regime is viable. The key variables of the analysis are, resulting from this consideration, the inflation and export performances, the development of the current account balance as well as the volatility of the exchange rate, the international reserves and the interest rates.

The development of the key variables is throughout positive, that is, inflation has fallen, exports are growing at higher rates than earlier and the current account deficits are sustainable. The volatility of the exchange rates, international reserves and interest rates fell also in general. However, the achievements cannot always be assigned to the implication of the crawling band regime.

Additionally, an index was developed in order to detect speculative pressure on the exchange rate which can be used as an indicator of credibility of the pursued policy in case interest differentials include risk premia. The calculations show that the credibility of monetary authorities has clearly improved by the introduction of the new exchange rate system.

As regards fiscal consolidation, it is not clear cut as to whether it has contributed to the improvement in the current account position and the decrease in inflation rates, but it seems reasonable to assume that it added a substantial part to the confidence in the Hungarian economic policy in general and in the monetary policy in particular.

In spite of generally good results, by 2000 it became obvious that no further enhancement could be expected from the crawling band. The most striking indication for this conclusion is that the disinflation progress stopped, which calls for more monetary policy autonomy of the central bank so as to be able to serve further price stabilization and nominal convergence to the Euro area. This issue will be discussed in detail in the next chapter.

5. Hungary's prospects for membership of the Economic and Monetary Union

5.1 Economic convergence

In the previous chapter we have seen that the exchange rate policy strategy pursued by Hungary since 1995 has contributed to the improvement of macroeconomic stability of the economy. This was not only the achievement of the exchange rate policy alone, but also the support it could relish from the side of fiscal and income policies played a crucial role. Furthermore, the privatization process via the sale of state enterprises to mainly foreign investors brought high foreign exchange revenues and served for the formation of a competitive economic structure. The accession of the country to the Organisation for Economic Co-operation and Development (OECD) and to NATO, as well as far-reaching liberalization of capital movements improved the economic and political attitude vis-à-vis Hungary. The exchange rate policy itself was an important factor in maintaining international competitiveness which can be seen by observing the real exchange rate. Calculated on the basis of value added, the real effective exchange rate was stabilized on the level of 1995, while based on consumer price indexes a revaluation could be observed.¹¹⁷ Additionally, the strategy was obviously successful in establishing confidence in the Hungarian economy and currency. The combination of all these factors together contributed to the success of the Hungarian economic stabilization up to 1999.

As the developments in 2000 showed that prospects for further improvement were rather poor, the exchange rate policy strategy was changed to an exchange rate target zone based on the example and shadowing of the ERM2 in 2001. This means that the central parity of the Forint is fixed vis-à-vis the Euro with the possibility of fluctuations according to market conditions within a band of ± 15 percent. Originally, this step was planned for cases where

¹¹⁷ See also Halpern/Neményi (2000).

inflation differential to the European Union average goes under 3 percent bearing in mind equilibrium real exchange rate appreciation during the catch-up progress. Hungarian monetary authorities had believed that a fixed central parity was compatible with a level of about 5 percent yearly inflation. The transition to a more flexible system happened without this precondition actually entering. Quite to the contrary, the aim of the change was to give way to the nominal revaluation pressures and provide more room for autonomous monetary policy to determine and follow its own target. This means that the exchange rate does not constitute a target for monetary policy and anchor for commodity price stabilization anymore. The introduction of an inflation target in order to channel inflation expectations is a clear sign that the central bank is ready to take the challenge of responsibility for the monetary policy. The exchange rate policy is provided with the flexibility which can help the economy to find the equilibrium exchange rate of the domestic currency.

After stating the positive outcome of the stabilization efforts made by Hungarian authorities since 1995 in the previous chapter, we must now turn to an assessment of the developments with respect to the question of future membership in the Economic and Monetary Union (EMU). As already mentioned, the criteria which have to be met by the candidates for accession into the European Union, the so-called 'Copenhagen Criteria', do not explicitly include the accomplishment of the criteria set up to prove the ability to participate in the Economic and Monetary Union. However, it has to be stressed that this is still implicit in the criterion saying that the new member has to be able to take on the obligations of membership. Adherence to the aims of political, economic and monetary union is listed in this context. This means that accession candidates have to pursue a proven record of stability oriented economic policy. Therefore, it is important to make some considerations about Hungary's prospects of becoming a member of the Economic and Monetary Union. Legally, this presupposes nominal convergence to the Euro area which is strictly defined and written

down in the Maastricht Treaty. The institutional prerequisite of membership in the monetary union means the independence of the central bank from political influence.

In the first step, the economic and institutional conditions of membership in the Economic and Monetary Union and the prospects of Hungary of fulfilling these criteria will be analyzed. The economic prerequisites as defined in the Maastricht Treaty are widely known as convergence criteria. They include the following:

- Annual government deficit must not exceed 3 percent of GDP.
- Total outstanding government debt must not exceed 60 percent of GDP.
- Rate of inflation to be within 1.5 percent of the three best performing member countries.
- Average nominal long term interest rate must be within 2 percent of the average rate in the three countries with the lowest inflation rates where interest rates shall be measured on the basis of long term government bonds or comparable securities.
- Exchange rate stability, meaning that for at least 2 years the country concerned has kept within the 'normal' fluctuation margins of the European Exchange Rate Mechanism (ERM) of ± 15 percent.

The treaty sets out economic goals which countries must be seen to pursue if they are deemed fit for the Euro. This means that countries not actually meeting the criteria may be admitted if it can be seen that they are on course to meet these targets.

There is a tremendous amount of literature about the economic proposals of the convergence criteria. Nonetheless, the formulation of the set of criteria itself is not regarded as questionable, rather its numerical concretization. We can say that the convergence criteria include the main figures to assess macroeconomic stability of an economy. The only thing that may be subject to some criticism is the numerical definition of the criteria and the possibility of fulfilling them by 'creative bookkeeping'. Nevertheless, if the figures are set at reasonable levels, they imply the similarity of the economic developments in the member

countries of the currency union. Therefore, this analysis should not be focused on the discussion of the convergence criteria but on the prospects of Hungary to fulfill them in the near future.

Table 5.1.: State of convergence in 2000

	Reference value	Hungary
Annual government deficit	3.0	3.7
Gross government debt	60.0	56.7
Inflation	2.4	9.8
Interest rates	7.2	7.98 – 9.15
Exchange rates*	±15	3.61

* Difference between the Euro rates from December 31st, 1998 and December 31st, 2000.

Source: European Central Bank, National Bank of Hungary

At present, Hungary is far from fulfilling all the convergence criteria. It is difficult to gather data for 2001 at the time, but based on data from 2000 and using the reference values published in the Convergence Report 2000¹¹⁸, the picture is clear at a glance. (See Table 5.1.) It is not the fiscal criteria which seem to be a serious problem. As already shown in Chapter 4.4., the gross government debt decreased substantially during the last decade and arrived at 56.7 percent of GDP outperforming by this some present Euro area members. As regards the annual government deficit, the results are also promising but with some restrictions. The balance of the central budget lay below –3 percent of GDP in 2000 and even in 2001 in spite of strong improvement, so that further tightening would be necessary to hit the margin. Additionally, an adjustment of the calculation standards to those used in the European Union would worsen the position by more than one percentage point. Then, guarantees and securities granted by the state to the Hungarian Development Bank and to the Hungarian Privatization

¹¹⁸ European Central Bank (2000)

and State Holding should be included into the calculation. Furthermore, European Union membership is likely to burden the central budget with some additional expenditures and push the country further away from reaching the government deficit criterion. A possible ERM2 and EMU membership of Hungary would mean a great challenge for the fiscal policy which would be responsible for securing internal and external stability after no autonomous monetary policy can be pursued¹¹⁹. Nonetheless, the monetary policy is already predetermined by the announced development of the exchange rates and the growing liberalization of capital movements even before the accession so that fiscal policy always plays an important role. The commitment to fiscal discipline is a very difficult task with respect to the process of harmonization, which, on the one hand, possibly reduces budget revenues. On the other hand, meeting the requirements of EU membership imposes an additional burden on the expenditures' side. The fiscal policy will carry the burden of the harmonization process to the 'acquis communautaire'. The budget itself does not have to be harmonized, as there is no obligation to change the system of the budget¹²⁰, which was drawn up in any case according to the Government Finance System in the early 90s. Nevertheless, the budget must be able to receive the financial resources from the European Union and to transfer the contribution of Hungary as a member state to it. According to calculations based on community rules, the country will be obliged to make payments amounting to about 1.5 percent of GDP including transfers to the budget of the Union and all complementary obligations. This sum will worsen the balance of the central budget. However, the resources which will flow to the country amount to about 5 percent of GDP so that in sum the welfare of the country will probably improve^{121,122}, although the central budget itself will not benefit from financial resources from

¹¹⁹ See also Gáspár/Várhegyi (1999).

¹²⁰ Bécsy (2000a).

¹²¹ Bécsy (2000b).

the European Union's budget. Moreover, the stabilization of domestic prices may lead to a worsening of the primary budget balance because the nominal value of the expenditures is rigid and cannot be adjusted to the rate of inflation which can be quite convenient for the central budget in case of higher than anticipated inflation rate but not in the opposite case while the real value of the interest payments increases with decreasing inflation if interest rates are fixed.

