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Monetary policy and the transformation of the banking system in Eastern Europe

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**Monetary Policy and the
Transformation of the Banking System
in Eastern Europe**

by

Claudia M. Buch

February 1995



Institut für Weltwirtschaft an der Universität Kiel
The Kiel Institute of World Economics

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I. Introduction

This paper analyzes the interdependence between the implementation of a non-inflationary monetary policy and the transformation of the banking systems in Eastern Europe.* These reform areas actually represent two sides of the same coin. While monetary policy is concerned with the provision of an optimal money supply to an economy – given the structure of money demand –, banking system reform has important implications for both, the structure of money demand as well as for the transmission of monetary impulses. The conduct of a successful monetary policy depends on the stability of structural parameters that are at least partially being determined through the financial system. At the same time, the success of banking system reform, i.e. the improvement in the efficiency of financial resource allocation, is affected by the stability of the monetary system. Monetary stability is crucial for an efficient allocation of resources because price signals should not be disturbed by high and volatile inflation rates which make it difficult to separate shifts in relative prices from movements in the general price level.

Facing the dilemma that monetary policy in order to be effective needs stable financial markets, and vice versa, the basic contention of this paper is that monetary stabilization and banking system reform have to be initiated simultaneously while taking feed-back effects between the two policy areas into account. Hence, the paper identifies the channels of interaction and describes policies which mitigate negative feed-back effects. The following second part identifies problems with the choice of intermediate targets for monetary policy during the transformation process in general as well as in the presence of distortions in the financial markets. The third part asks which policy instruments can be implemented under conditions of financial market imperfections and how these should be designed in order to avoid negative effects on the efficiency of financial resource allocation. The fourth part assesses the reforms that have been implemented in the monetary systems of the Czech Republic, Hungary, and Poland against this framework. The fifth part concludes.

II. Monetary Policy in Emerging Financial Markets

This chapter outlines general problems associated with the choice of intermediate targets. It does not intend to answer the question which intermediate target would be optimal for the emerging market economies. More specifically, the obstacles to implementing a policy of monetary targeting during the transformation process are shown. These obstacles are divided into those that stem from the instability of money demand and from the control of money

* This research has been conducted in the framework of a research project on financial market reform in Eastern Europe. Financial support of the Volkswagen-Foundation is gratefully acknowledged.

supply by the monetary authorities. The last section of this chapter summarizes to what extent frictions and imperfections in financial markets affect the conduct of monetary policy and outlines criteria that characterize a non-distortionary policy.

The conduct of monetary policy during the transformation from plan to market requires both, the definition of appropriate targets for monetary policy as well as their implementation. Monetary policy assumes an active role in macroeconomic management for the first time after decades of having passively followed the requirements of the real production plan. By separating the monetary circuits of households and firms, by regulating the exchange of cash into non-cash money, and by synchronizing credit and production plans, central planners could almost perfectly monitor and control monetary flows. As a consequence, they had no need to acquire knowledge about the structure of money demand, the determinants of money supply, and about the channels through which monetary impulses were transmitted into prices. Whatever the ultimate goal of monetary policy was, it could be reached fairly directly, and there was no need to specify intermediate targets. Not always, however, did the authorities succeed in synchronizing real money supply and demand. In the context of administratively fixed prices did an excess of money supply over money demand not necessarily lead to an increase in the absolute price level but, instead, to a monetary overhang. The resulting disequilibrium in the goods market was characterized by shortages of consumer goods, the disequilibrium in the money market led to forced savings, i.e. to high (involuntary) holdings of financial assets.¹

Feltenstein and Ha [1993] provide estimates for the size of the monetary overhang in the Czech Republic and in Poland in the 1980s. They find a significant amount of repressed inflation in Poland which became smaller towards the end of the decade. Price liberalization in the Polish case caused inflation to increase to almost 600 % in 1990, thereby eroding the monetary overhang. For the Czech Republic, in contrast, no large difference between official prices and black market prices and thus no large monetary overhang could be found. The Czech authorities could obviously, by keeping administrative macroeconomic control fairly tight, align money supply and demand under central planning. Hence, price liberalization in the Czech Republic led only to relatively moderate rates of inflation if compared to other reform countries. A similar conclusion can be drawn for the case of Hungary where official prices had already been somewhat liberalized prior to the final overhaul of central planning. The remainder of this paper will therefore deal with implementation problems for monetary policy after any existing monetary overhang has been taken care of.