As regards the criteria for inflation, interest rate and exchange rate stability, it is straightforward that these criteria are closely connected to each other, especially in the case of a Central European transition country like Hungary. As long as inflation is high, nominal interest rates must also be high as they have to be set at a level which secures real interest rates of at least 2-3 percent to encourage savings. Furthermore, nominal exchange rates must also be adjusted for inflation in order to maintain international competitiveness and provide for balance of payments equilibrium. The extent of adjustments should be pre-announced as well as taking into account the changes in the equilibrium real exchange rate during the catch-up progress. In this way, monetary authorities obtain the possibility of a continuous reduction of the inflation rates via a channeling of inflation expectations. The foregoing analysis has discussed the role of the exchange rate policy strategy pursued by Hungary since March 1995 in managing to find a balance between the targets of inflation reduction and maintenance of international competitiveness while serving for predictability of the nominal exchange rates. It was stated that good work has been done and the macroeconomic stability of the economy was improved. Inflation and interest rates were reduced. Exchange rates were kept within the band without difficulties and there was enough room for reducing the rate of depreciation of the central parity gradually. After the very successful year in 1999, further reduction in the inflation rates were not possible in light of the oil price shock, the strength of the US Dollar

¹²² How far the new members will be included into the system of subsidies is still subject to

vis-à-vis the Euro and increases in food prices during 2000. Additionally, a pressure to increase prices was induced by the increase of the minimum wage level by about 60 percent, effective from January 1st, 2001.¹²³ A new modification in the course of the exchange rate policy became necessary again, because the progress in inflation reduction had obviously stopped and the inflation rate sticking at a level of about 10 percent. The solution was seen in fixing the central parity (October 1st, 2001) to the Euro and widening the fluctuation band (May 4th, 2001). The fixing of the central parity should serve the further reduction of inflation expectations and inflation rates. Regarding the present path of inflation, it is surprising and quite contrary to expectations that it was possible to fix the central parity so credibly. This may have raised the differentials to foreign interest rates because of higher devaluation expectations. In fact, the nominal exchange rate revalued by nearly 10 percent at the moment of widening the band to ± 15 percent and there is no sign of an upswing of long-term interest rates. This states the strong confidence of the markets in the Hungarian economic policy and currency. However, there is still some cause for concern about the issue of international competitiveness. The advantage of the widening of the fluctuation band was that this allowed for an appreciation of the nominal exchange rate and released the National Bank of Hungary from interventions. It is not yet clear whether this was actually suitable for reducing the costs of sterilization. But it is obvious that this step provided more room for maneuver of the monetary policy, such as influencing the interest rates in order to control inflation. This also increases the exchange rate exposure, that is, the risk of devaluation and the required premium to cover this risk. In sum, interest rates tend to be increased by this step. Nevertheless, speculative capital inflows will probably be reduced which again decreases the costs of sterilization.

negotiations. It is planned to start with low levels of financial support, then increase gradually.

¹²³ From HUF 25,500 to HUF 40,000. By January 2002, a further increase to HUF 53,000 was introduced.

The crawling band exchange rate system was designed in a way which bound the hands of the central bank in order to replace a lack of credibility. The main question about the modification of the exchange rate policy strategy in this situation is whether the central bank has gained the confidence of the economic agents so that it will be able to pursue a credible monetary policy in a wider band. The fact that the exchange rate could be kept within the band during the operation of the crawling band and rested mostly at the strong edge of the band speaks for this. Until early 2001, there was no consensus between the president of the central bank and the minister of finance about what to do. It was clear that the crawling band system as it was constituted would not make any further improvements in the reduction of inflation and a modification was unavoidable. Against the background that the main source of the success of the stabilization package lay in the combination of the exchange rate policy with fiscal discipline and control over the real wage developments at the outset of the program, this decision deserved serious consideration. And this especially because, by 1997, real wages had increased and fiscal policy had been loosened. The debate was over when Zsigmond Járαι left the chair of the Ministry of Finance to become president of the central bank and replace György Surányi in April 2001. Járαι ‘accepted’ his own earlier proposal to reduce the rate of crawl in April then widened the band in May 2001. In summer 2001, an inflation target was announced to channel inflation expectations. The goal was set to an ambitious 4.3 percent (± 1 percent) by the end of 2002. Nonetheless, the consumer price index amounted to about 9 percent in 2001, even if price increases decelerated to 6.9 percent by the end of the year. The reduction in inflation can be more the consequence of revaluation of the Forint than a result of the successful monetary policy activity of the National Bank of Hungary. Hence, it does not signal further prospects for rapid disinflation, because it jeopardizes international competitiveness.

As regards monetary policy instruments, their harmonization to European Union practice means in the first instance a reduction of the reserve requirements, which at present

amount to 11 percent of deposits and thus are very high compared to the European Union level. The reduction of the reserve requirements will have a liquidity effect which has to be neutralized by other instruments like increasing the real interest rates and may worsen the position of Hungary in fulfilling the Maastricht interest rate criterion. On the other hand, the spread between deposit and lending rates can narrow and this leads to a reduction of the average interest rate level.

It is valid for all Central and Eastern European candidates that there must be an inconsistency problem between the exchange rate and the inflation rate criteria¹²⁴, which calls for serious considerations as to whether the candidates should by all means strive for an early membership in the Euro area. This would only be the case if the benefits of the membership outweighed the costs which would emerge from the suggestion that a renegotiation or reconsideration of the criteria would be needed in case they fail nominal convergence to the Euro area. Due to relative price adjustments and the Balassa-Samuelson effect, inflation rates will long be higher in the Central and Eastern European countries than in the core of the European Union and the equilibrium real exchange rate vis-à-vis the Euro appreciates. The Balassa-Samuelson effect means that during the catch-up progress, the Central and Eastern European countries underlie continuous asymmetric real shocks, that is, supply shocks compared to the core countries of the monetary union. In the absence of mobility of production factors, especially of labor, and with price and wages rigidities, exchange rate changes will still be needed, otherwise a differential of inflation rates to the core countries has to be taken into account. Estimates of the measure of the equilibrium real appreciation due to the catch-up progress vary with the method of calculation¹²⁵ but all have in common that this exceeds the 1.5 percent allowed inflation differential according to the inflation criterion. Szapáry (2000) argues that a nominal appreciation in order to prevent an adjustment of the

¹²⁴ See also Buitier/Grafe (2001).

prices via inflation would not be accepted by producers in the Central and Eastern European countries as it would cause extreme deterioration in international competitiveness as long as inflation is not slowed down. This could happen following a time lag after appreciation. As a matter of fact, neither exchange rate adjustments nor inflation deviations by more than 1.5 percent are allowed by the Maastricht criterion and this might represent an inconsistency problem with the criteria. This argument can support either the demand for derogation from the inflation criterion¹²⁶ or rather the view that the whole project of the introduction of the Euro was too early or else that the monetary union is too wide, so that Euro-Land itself is no optimum currency area. An example to support this opinion is the case of Ireland, which performed well above European Union average growth rates, close to 10 percent, in 1999 and 2000. The inflation rate accelerated to 5.6 percent in 2000¹²⁷ because of losing the possibility of using the nominal exchange rate for adjustment. This consideration would also reject an early accession of the Central and Eastern European countries into the EMU and leads to the logical interpretation that the accession candidates may not yet be ready to become members of the monetary union. The disadvantages of membership could prevail as long as the nominal convergence to the present European Union is not sustainably achieved. This topic must be even discussed in this chapter, that is, for a thorough economic analysis we have to ask in the next stage for the costs and advantages of forcing a rapid introduction of the Euro in Hungary even by means of a unilateral adoption of the common currency, called ‘euroization’. This poses the question of whether the country could be a part of the Euro area without difficulties, which has to be investigated on the basis of the theory of optimum currency areas.

¹²⁵ Estimates for Hungary see in Chapter 3.2.

¹²⁶ See for example Buiter/Grafe (2002).

¹²⁷ Source: ESRI, Dublin.

5.2 Validity of the theory of optimum currency areas

The theory of optimum currency areas provides a set of criteria to assess the similarity of two economies or their ability to adjust to shocks without using the nominal exchange rate as an absorber. In the case of the Central and Eastern European countries, the main problem may be the occurrence of real shocks asymmetrically to the European Union or asynchronous business cycles. As already discussed above, the existence of productivity differentials is empirically stated for most Central and Eastern European countries, especially for Hungary. This means that the economy is subject to continuous supply shocks which make an appreciation of the real exchange rate necessary. An irrevocable fixing of the nominal exchange rate would in this case accelerate inflation. Therefore, monetary policy should be tighter for Euro area members going through a catch-up process to the core members.¹²⁸ Nonetheless, the European Central Bank conducts a monetary policy which focuses on the Euro-zone average so that it is dominated by the core members such as Germany and France.

On the other hand, recent theoretical considerations stress the endogeneity of the optimum currency area criteria. For example, Frankel/Rose (1998) argue that increased trade integration is likely to lead to a convergence of business cycles which means that sectoral demand or supply shocks affect all countries at the same time. This results from the elimination of transaction costs which enhance trade relations within the currency area. To the extent that intra-industry trade rather than specialization is promoted by this, national business cycles become synchronized. The ‘Lucas-critique’¹²⁹ to the theory of optimum currency areas tells us that the entry to a currency area changes economic behavior and economic structures. Corsetti/Pesenti (2002) follow the same idea and point out that a credible policy commitment to a monetary integration may lead to a change in pricing strategies of firms to set prices in

¹²⁸ See also Gros (2000).

¹²⁹ See Lucas (1976).

local rather than in domestic currency terms. This again makes currency union the optimal policy choice.

There has been a lot of empirical research on the subject of real shocks in the Central and Eastern European countries, too. They deliver a quite different picture for these countries, but the position of Hungary appears to be outstanding with respect to correlation in terms of intra-industry trade as well as demand and supply shocks. As regards intra-industry trade, Hungary outperforms some present Euro area members such as Finland and Portugal.¹³⁰ The reason for the good performance in supply shock correlation lies in the high attraction of the country to foreign direct investment and very intensive trade relations to the European Union.¹³¹ Boone/Maurel (1999) find that Hungarian business cycles are fairly closely correlated to German cycles so that joining the monetary union would bring net benefits. Fidrmuc (2001) states that recovery after the transitional recession in Central and Eastern Europe was strongly promoted by exports to the European Union. The results of his estimation show that developments in the area are driven to an increasing extent by business cycles in the European Union.

As we can see, the question as to whether the Central and Eastern European countries, especially Hungary, are subject to intensive asymmetric shocks vis-à-vis the European Union is controversial, so that it cannot be decided easily. Therefore, it seems useful to make further considerations about whether there exist mechanisms to execute the adjustment without the necessity of nominal exchange rate changes once an asymmetric shock has occurred.

The oldest argument introducing the notion of optimum currency areas is the one that international factor mobility¹³² drives production factors from regions hit by a negative demand shock to regions hit by a positive demand shock. This process is made necessary by

¹³⁰ See Fidrmuc/Schardax (2000).

¹³¹ See Fidrmuc/Korhonen (2001).

¹³² See Mundell (1961).

nominal wage rigidities which make a downward adjustment of product prices impossible in case of demand fluctuations. Quite to the contrary, nominal wage indexation is a widely accepted practice throughout Europe, in the East as in the West. Therefore, international factor movements should overtake the burden of adjustment and replace nominal exchange rate changes. In actual fact, capital is free to flow from the European Union to Hungary and vice versa. Nevertheless, labor mobility is a sensitive area during the accession negotiations where the German opinion, supported merely by the Austrian, dominates the discussion so that an agreement could only be achieved by allowing for a derogation period of at least five years. By this, German – mainly right-wing – politicians tried to prevent further aggravations of the labor market situation and calm fears stemming from an overestimation of the mobility incentives of Central and Eastern European workers as well as of the attraction of Germany.¹³³ As a result, using the criterion of international factor mobility, Germany has blocked the way of Central and Eastern European accession candidates from becoming members of the Economic and Monetary Union for at least five years after accession even if nominal convergence were achieved. On the other hand, it should be asked how far this criterion could be relevant at all. It was pointed out at the beginning of the paragraph that the main argument relies on demand shocks. But how are they identified? Well, they are identified by the restriction that their long-term impact on the output is zero. Only supply shocks can have an effect on the output. Using this definition, there should be little rationale in moving workers from one region to the other following the mood of demand. Furthermore, it is surprising that factor movements are regarded to be easier to fulfill than price adjustments. As regards supply shocks, they are not included in the criterion, but, according to empirical investigation, this kind of asymmetric real shock is the one that is most likely to occur between the Central and Eastern European countries and the European Union mainly as

¹³³ This is best represented by the outcome of the German 'Greencard' initiative for specialists

a result of inward foreign direct investment, that is, international capital mobility. These shocks appear continuously and force an adjustment in the real exchange rate by means of either nominal exchange rate or price level variations.

McKinnon (1963) stresses that with an increasing level of openness of an economy, changes in the nominal exchange rate lose their effectiveness to handle demand shifts between domestic and foreign produced goods. The more open the economy, the stronger the transmission of nominal exchange rate variations into domestic price variations. Hungary is regarded to be relatively open with about one third of GDP produced in the tradable sector. Empirical investigation¹³⁴ on the sources of inflation found out that import prices, and by the same token, devaluations of the currency, play an important, however, transitory role in price increases. Therefore, on the basis of these considerations we can conclude that Hungary could participate profitably in the Economic and Monetary Union. Additionally, the size of the country also speaks for participation. This argument includes the critique on the theory of openness and says that a small country cannot use variations in its nominal exchange rate to influence its international terms of trade independent of the degree of its openness. It will always be a price taker in the world markets of goods and services.

Kenen (1969) argues that countries with a high degree of diversification in their production will export a wide range of different goods so that it is less likely to be hit by sector-specific demand shocks. We have seen in Chapter 4.1. that the export structure of Hungary moved to a high concentration on manufactured products which make up about 80 percent of exports. Nearly 60 percent was accounted for by machinery and transport equipment in 1999. This actually increases the possibility that a negative demand shock in this sector could cause painful disturbances in the current account of the country.

in information technology.

¹³⁴ See Chapter 2.2.

As regards capital movements, they can also play an important role in equilibrating payments imbalances.¹³⁵ If there is a high degree of international financial integration, there will be no need for nominal exchange rate adjustments to restore external equilibrium, because current account imbalances will cause interest changes which induce equilibrating capital flows. The precondition of this process is the elimination of all kinds of restrictions on international capital movements. In Hungary, this happened on June 16th, 2001 by establishing full convertibility of the Forint.

As already indicated by the convergence criteria, it is also important that countries participating in a currency area by irrevocably fixing their bilateral exchange rates should have similar inflation rates otherwise the products of the member with higher price increase ratios could suffer a loss of competitiveness. This is a crucial point in the integration of Hungary into the Economic and Monetary Union, because the country still has high inflation rates and the inflation differential exceeds the rate which would be compatible with fixed nominal exchange rates vis-à-vis the Euro also taking the Balassa-Samuelson effect into account. However, inflation differentials are possible even within a currency area.¹³⁶ This is the case if absolute price levels differ as they will converge through a deepening of the economic integration between the countries. According to estimations, Hungarian price levels still lies well below the European Union average and it will take about 10-12 years to adjust.¹³⁷ During this period, the Hungarian inflation rate is likely to exceed the European Union average by 3-4 percentage points additionally to the impact of the Balassa-Samuelson effect.

On the other hand, ideal monetary integration presupposes complete economic integration which cannot be achieved without a certain degree of political integration. To

¹³⁵ See Ingram (1973).

¹³⁶ See European Central Bank (1999).

¹³⁷ See Tarafás (2001).

surrender the monetary sovereignty of the member countries to a single supranational monetary authority such as the European Central Bank is the best way to coordinate monetary policy within the currency area. The supranational institution can consistently manage the international reserves and the exchange rates of the area vis-à-vis the rest of the world as well as provide for an appropriate distribution of the money supply within the area. Brada/Kutan (2001) investigate the convergence of the candidates' monetary policy to the European Union by measuring the extent to which the money stock of a given country is dominated by Germany where the Bundesbank was taken as a proxy for the European Central Bank. They find that between 1993 and 2000, Hungary and Poland do not follow the German monetary policy. We will see later in this chapter whether the legislative ruling on the operation of the National Bank of Hungary has converged to the directives of the common monetary policy of the Euro area. In this case, the surrender of the monetary policy autonomy would not mean a shock to the economy. As regards other fields of political integration, especially fiscal policy, there is a low degree of coordination between the present members of the Economic and Monetary Union. The main tool is the restriction of the yearly government deficit to a maximum level of 3 percent of GDPt. For Hungary, autonomous fiscal policy is likely to gain in importance because it will be the only instrument to carry out the adjustment in case of shocks if the exchange rate policy is bound by irrevocably fixed conversion rates and mobility of production factors is not allowed for.

After the discussion of optimum currency area criteria and their application to Hungary, the idea of the unilateral introduction of the Euro, a 'euroization', in order to promote convergence of the Central and Eastern European countries to the European Union is worth mentioning. This, however, can be no legal option for any of the accession candidates because of its strict rejection by the European Council of Finance Ministers (ECOFIN). They stress that this would run counter to the economic reasoning of the Maastricht Treaty. There is obviously no incentive on the side of the European Union to allow for derogations from the

convergence criteria, rather a proof of sustainability is stressed. However, 'euroization' might be beneficial for the candidates for the same reasons as full participation in the monetary union, but with some restrictions resulting from the unilateral nature of this measure. The first one is that a country can unilaterally adopt foreign currency, that is, replace its domestic currency in favor of an other currency, but only in the case that it possesses international reserves sufficient to cover the entire currency in circulation at the fixed conversion rate. Given this technical prerequisite which appears to be fulfilled in Hungary¹³⁸, the considerations about the issue can be continued based on a thorough analysis of costs and benefits.¹³⁹ The main arguments that support monetary integration are listed below:

- The reduction of transaction costs and exchange rate volatility might intensify trade relations between the candidates and the European Union. About 70 percent of Hungary's external trade is concentrated on the area so that this might mean a significant position. The gains would be increased by the extension of the Euro area to other candidate countries.
- Any participation in a currency area or a unilateral adoption of a foreign currency can be understood as an anti-inflationary strategy akin to a fixed exchange rate which supports stabilization efforts. The elimination of the domestic component in the monetary base is a means to decelerate money supply growth, although, too rapid disinflation can induce (temporary) costs in terms of output loss and increased unemployment. Therefore, disinflation should happen gradually in order to give room for an adjustment in inflation expectations.
- Interest rates will be lowered by the elimination of a currency risk on foreign debt.

This might encourage investment and release the debt servicing burden on the

¹³⁸ See Schoors (2001).

¹³⁹ The list summarizes the discussion made by Nuti (2000), Wójcik (2000) and Schoors (2001).

central budget. Default risk will remain, but it will become smaller. The ability to borrow internationally in the currency which is used domestically gives the authorities more room for maneuver.

- Contrary to a currency peg, current account issues do not play an important role any more. If there is no devaluation risk or no risk of leaving the currency area, capital inflow will finance the current account deficit. It has to be emphasized that this argument only applies to full membership in the currency area. A unilateral introduction of a foreign currency will not provide a protection.¹⁴⁰
- The stock of international reserves needed for direct central bank interventions on the foreign exchange market and to secure external obligations, that is, net imports or foreign debt will be lower. However, the composition of foreign debt currency denomination plays a crucial role in this respect.
- The risk of a currency crisis contagion will be lowered by a considerable extent, but not the risk of crises which are related to disadvantageous developments in the fundamentals or to reversal of capital inflows.
- The policy commitment to an irrevocably fixed exchange rate can play a catalytic role for fiscal discipline and structural reforms, although this should not be taken for granted.

The possible disadvantages that may follow from the introduction of the Euro result mainly from the renouncement of monetary and exchange rate policy autonomy. These points have already been discussed on the basis of the theory of optimum currency areas. Additionally, the country which unilaterally adopts a foreign currency will lose seigniorage revenues. Although a participation could be negotiated with the authorities of the country issuing the given currency, this might be impossible for the Central and Eastern European

¹⁴⁰ Edwards (2001) shows this on the example of dollarized countries.

countries according to the attitude of the European Union on this subject. However, as we have seen in Chapter 4.4., these revenues do not play an important role in budget financing in Hungary, so this can aggravate the efforts to fulfill the debt criterion. Furthermore, the National Bank of Hungary as a lender of last resort in case of banking crises cannot be replaced by the European Central Bank because of the lack of willingness of the latter to support the idea. Nonetheless, this is not really important with respect to intensive foreign owned banks' participation in the Hungarian financial market, especially of banks with headquarters in the Euro area which are actually backed by the European Central Bank. They will be able to shift deposits to their Hungarian branches.

Schweickert (2001) develops indicators measuring the optimality of participation in the monetary union for accession candidates in comparison with a reference group consisting of Greece, Ireland, Portugal and Spain. The calculations are based on the assumptions that the benefits are higher, the stronger the bilateral trade with the Euro area, the smaller the country is relative to the Euro area, the larger the weight of the Euro in the currency basket for the effective exchange rate and the higher the gain in credibility. The costs of participation increase with higher asymmetry in business cycles, with differences in trade structures, with stronger trends for real exchange rate changes and with increasing deviation of exchange rates from the purchasing power parity. The conclusion of the analysis is that three of the candidate countries, i.e. Estonia, Hungary and Slovenia would clearly benefit from a participation in the Economic and Monetary Union.

After these considerations, some attention should be paid to real convergence, too, that is, to narrowing the income gap to the European Union average measured by the GDP per capita. The reason for this is that this may prevent tensions stemming from the unification and orientation of the monetary policy on the core countries' needs. Sarajevs (2001) finds that there is clearly progress in real convergence, although the exact rate is extremely difficult to calculate because of an insufficiently long observation period coverage by the available data.

Therefore, it is nearly impossible to estimate how long it would take to close the gap. Nevertheless, taking the late joiners to the European Union, such as Greece, Portugal and Spain, as an example, we would come to the conclusion that the prospects for the Central and Eastern European candidates are similarly promising. This definitely invalidates the arguments which support a postponement of the enlargement process. By forcing accession of the candidates into the European Union the progress of real convergence might accelerate and nominal convergence would be supported.

5.3 Legal convergence

The legal or institutional prerequisite of EMU membership is the independence of the central bank from political influence. This is characterized by the institutional, functional and financial independence of the central bank as an institution as well as of its employees. The Maastricht treaty defines the following four central bank independence criteria:

- **The institutional independence** of the central bank means that the target of price stability is defined by law.
- **The functional independence** of the central bank in the determination and execution of the monetary policy means that the central bank supports the overall economic policy, though, it must refrain from this if price stability is endangered.
- **The financial independence** forbids any kind of financial support to the government sector by the central bank.
- The most crucial prerequisite of central bank independence is **personnel independence**. The period of office of the members of the decision making bodies of the central bank must be longer than the election period.

The rules which regulated the operation of the National Bank of Hungary during the 90s were laid down in the Central Bank Act of 1991. This law did not meet all requirements

to secure central bank independence. Therefore, a new Central Bank Act was adopted in June 2001, which is declared to be compatible with the Statute of the System of European Central Banks and the European Central Bank.

As regards institutional and functional independence, the National Bank of Hungary is obliged to maintain price stability as a major goal, and in doing this, it is independent and cannot ask for or accept instructions from the government or from any other authority. This is a clear improvement of the new legislation compared to the earlier one which aimed at the maintenance of the internal and external purchasing power of the national currency, but this did not imply the predominance of price stability. The supplement that in case price stability is endangered the central bank can refuse to support the economic policy of the government also first appeared in 2001. Moreover, the relationship between the government and the central bank is now clearly defined. By law, one representative of the government has to be present at the meetings of the Council of the central bank for consultation, but he has no voting power. The rule that the monetary policy guidelines have to be presented to the government for comments then to the parliament was reduced to a reporting obligation to the parliament according to Economic and Monetary Union rules which forbid any political influence such as pre-consultations with the government or the parliament. The exchange rate policy must be determined in unanimity between the government (Minister of Finance) and the central bank. This rule is similar to the Maastricht rules where the European Council of Finance Ministers (ECOFIN) is involved in the determination of exchange rate policy of Euro-Land. Nonetheless, the European Central Bank is not obliged to maintain the external purchasing power of the European currency. The obligation of the National Bank of Hungary to maintain the external value of the Forint affected its independence. Therefore, in 2001, the Central Bank Act was modified concerning the definition of the main task of the central bank.

Earlier, the Hungarian Central Bank Act included to some extent and duration the possibility of granting liquidity credits to the government. These could be granted for the

amount of 2 percent of budgetary revenues for a maximum duration of 2 weeks per month. In fact, there has been no central bank financing of the budget deficit since 1996, yet still, the Maastricht Treaty requires the prohibition of this by law. This was done by the act of 2001. Concerning the fact that there has been no need for central bank credit for years, this should not cause any disturbances in the budget. As regards financial independence, the rule stating that all profits of the central bank should be transferred to the central budget was also critical, as this sum was included into the budgetary plan in advance. This clause cannot be found in the new Central Bank Act.

With reference to the personnel independence criteria, the president and the vice presidents of the central bank are appointed for 6 years while the parliamentary election period is 4 years long. Incompatibility rules were strengthened in relation to all members of the decision making board. The members of the monetary council must not hold any political or any central or local governmental position and neither can they be a leading or supervisory official of any company. The governors must not have any other employment.

The required stability of the banking system calls for an organization which supervises the banks. This organization must take prompt measures for liquidation of bankrupt banks and must not grant credits, which may only happen in exceptional cases and only in case of a temporary liquidity problem. In the case of insolvency, the credit must be rejected. Furthermore, the bank supervision must be free of any kind of political influence. This requirement is not met in Hungary. In the past, there were several cases when an intervention was postponed because of the lack of authorization from the State Money and Capital Markets Supervision (ÁPTF) to react. These cases have shown that the government was trying to protect the shareholders and the creditors more than it would have been committed to within the system of deposit insurance. The central bank can grant an extraordinary credit to a financial institution only in the case that the operation of the institution would otherwise endanger the stability of the financial system.

The rationale behind the demand for central bank independence is that it is usually negatively correlated to inflation, that is, countries with a more independent central bank have lower inflation rates. Therefore, it is reasonable to examine the legal and actual independence of the central bank from political authorities and decisions. The legal independence can be measured by the construction of an index based on a set of assessment criteria concerning the central bank legislation. It has to be noted at this point that the score which can be assigned to the given question is usually subject to individual judgment, so that the results are highly dependent on the personal opinion of the viewer. The actual independence is usually measured by the turnover rate of central bank governors as a proxy. In the following, these measures will be described.

The Grilli-Masciandaro-Tabellini (GMT) Index¹⁴¹ is composed of two subindexes, which are closely related to each other: The index of political independence includes nine subitems concerning the appointment procedure of the central bank's governor and board, the relationship of the decision making body of the central bank with the government as well as the constitution of the formal responsibilities of the central bank. The economic independence comprises seven subitems concerning the issue of central bank financing of the budget and the instruments of monetary policy. The subitems are scored using a binary system which indicates that the assumption is true (1) or not true (0). The overall index is calculated by a simple addition of the scores. The new central bank legislation of Hungary gets an index value of 15, while the former Central Bank Act got a score of 9.¹⁴²

Cukierman (1992) set up a valuation system for central bank independence based on indicators grouped under four headings:

- Chief executive officer (CEO): his term of office in years, appointment and dismissal as well as incompatibility clauses.

¹⁴¹ See Grilli/Masciandaro/Tabellini (1991).

- Policy formulations (PF): regulations of the competence to formulate the monetary policy strategy, participation of the central bank in the budgetary process, government directives and resolution of conflict.
- Final objectives (OBJ): the appearance of price stability in the legislated central bank objectives.
- Limitations on lending (LL): regulations on central bank financing of the budget.

The codings range on a scale from 0 to 1 which allows for numerous graduations. Higher figures indicate higher independence of the central bank. The scores are aggregated to an overall index in a relatively complicated procedure. First, weighted or un-weighted averages of the variables of the particular groups are calculated. In a second stage, these averages are aggregated to a single index of legal independence. A central bank which can decide independently within the framework of the law gets a valuation of 0.8. The figure 1 means that the central bank has an influence even on the national finances. Comparing the requirements imposed by this index, Dvorsky (2000) notes that in some points they are stricter than those formulated in the Maastricht Treaty. Cukierman gives the highest score to the legislated central bank objectives only in the case that the central bank is the final authority to pursue policies aimed at achieving price stability even in conflict with the government. On the other hand, the Treaty addresses regulations on appointment procedures, terms of office, dismissal and incompatibility of all members of the highest decision-making body of the European Central Bank. The index of central bank independence takes only the legal status of the chief executive officer into consideration. According to Cukierman's system, the rules laid down in the Central Bank Act of 1991 achieved a valuation of 0.38¹⁴³, that is, Hungary possessed a medium independent central bank. The valuation was improved compared to 1989, when the country got a mark of 0.24. The scores for the new Central Bank Act from

¹⁴² See Dvorsky (2000) and Maliszewski (2000).

June 2001 are presented in Table 5.2. The basis of the calculation of the weighted (LVAW) and un-weighted (LVAU) indexes for central bank independence is the wording of the legislation, because an interpretation of the implementation in practice is not yet possible because of the short time period since its adoption. The term of office of the president of the central bank is 6 years (too=6: 0.75) and he is appointed by the president of the republic on the proposal of the prime minister, which procedure allows for the influence of the government (app: 0). The dismissal rule is specified by the legislation for nonpolicy reasons (diss: 0.83). The president of the central bank is prohibited by the incompatibility rule from holding any other government office (off:1). In fact, this is valid for all members of the monetary council. The central bank has the authority to formulate the monetary policy and in doing this, it is independent from instructions of the government or of any other authority (monpol, conf: 1). The central bank has the right to make a comment on the formulation of the government's budget, but there is no rule that it would be active in the formulation process (adv: 0.5). All variables in the group 'limitations on lending' get the score 1, because the National Bank of Hungary is prohibited from granting a credit to the government or to any local authority or to companies under their control as well as from buying their securities. Furthermore, it is not allowed for the central bank to accept financial assets as security from the borrower's own emission. The result shows a high grade of central bank independence in Hungary.

¹⁴³ Germany scored 0.66, Japan scored 0.16. [See Schenk (1996).]

Table 5.2.: Legal central bank independence in Hungary

Group	Variable	Weight		Index value	Weight
		Score	(1st stage)		(2nd stage)
CEO	Too	0.75	no		
	App	0	no		
	Diss	0.83	no		
	Off	1	no		
	CEO			0.645	0.20
PF	Monpol	1	0.25		
	Conf	1	0.50		
	Adv	0.5	0.25		
	PF			0.875	0.15
OBJ	Obj	1		1	0.15
LL	Lla	1		1	0.15
	Lls	1		1	0.10
	Ldec	1		1	0.10
	Lwidth	1		1	0.05
	Ltype	1	no		
	Lmat	1	no		
	Lint	1	no		
	Lprm	1	no		
	Lm			1	0.10
	LVAW			0.91	
	LVAU			0.94	

Source: own calculations

Loungani/Sheets (1997) develop indexes of central bank independence concentrating on transition economies. They define three components of independence. First, the central bank is labeled as independent in choosing its goals if price stability as the central bank's macroeconomic objective is declared by law. Second, the definition of the economic independence relies on the same presumptions as the GMT index. Third, the category of

political independence encompasses factors concerning the appointment procedure and dismissal rules of central bank governors, the terms of office of the board members and government participation in the central bank board. Depending on the particular question, answers of 'no' or 'yes' are scored with 1 or 0. Ambiguous answers receive 0.5. A second index assesses the similarity between the characteristics of the given central bank and the German Bundesbank. This index suggests that while a bidding limit on central bank lending to the government must be defined for independence, the prohibition of lending to the government might be too stringent and therefore unnecessary. The higher scores of both indexes indicate higher central bank independence. The calculations show ambiguous results for Hungary. Its central bank is ranked as second least independent by the central bank independence index, while its relatively close similarity to the German Bundesbank characterizes it as the third most independent central bank among twelve Central and Eastern European countries.

While the above described measures deal with central bank independence as written down in the legislation, these can deliver biased results if there is a tradition or understanding between the government and the central bank that the implication will be understood in a different way. To detect this, Cukierman (1992) proposes the calculation of the turnover rate of central bank governors as a proxy. This rate is based on the actual average term of office of the governors. The larger turnover rate indicates a lower level of central bank independence. The tenure of the governors should be longer than the electoral period to ensure independence. The threshold turnover lies somewhere between 0.2 and 0.25 for countries with an electoral period of 4 years. In Hungary, all central bank governors are appointed for 6 years, which reflects a high actual grade of independence. However, there was political discussion about the nomination of new vice presidents in the near past. Their appointment was postponed to the period of a new central bank president who entered into office in March 2001. This practice contradicts the rules of independence and is alarming. In this way, the

conservative government was able to have a strong influence on the vice presidents of the central bank, as they were appointed on the proposal of the new president who had earlier been a member of the government.

5.4 Summary

As regards prospects for membership in the Economic and Monetary Union, the analyses in the first part of the chapter have shown that Hungary had made enormous advancement towards fulfilling the economic preconditions for membership. This can be seen on the progress in nominal and real convergence to the European Union. However, convergence has not been attained. The major problem is the inflation rate which, in spite of huge progress in stabilization, still lies well above the European Union average. The catch-up process to the core countries of the European Union appears to be an important factor in this respect and it can be assumed that it will not be completed within the next few years. The recent change in the exchange rate policy strategy gave room for revaluation of the domestic currency as well as a reduction in the prices of some tradable goods and the inflation rate. However, this is only a one-off effect; further revaluations may jeopardize international competitiveness and may result in increased volatility of the exchange rate as well as rising interest rates stemming from required risk premia. Therefore, the monetary policy which also gained room for maneuver by the expansion of the exchange rate fluctuation band must take over the part of commodity price stabilization. This was the intention of introducing an inflation target.

In spite of problems with nominal convergence, the analysis on the basis of the theory of optimum currency areas demonstrated that Hungary clearly turns out to be an outrider among Central and Eastern European countries. While empirical investigations show ambiguous results for the other accession candidates with regards to the feasibility of monetary integration with the Euro area, Hungary remains in a favorable position.

Nonetheless, we should not be too enthusiastic about a rapid introduction of the Euro in Hungary. We have seen that a unilateral introduction prior to European Union membership and nominal convergence according to the Maastricht criteria is definitively out of the question. Even attempts to renegotiate the criteria in order to have the situation of the candidate countries taken into consideration and ease the inconsistency problem between the exchange rate and the inflation criteria is hit by resistance from the European Commission. Therefore, it will obviously take some more years for Hungary to become an 'in'.

In the third part of the chapter the institutional requirements of membership in the Economic and Monetary Union were overviewed. The independence of the central bank from the government was investigated and it was ascertained that the Central Bank Act of June 2001 legalizes a high grade of institutional, functional, financial and personnel independence of the National Bank of Hungary as a decision-making authority in monetary questions. The regulations on the central bank are consistent with the requirements for membership in the European System of Central Banks (ESCB) so that they do not have to be changed prior to accession into the Economic and Monetary Union.

6. Summary of results and outlook

The present study explained that resulting from the history of a centrally planned economy and the transition process towards a market oriented economy, Hungary did the best to choose a foreign-currency standard to stabilize its economy. However, the experiences especially during the early transition phase made clear that a peg was not feasible; rather the attempt to fix the exchange rate led to unsustainable current account deficits. What is more, the country faced a 'twin-deficit' problem. On the other hand, other targets for monetary policy combined with flexible exchange rates were equally not viable at the time partly because of a lack of credibility of the central bank to be able to follow the target of disinflation and partly because of fears that capital inflows to the country may induce exchange rate misalignments.

The implemented crawling band regime delivered a suitable solution for balancing between fixed and flexible exchange rates in the second half of the 90s. It was constituted in a way that the yearly devaluation of the central parity was always set lower than the inflation forecasts, but the resulting appreciation of the real exchange rate calculated on consumer price indexes did not deteriorate international competitiveness. This can be seen also on the current account balances which did not exceed sustainable deficit levels. Further, continuous reduction of the rate of crawl signaled a path to inflation reduction to the public and was obviously accepted by them, changing the way of building their expectations from a backward-looking to a forward-looking one. For the monetary and exchange rate policy, the crawling band delivered a credible target and a binding commitment. Through the ability to keep the exchange rate within the pre-announced band without increasing interest rate or international reserves volatility, the central bank earned the confidence of domestic as well as foreign agents. This must have induced the financial capital inflows which put a revaluation pressure on the exchange rate and forced interventions of the central bank in order to prevent exchange rate misalignment, but at the same time aggravated the disinflation process.

In 2001, widening the exchange rate fluctuation band gave room for a revaluation (which in fact set in at once and has not yet been reversed at the time of the study), so that a fixing of the central parity could be safely carried out. The effect of inflation reduction is also recognizable but this is an effect which cannot be repeated. Additional strong revaluations could seriously deteriorate international competitiveness and decelerate economic growth which accelerated gradually after the initial contractive effect of the stabilization program and is important for real convergence to the European Union. Therefore, active monetary policy must carry the weight of further disinflation by defining its own target. The National Bank of Hungary chose to follow an inflation target to serve this purpose. The exchange rate arrangement with a wide fluctuation band is to allow for alignment to the equilibrium rate.

As regards membership in the Economic and Monetary Union, Hungary definitely fails to meet the nominal convergence criteria. It is not the debt or exchange rate criteria but rather the fulfillment of the inflation and interest rate criteria that appear to represent a difficulty. To circumvent this problem, the National Bank of Hungary, similarly to central banks of other Central and Eastern European countries, considered a unilateral introduction, or a 'euroization'. The reason for this lies in the possibility that the advantages of membership in the currency union can outweigh the disadvantages and Hungary can constitute an optimum currency area with the present members. Nonetheless, this measure is rigorously rejected by the European Commission, although Hungary has made enormous advances in fulfilling the criteria which are supposed by the theory.

The postponement of the introduction of the Euro in Hungary seems quite reasonable, because despite efforts to forecast and empirically underpin, it is still not yet clear how the economy will be affected by the accession into the European Union. Additionally, even the exact date of the enlargement is not yet certain. It is likely and also desirable that real convergence will be accelerated by deepening the integration with the present European Union members, so that an autonomous monetary and exchange rate policy may be necessary

in order to prevent an overheating of the economy or creation of inflationary pressures. The possibility of participating in European Union programs will most probably result in subsidy inflows which overcompensate the contribution of the country to the European Union budget. Net inflows resulting from the participation in these programs can generate pressures on the exchange rate to revalue vis-à-vis the Euro. Nonetheless, a revaluation of the central parity should not be carried out before the current account balances are inverted to surpluses, indicating a substantial improvement of the international competitiveness of Hungarian products. A revaluation based on capital inflows would bear the danger of exchange rate misalignments. The introduction of the Euro and the irrevocable fixing of the conversion rate should first happen when an equilibrium exchange rate insuring a sustainable export lead growth of the economy is found.

As we have seen, Hungary has made huge progress towards full membership in the European Union not only by keeping up to the accession negotiations and taking on the commitment to the 'acquis communautaire' but also by a proven record of stabilization efforts shouldered mostly by the exchange rate policy relying on a crawling band system. However, the optimal date of accession into the Economic and Monetary Union can still not be determined in light of the present change in the monetary and exchange rate policy strategies as well as the possible effects of European Union membership. This must remain a subject for further research.

7. References

- Aghevli, B.B.; Khan, M.S.; Montiel, P.J. (1991), Exchange Rate Policy in Developing Countries: Some Analytical Issues, Occasional Paper No. 78, International Monetary Fund, Washington DC.
- Antalóczy, K.; Botos, K. (1990), Lesz-e konvertibilis a forint? A klíringtől a konvertibilitásig (Will the Forint be convertible? From clearing to convertibility), Közgazdasági és Jogi Könyvkiadó, Budapest.
- Baár, J. (1992), Árfolyampolitika (Exchange rate policy), Bankszemle, No. 8, pp. 1-8.
- Baárné Nyitrai, I. (1991), Gondolatok az infláció jellegéről és a monetáris politikai vonatkozásokról (Thoughts on the nature of inflation and its monetary policy implications), Bankszemle, No. 3, pp. 15-18.
- Baárné Nyitrai, I. (1992), Árfolyampolitika 1982-től napjainkig (Exchange rate policy from 1982 to recent days), Bankszemle, No. 1-2, pp. 26-33.
- Balassa, B. (1964), The Purchasing-Power-Parity Doctrine: A reappraisal, Journal of Political Economy, December.
- Barabás, G. (1996a), Árhatások a magyar külkereskedelemben (Price effects in Hungarian foreign trade), Külgazdaság, No. 4, pp. 30-49.
- Barabás, G. (1996b), Kamatparitás a lebegő és csúszó leértékeléses árfolyamrendszerben (Interest parity in a floating and in a crawling exchange rate system), Külgazdasági Szemle, pp. 972-994.
- Barabás, G.; Hamecz, I.; Neményi, J. (1998), A költségvetés finanszírozási rendszerének átalakítása és az eladósodás megfékezése (The restructuring of the budget financing system and slowing-down of indebtedness), Part I, Közgazdasági Szemle, pp. 653-674; Part II, Közgazdasági Szemle, pp. 789-802.
- Bayoumi, T.; Eichengreen, B. (1998), Exchange rate volatility and intervention: implications of the theory of optimum currency areas, Journal of International Economics, pp. 191-209.
- Bécsy, E. (2000a), EU + PÉNZ + TÁR, A magyar európai uniós csatlakozás költségvetési szemmel (EU + CASH + COUNTER, The Hungarian European Union Accession with the eyes of the central budget), Part V., Pénzügyi Szemle, No. 10, pp. 913-918.

- Bécsy, E. (2000b), EU + PÉNZ + TÁR, A magyar európai uniós csatlakozás költségvetési szemmel (EU + CASH + COUNTER, The Hungarian European Union Accession with the eyes of the central budget), Part VI., Pénzügyi Szemle, No. 11-12, pp. 1046-1052.
- Bofinger, P. (1990), The role of monetary policy in the process of economic reform in Eastern Europe, Discussion Paper No. 457, Europe, Centre for Economic Policy Research, London.
- Bofinger, P. (1991), Options for the payments and exchange rate systems in Eastern Europe, Discussion Paper No. 545, Centre for Economic Policy Research, London.
- Boone, L.; Maurel, M. (1998), Economic Convergence of the CEECs with the EU, Discussion Paper No. 2018, Europe, Centre for Economic Policy Research, London.
- Borensztein, E.; Masson, P.R. (1993), Exchange Rate Arrangements of Previously Centrally Planned Economies, in: Financial Sector Reforms and Exchange Rate Arrangements in Eastern Europe, IMF Occasional Paper, Washington, Part II.
- Brada, J.C.; Kutan, A.M. (1999), The End of Moderate Inflation in three Transition Economies?, ZEI Working Paper B 21, Center for European Integration Studies, Bonn.
- Brada, J.C.; Kutan, A.M. (2001), The Convergence of Monetary Policy between Candidate Countries and the European Union, Working Paper, Southern Illinois University at Edwardsville, mimeo.
- Brüstle, A., Milton, A.-R. (1997), Wechselkurse und Wettbewerbsfähigkeit der Transformationsländer - Daten und Entwicklungen, in: Döhrn, R. (ed.), Osterweiterung der EU - Neue Chancen für Europa?, Duncker & Humblot, Berlin, pp. 137-146.
- Buiter, W.H.; Grafe, C. (2001), Central Banking and the Choice of Currency Regime in Accession Countries, SUERF Studies No. 11, Société Universitaire Européenne de Recherches Financières, Vienna.

- Buiter, W.H.: Grafe, C. (2002), *Anchor, Float or Abandon Ship: Exchange Rate Regimes for Accession Countries*, Discussion Paper No. 3184, Centre for Economic Policy Research, London.
- Cassel, D. (1987), *Inflation und Inflationswirkungen in sozialistischen Planwirtschaften*, in: Thieme, H.J. (ed.), *Geldtheorie*, Nomos Verlagsgesellschaft, Baden-Baden, pp. 263-294.
- Cirera, X.; Hölscher, J. (2001), *Exchange Rate Regimes and Monetary Policies in Transition to Monetary Union: The case for Capital Controls*, Paper presented in the Workshop 'Monetary and Exchange Rate Strategies related to the Current European Union's Enlargement Process', Tinbergen Institute, Rotterdam, mimeo.
- Colombatto, E.; Macey, J. (1996), *Exchange-Rate Management in Eastern Europe: A Public Choice Perspective*, *International Review of Law and Economics*, pp. 195-209.
- Coricelli, F.; Jazbec, B. (2001), *Real Exchange Rate Dynamics in Transition Economies*, Centre for Economic Policy Research Discussion Paper No. 2869.
- Corsetti, G.; Pesenti, P. (2002), *Selfvalidating Optimum Currency Areas*, Working Paper No. 8783, National Bureau of Economic Research, Cambridge, MA.
- Csikós-Nagy, B. (1997), *A monetáris politika kritikai elemzése (Critical analysis of the monetary policy)*, *Külgazdaság*, No. 3, pp. 68-74.
- Cukierman, A. (1992), *Central Bank Strategy, Credibility and Independence: Theory and Evidence*, MIT Press, Cambridge, Massachusetts et al.
- Darvas, Z. (1996), *Exchange Rate Premia and the Credibility of the Crawling Target Zone in Hungary*, Centre for Economic Policy Research Discussion Paper No. 1307. (also published as: *Kamatkülönbség és árfolyamváltozások az előre bejelentett kúszó árfolyamrendszerben*, *Közgazdasági Szemle*, pp. 920-947).
- Darvas, Z. (1998), *Csúszó árfolyamrendszerek, Elméletek és nemzetközi tapasztalatok (Crawling exchange rate regimes, Theory and international experiences)*, NBH Occasional Paper 1998/16, National Bank of Hungary, Budapest.
- Davenport, M. (1992), *Exchange rate policy for Eastern Europe and a peg to the ECU*, Economic Papers No. 90, The Directorate-General for Economic and Financial Affairs, Commission of the European Communities, Brussels.
- De Broek, M.; Sløk, T. (2001), *Interpreting Real Exchange Rate Movements in Transition Countries*, IMF Working Paper, WP/01/56, International Monetary Fund, Washington.

- De Grauwe, P. (1997), *The Economics of Monetary Integration*, Third Revised Edition, Oxford University Press, Oxford.
- Dibooglu, S.; Kutan A.M. (2000), *Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary*, ZEI Working Paper B 14, Center for European Integration Studies, Bonn.
- Dietz, R. (1999), *Exchange Rates and Relative Prices in Central and Eastern European Countries: a Systems and Transaction Cost Approach*, Research Report No. 254, The Vienna Institute for Comparative Economic Studies, Vienna.
- Dornbusch, R. (1994), *Exchange Rate Policies in Economies in Transition*, in: Barth, R. C./ Wong, C.-H., (eds.) *Approaches to Exchange Rate Policy - Choices for Developing and Transition Economies*, Washington, pp.235-249.
- Dornbusch, R.; Giavazzi, F. (1998), *Hard Currency and Sound Credit: A Financial Agenda for Central Europe*, mimeo.
- Dvorsky, S. (2000), *Measuring Central Bank Independence in Selected Transition Countries*, in: *Focus on Transition*, Oesterreichische Nationalbank, 2/2000, pp.77-95.
- Edwards, S. (2001), *Dollarization and Economic Performance: An Empirical Investigation*, Working Paper No. 8274, National Bureau of Economic Research, Cambridge, MA.
- Égert, B. (2002a), *Does the Productivity-Bias Hypothesis Hold in the Transition? Evidence from Five CEE Economies in the 1990s*, *Eastern European Economies*, Vol. 40, Nr. 2, pp. 5-37.
- Égert, B. (2002b), *Investigating the Balassa-Samuelson hypothesis in the transition: A panel study*, *The Economics of Transition*, July 2002 (forthcoming).
- Eichengreen, B.; Rose, A.K.; Wyplosz, C. (1995), *Exchange market mayhem: the antecedents and aftermath of speculative attacks*, *Economic Policy*, pp. 249-296.
- Erdős, T. (1989), *Wanted: A well founded economic policy – Problems of external and internal equilibrium, economic growth and inflation*, *Acta Oeconomica*, Vol. 41, No. 3-4, pp. 339-376.
- Erdős, T. (1998), *Az infláció leszorításával elérhető haszon Magyarországon (The advantages of reducing inflation in Hungary)*, *Külgazdaság*, No. 1, pp. 27-44.
- European Central Bank (1999), *Inflation Differentials in a Monetary Union*, *Monthly Bulletin* October, European Central Bank, Frankfurt.
- European Central Bank (2000), *Convergence Report 2000*, European Central Bank, Frankfurt.

- Fidrmuc, J. (2001), The Endogeneity of the Optimum Currency Area Criteria, Intraindustry Trade, and EMU Enlargement, Discussion Paper No. 106/2001, LICOS Centre for Transition Economics, Katholieke Universiteit Lueven.
- Fidrmuc, J.; Korhonen, I. (2001), Similarity of supply and demand shocks between the euro area and the CEECs, BOFIT Discussion Papers, 2001/14, Bank of Finland, Helsinki.
- Fidrmuc, J.; Schardax, F. (2000), More 'Pre-Ins' Ante Portas? Euro Area Enlargement, Optimum Currency Area, and Nominal Convergence, in: Focus on Transition, Oesterreichische Nationalbank, 2/2000, pp.28-47.
- Frankel, J.A. (1980), Test of Rational Expectations in the Forward Exchange Market, Southern Economic Journal, Vol. 46, pp. 1083-1101.
- Frankel, J.A; Rose, A.K. (1998), The Endogeneity of the Optimum Currency Area Criteria, Economic Journal, pp. 1009-1025.
- Frenkel, J.A.; Levich, R.M. (1975), Covered Interest Arbitrage: Unexploited Profits?, Journal of Political Economy, pp. 325-338.
- Friedman, M. (1953), The Case for Flexible Exchange Rates, in: Friedman M., Essays in Positive Economics, University of Chicago Press, Chicago.
- Gabrisch, H. (1997), Reale Aufwertung: Wachstumsbremse für mittel- und osteuropäische Länder, Wirtschaft im Wandel, 2/1997, pp. 16-23.
- Gáspár, P. (1992), Árfolyampolitika a stabilizációs programokban (Exchange rate policy in stabilization programs), Pénzügyi Szemle, No. 4, pp. 218-234.
- Gáspár, P. (1995), The exchange rate policy of Hungary between 1989 and 1994, Institute for World Economics Working Paper, Hungarian Academy of Sciences, Budapest.
- Gáspár, P. (1997), Fiscal Difficulties in Transition, in: Gáspár, P. (ed.), Macroeconomic Issues of Recovery in Transition Economies, Akadémiai Könyvkiadó, Budapest.
- Gáspár, P. (1998), Az 1995-1997-es költségvetési kiigazítás Magyarországon (Fiscal consolidation in Hungary in 1995-1997), in: Pénzügykutató Rt. (ed.), Tanulmányok a Pénzügykutató harmincéves évfordulójára, Gazdaság a rendszerváltásban (Studies for the 30th anniversary of the Institute for Financial Research, Economy in the transition), Perfekt Rt., Budapest, pp. 59-79.
- Gáspár, P.; Várhegyi, É. (1999), Az euro bevezetésének rövid- és középtávú hatásai a magyar gazdaságra (The short- and mid-term implications of the Euro introduction on the Hungarian economy), Working Paper 1999/1, Pénzügykutató Rt., Budapest.
- Grilli, V.; Masciandaro, D.; Tabellini, G. (1991), Political and Monetary Institutions and Public Financial Policies in the Industrial Countries, Economic Policy, pp. 341-392.

- Gros, D. (2000), How Fit are the Candidates for EMU?, *The World Economy*, pp. 1367-1377.
- Hajdú, G. (1994), *Árfolyamrendszer és árfolyampolitika Magyarországon (1946-1993)* (Exchange rate system and exchange rate policy in Hungary), National Bank of Hungary, Budapest.
- Halpern, L. (1989), Effects of Devaluation in a Macroeconometric Model for Hungary, *Acta Oeconomica*, 41, No.3-4, pp. 293-312.
- Halpern, L. (1996), Real Exchange Rate and Exchange Rate Policy in Hungary, *Economics of Transition*, No. 4, pp. 211-218.
- Halpern, L. (1997), Az árfolyam, árfolyampolitika és versenyképesség közötti kapcsolat (Interdependence between the exchange rate, exchange rate policy and competitiveness), NBH Working Papers, National Bank of Hungary, Budapest.
- Halpern, L.; Neményi, J. (1999), Balance of Payments, Exchange Rates, and Competitiveness in Hungary, in: Blejer, M.I.; Skreb, M. (eds.), *Balance of Payments, Exchange Rates, and Competitiveness in Transition Economies*, Kluwer Academic Publishers, Boston et al.
- Halpern, L.; Neményi, J. (2000), A konvergencia fiskális feltételei és az Európai Unióhoz való csatlakozás (Fiscal foundation of convergence and accession to the European Union), *Közgazdasági Szemle*, pp. 116-135.
- Halpern, L.; Wyplosz, C. (1995), Equilibrium real exchange rates in transition, Centre for Economic Policy Research, Discussion Paper No. 1145, London.
- Havlik, P. (1990), Die Wechselkurspolitik der RGW-Länder und die Probleme der Konvertibilität, Research Report No. 162, The Vienna Institute for Comparative Economic Studies, Vienna.
- Havlik, P. (1996), Exchange rates, competitiveness and labor costs in Central and Eastern Europe, Research Report No. 231, The Vienna Institute for Comparative Economic Studies, Vienna.
- Hoch, R.; Radnóti, É. (1993), Az állam, a piac és a fogyasztás (The state, the market and the consumption), *Kereskedelmi Szemle*, No. 1, pp. 1-4.
- Hoggarth, G. (1997), Monetary Policy in Transition - the Case of Central Europe, in: *Central Banking*, Vol. 8, No. 1, pp. 32-76.
- Huszt, E. (1987), Antiinflációs útkeresés – monetáris politika és gyakorlat Magyarországon (Searching for an anti-inflationary way – monetary policy and practice in Hungary), *Közgazdasági és Jogi Könyvkiadó*, Budapest.

- Jakab, M.Z. (1998), A valutakosár megválasztásának szempontjai Magyarországon (The criteria for the choice of a currency basket in Hungary), NBH Working Paper 1998/12, National Bank of Hungary, Budapest.
- Jakab, M.Z.; Kovács, M.A. (2000), A reálárfolyan-ingadozások főbb meghatározói Magyarországon (The main determinants of real exchange rate movements in Hungary), Közgazdasági Szemle, pp. 136-156.
- Jochem, A.; Sell, F.L. (2001), Währungspolitische Optionen für die Mittel- und Osteuropäischen Beitrittskandidaten zur EU, Mohr Siebeck, Tübingen.
- Ingram, J. (1973), The Case for European Monetary Integration, Princeton Essays in International Finance No. 98, Princeton University, Princeton.
- Kath, D. (1997), Währungspolitische Gestaltungsmöglichkeiten einer Osterweiterung der Europäischen Union, in: Döhrn, R. (ed.), Osterweiterung der EU - Neue Chancen für Europa?!, Duncker & Humblot, Berlin, pp. 147-155.
- Kempa, B. (1998), Währungspolitische Strategien zur Heranführung der "Pre-Ins" an die europäische Währungsunion, in: Aussenwirtschaft, 53, No. IV, pp. 539-551.
- Kenen, P.B. (1969), The Theory of Optimum Currency Areas: An Eclectic View, in: Mundell, R.A.; Swoboda, A.K., Monetary Problems of the International Economy, The University of Chicago Press, Chicago.
- Koch, E.B. (1997), Exchange Rates and Monetary Policy in Central and Eastern Europe – A Survey of some Issues, in: MOCT-MOST, pp. 1-48.
- Kopits, G. (1995), Az előre bejelentett csúszó árfolyamrendszer Magyarországon (The crawling band system in Hungary), Közgazdasági Szemle, No. 9, pp. 797-818.
- Kopits, G. (1999), Implications of EMU for Exchange Rate Policy in Central and Eastern Europe, IMF Working Paper, 99/9, Washington.
- Krzak, M. (1994), Exchange Rate Regimes in Central and Eastern Europe, in: Monthly Reports, 1994/5, The Vienna Institute for Comparative Economic Studies, pp. 33-37.
- Kornai, J. (1996), Adjustment without Recession: A Case Study of Hungarian Stabilization, Discussion Papers, Collegium Budapest Institute for Advanced Studies, Budapest. (also published as: Kiigazítás recesszió nélkül, Közgazdasági Szemle, No. 7-8.)
- Laski, K. (1995), Fiscal Policy and Effective Demand During Transition, in: Thieme, H.J. (ed.), Geld und Kredit im Transformationsprozeß, Duncker & Humblot, Berlin, pp. 61-80.

- Lipschitz, L. (1997), Monetary Policy in Central and Eastern Europe: Strategies, Instruments, and Transmission Mechanisms, in: Oesterreichische Nationalbank (ed.), Monetary Policy in Transition in East and West, pp. 124-130.
- Lipschitz, L.; McDonald, D. (1992), Real Exchange Rate and Competitiveness – A Clarification of Concepts, and some Measurements for Europe, *Empirica*, Vol.19, No. 1, pp. 37-69.
- Loungani, P.; Sheets, N. (1997), Central Bank Independence, Inflation, and Growth in Transition Economies, *Journal of Money, Credit, and Banking*, pp. 381-399.
- Lucas, R.E. (1976), Econometric policy evaluation: A critique, in: Brunner, K.; Meltzer, A. (eds.), *The Phillips Curve and Labor Markets*, Vol. 1, Carnegie-Rochester Conferences on Public Policy, Amsterdam, pp. 19-46.
- Maliszewski, W. (2000), Central Bank Independence in Transition Economies, *The Economics of Transition*, pp. 749-789.
- Masson, P.R. (1999), Monetary and Exchange Rate Policy of Transition Economies of Central and Eastern Europe after the Launch of the EMU, IMF Policy Discussion Paper, PDP/99/5.
- Matolcsy, G. (1997), Kiigazítás recesszióval – Kemény költségvetési és puha piaci korlát (Adjustment with recession – Strict budget and soft market constraint), *Közgazdasági Szemle*, No. 9, pp. 782-798.
- McKinnon, R.I. (1963), Optimum Currency Areas, *American Economic Review*, pp. 717-725.
- Mikolasek, A. (1998), A magyar árfolyamrendszer egy elméleti kerete (A theoretical framework for the Hungarian exchange rate system), *Közgazdasági Szemle*, pp. 803-815.
- Mishkin, F.S. (1999), International experiences with different monetary policy regimes, *Journal of Monetary Economics*, 43, pp. 579-605.
- Mundell, R.A. (1961), A Theory of Optimum Currency Areas, *American Economic Review*, pp. 657-664.
- Mundell, R.A. (1991), Stabilization Policies in Developing and Socialist Countries, in: Claassen, E.-M. (ed.), *Exchange Rate Policies in Developing and Post-Socialist Countries*, pp. 21-51.
- Mundell, R.A. (1999), Exchange-Rate Arrangements in the Transition Economies, in: Blejer, M.I.; Skreb, M. (eds.), *Balance of Payments, Exchange Rates, and Competitiveness in Transition Economies*, Kluwer Academic Publishers, Boston et al.

- Neményi, J. (1997), Monetary Policy in Hungary: Strategies, Instruments and Transmission Mechanisms, in: Oesterreichische Nationalbank (ed.), Monetary Policy in Transition in East and West, Vienna, pp. 131-161.
- Neményi, J. (1999), Challenges of Monetary Policy in the run-up to European Union Accession, *Economic & Financial Review*, Spring 1999, pp. 13-45.
- Nuti, M. (1996), Inflation, interest and exchange rates in the transition, *Economics of Transition*, Vol. 4 (1), pp. 137-158 (A short version was published in: *Economic Outlook*, February 1996, pp. 6-11.
- Nuti, M. (2000), The Costs and Benefits of Euro-isation in Central-Eastern Europe Before and Instead of EMU Membership, Working Paper No. 340, London Business School, London.
- Obláth, G. (1994), Exchange Rate Policy and Real Exchange Rate Changes in Economic Transition, in: Gács, J.; Winckler, G. (eds.), *International Trade and Restructuring in Eastern Europe*, Heidelberg, pp. 15-47.
- Obláth, G. (1995), A költségvetési deficit makrogazdasági hatásai Magyarországon (The macroeconomic effects of the budget deficit in Hungary), *Külgazdaság*, pp. 22-33.
- Obláth, G. (1997), Árfolyampolitika, bérköltségek, versenyképesség és gazdasági fejlődés – Elméletek és hazai tapasztalatok (Exchange rate policy, labor costs, competitiveness and economic development – theories and domestic experiences), KOPINT-DATORG, Budapest.
- Obláth, G. (1998), Árfolyampolitika, bérköltségek és nemzetközi versenyképesség – II. rész (Exchange rate policy, labor costs, and international competitiveness – Part II.), *Külgazdaság*, pp. 4-29.
- Ohr, R. (1996), Exchange Rate Policy in Eastern Europe, in: Lang, F. P.; Ohr, R. (eds.), *Yearbook of economic and social relations 1996*, Studies in Contemporary Economics, Heidelberg, pp. 217-242.
- Orlowski, L.T. (2000), Direct Inflation Targeting in Central Europe, *Post-Soviet Geography and Economics*, Vol. 41, No. 2, pp. 134-154.
- Orlowski, L.T.; Corrigan, T.D. (1999), Volatility of Central European Exchange Rates, Reaction to Financial Contagion, and Policy Recommendations for European Union Accession, *Russian and East European Finance and Trade*, Vol. 35, No. 6, pp. 68-81.
- Pieper, B. (1995), *Währung in der Transformation: Wirtschaftslenkung, Stabilisierung und außenwirtschaftliche Öffnung beim Übergang von der Plan- zur Marktwirtschaft*, Nomos Verlag, Baden-Baden.

- Podkaminer, L. et al. (1997), Transition Countries: 1997 External Deficits Lower than Feared, Stability again a Priority, Research Report No. 243, The Vienna Institute for Comparative Economic Studies (also published as: Externe Defizite der Transformationsländer niedriger als befürchtet, WIFO Monatsberichte, 5/1998, pp. 319-338.
- Radnóti, É. (1995), Árfolyampolitika és infláció (Exchange rate policy and inflation), Kereskedelmi Szemle, No. 8, pp. 7-9.
- Riecke, W. (1991), Gazdaságpolitika, monetáris politika és az árfolyamrendszer megválasztása (Economic policy, monetary policy and the choice of the exchange rate regime), Bankszemle, No. 1, pp. 20-25.
- Ritter, R. (2000), Wechselkurspolitik im Transformationsprozeß, Nomos Verlag, Baden-Baden.
- Rusek, A. (1996), Real Exchange Rates, Economic Performance, and Trade Balances in the Central European Free Trade Association, International Advances in Economic Research, Vol. 2, No. 4, pp. 386-393.
- Sachs, J. D. (1996), Economic Transition and the exchange rate regime, American Economic Review, Vol. 86, No. 2, pp. 147-152.
- Samuelson, P. (1964), Theoretical Notes on Trade Problems, Review of Economics and Statistics, pp. 145-154.
- Sarajevs, V. (2001), Convergence of European transition economies and the EU: What do the data show, BOFIT Discussion Papers, 2001/13, Bank of Finland, Helsinki.
- Schäfer, W. (1993), Wechselkurspolitische Optionen für Osteuropa, Diskussionsbeiträge aus dem Institut für Theoretische Volkswirtschaftslehre, Universität der Bundeswehr, Hamburg.
- Schenk, T. (1996), Jegybanki emancipáció (Emancipation of the central bank), Bank és Tőzsde, Vol. 30, No. IV.
- Schoors, K. (2001), Should the Central and Eastern European accession countries adopt the EURO before or after accession?, Paper presented in the Workshop 'Monetary and Exchange Rate Strategies related to the Current European Union's Enlargement Process', Tinbergen Institute, Rotterdam, mimeo.
- Schweickert, R. (2001), Assessing the Advantages of EMU-Enlargement for the EU and the Accession Countries: A comparative Indicator Approach, Kiel Working Paper 1080, Kiel Institute of World Economics, Kiel.

- Siklos, P.; Ábel, I. (1997a), A reálárfolyam mint monetáris célváltozó és a sterilizációs gyakorlat Magyarországon (Real exchange rate as monetary target variable and sterilization practice in Hungary), *Külgazdaság*, Vol. 41, No. 5, pp. 48-65.
- Siklos, P.; Ábel, I. (1997b), Monetary Policies in Transition: an Evaluation of the Hungarian and Czech Experiences, in: Gáspár, P. (ed.), *Macroeconomic Issues of Recovery in Transition Economies*, Akadémiai Könyvkiadó, Budapest.
- Simon, A.; Kovács, M. (1998), Components of the Real Exchange Rate in Hungary, NBH Working Paper 1998/3, National Bank of Hungary, Budapest.
- Spaventa, L. (1996), Out in the Cold?, Outsiders and Insiders in 1999: Feasible and Unfeasible Options, *BNL Quarterly Review Special Issue: European Monetary Union, The Problems of the Transition to a Single Currency*, pp. 137-159.
- Stolze, F. (1997), The Central and East European Currency Phenomenon Reconsidered, in: *Eastern European Economics*, Vol. 35, No. 1, pp. 5-30 (also published as: Research Report No. 232, The Vienna Institute for Comparative Economic Studies, 1996).
- Sutherland, A. (1995), Monetary and real shocks and the optimal target zone, *European economic review*, 39, No 1, pp. 161-172.
- Svensson, L.E.O. (1991), The simplest test of target zone credibility, *Centre for Economic Policy Research Discussion Paper No. 493*.
- Szapáry, G. (2000), Maastricht and the Choice of Exchange Rate Regime in Transition Countries During the Run-Up to EMU, NBH Working Paper 2000/7, National Bank of Hungary, Budapest.
- Szapáry, G.; Darvas, Zs. (1999), A nemzetközi pénzügyi válságok tovaterjedése különböző árfolyamrendszerekben (The Spread of International Financial Crises under Various Exchange-Rate Systems), *Közgazdasági Szemle*, No. 11, pp. 945-968. (also published as NBH Working Paper 1999/10, National Bank of Hungary, Budapest.)
- Szapáry, G.; Jakab, Z. (1998), Exchange Rate Policy in Transition Economies; The Case of Hungary, *Journal of Comparative Economics*, 26, pp. 691-717. (also published as: A csúszó leértékelés tapasztalatai Magyarországon, NBH Working Paper, 1998/6, National Bank of Hungary, Budapest.)
- Tarafás, I. (1994), Monetáris politika, árfolyam-politika – perspektívában (Monetary policy, exchange rate policy – in the perspective), *Külgazdaság*, No. 10, pp. 4-12.
- Tarafás, I. (2001), A kamat, az árfolyam és a forint hátralevő évei (The remaining years of the interest rate, the exchange rate and the Forint), *Közgazdasági Szemle*, pp. 480-497.

- Tavlas, G.S. (1998), Book Review on: Williamson J. (1996), The Crawling Band as an Exchange Rate Regime: Lessons from Chile, Colombia, and Israel, *The Economic Journal*, pp. 1895-1898.
- Theurl, Th. (1997), Monetäre Transformation: Konsistenzfallen einer sich wandelnden Wirtschaftsordnung, in: Cassel, D., (ed.) *Institutionelle Probleme der Systemtransformation*, Berlin, pp. 141-163.
- Várhegyi, É. (1990), Pénzfolyamatok – a kormányzati törekvések ellenében (Monetary processes – contradictory to government efforts), *Külgazdaság*, No. 8, pp. 30-45.
- Várhegyi, É. (1991), The Pitfalls of Monetary Policy, *Hungarian Quarterly*, No. 122, pp. 124-130.
- Várhegyi, É. (1993), Monetáris politika a gazdasági folyamatok tükrében (Monetary policy in the light of economic processes), *Közgazdasági Szemle*, No. 5, pp. 396-414.
- Várhegyi, É. (1994), Monetáris és bankpolitika: a rendszerváltás első kormányának mérlege (Monetary and banking policy: an assessment of the first government of the transition), *Külgazdaság*, No. 4, pp. 39-52.
- Williamson, J. (1991), Advice on the Choice of an Exchange Rate Policy, in: Claassen, E.-M. (ed.), *Exchange Rate Policies in Developing and Post-Socialist Countries*, pp.395-403.
- Williamson, J. (1996), *The Crawling Band as an Exchange Rate Regime: Lessons from Chile, Colombia, and Israel*, Institute for International Economics, Washington, DC.
- Wójcik, C. (2000), A Critical Review of Unilateral Euroization Proposals: The Case of Poland, in: *Focus on Transition*, Oesterreichische Nationalbank, 2/2000, pp. 48-76.
- Wyplosz, C. (1997), Monetary Options for the „Outs“, in: Oesterreichische Nationalbank (ed.), *Monetary Policy in Transition in East and West*, pp. 104-113.

List of Hungarian Journals:

Bankszemle = Bank Review

Bank és Tőzsde = Bank and Stock Exchange

Kereskedelmi Szemle = Trade Review

Külgazdaság = International Economy

Közgazdasági Szemle = Economic Review

Pénzügyi Szemle = Financial Review

Data Sources

Central Statistical Office, Statistical Yearbook of Hungary.

International Monetary Fund, International Financial Statistics.

National Bank of Hungary, Monthly and Yearly Reports.

Organisation for Economic Co-operation and Development, International Trade by
Commodity Statistics.