¹ Note that it is difficult to assess the true amount of this monetary overhang. It may, for example, have been rational for consumers to hold relatively large stocks of cash as transaction balances because consumer goods became often unexpectedly available and because non-cash balances could not immediately be converted into cash.

1. Choice of Intermediate Targets

Upon the abolition of central planning the need emerges to define intermediate targets for monetary policy, provided that the price level cannot be targeted directly. In general, four different types of intermediate targets are conceivable. These are the volume of money supply, the prices at which gold or foreign currency are convertible into domestic currency, interest rate variables such as the nominal market rate or the real interest rate, and other variables such as GDP [Lindsey/Wallich, 1992, p. 744]. The problem with all these intermediate targets is that they encounter severe measurement and information problems. The real interest rate, for example, can only be measured if the price expectations of the public are known. Because markets for futures from which the inflationary expectation could be derived do not exist at the beginning of the reform process, measurement problems prohibit the use of the real interest rate as a monetary policy target. Other variables such as GDP are typically measured with a considerable time lag and, again, cannot be used as operational targets. In addition, it holds for all potential intermediate targets of monetary policy that the transmission from monetary impulses into prices is to a substantial degree determined by the institutional arrangements on financial markets. It is the stability of the structural parameters which underlie monetary policy and their volatility which determine whether monetary aggregates, interest rates, or other variables should be chosen as intermediate targets. Because of the instability of these parameters in the transformation process, a country may choose to abandon an independent monetary policy entirely and to tie its currency to foreign (stable) currency. This option has become known as a currency board arrangement which combines a fixed exchange rate with a rule-based monetary policy.² By definition, the monetary authorities under such a regime do not have to search for appropriate intermediate targets or for ways to implement these.

The choice of an intermediate target can be based on the magnitude of financial and real shocks in an economy. The interest rate is superior to a monetary target if disturbances affect only money demand (financial shocks) but not the relationship between interest rates and nominal spending (real shocks). During the transformation process, however, the clear separability between these two options is not given. Even if the monetary authorities decide to target the money supply instead of interest rates, they should raise real interest rates to positive levels. Negative real interest rates heavily distort the allocation of resources because they discourage savings while encouraging borrowing and are therefore typically accompanied by administrative restrictions on credit allocation. In addition, during the transformation from plan to market, real as well as financial shocks are occurring simultaneously, with their

² See Buch et. al. [1995] for a discussion of the advantages and disadvantages of fixed exchange rate regimes.

magnitude being hard to determine empirically. Khan and Sundararajan [1992] therefore propose to utilize a basket of targets and instruments. Hilbers [1993] argues that at the beginning of the transformation process, when the banking system is still highly monopolized and when budget constraints are weak, directly controlled quantitative targets should be preferred over interest rate targets.

The optimality of an intermediate target also depends on its implementability. Cukierman [1994, pp. 1442] distinguishes between targeting the price level or a monetary aggregate. He proposes to let the choice of a target depend on its controllability and the transparency. While the monetary base may be controllable for the monetary authorities, it may lack a transparent relation to prices. The price level, instead, is a transparent target but lacks controllability – especially during the transformation process. Hence, he proposes the choice of a wider monetary aggregate as an intermediate target as a reasonable intermediate solution. The following section looks at problems with the monetary targeting more closely.

2. Problems with Monetary Targeting

2.1. Instability of Money Demand

The basic assumption of the standard approach of monetary targeting is that the structural parameters which determine the transmission of monetary impulses into prices are stable. In this respect, the stability of money demand – i.e. the stability of the income velocity of money – is of key importance [Neumann/von Hagen, 1987]. Underlying this concept is the quantity equation which relates changes in prices (P) to changes in money supply (M), velocity (V), and output (Y):³

$$\Delta P = \Delta M + \Delta V - \Delta Y$$

[1]

$$\Delta V = f(\Delta Y, \Delta P^e, \Delta i)$$

Velocity is a function of income, nominal interest rates (i) – which determine the opportunity costs of holding money –, and the expected price level (P^e). Variables that have a positive impact on money demand lower the velocity of money because the average holding period of each currency unit rises. Conversely, higher opportunity costs of holding money lower money demand and raise velocity. Nothing can be said a priori about the optimality of a specific monetary aggregate as an intermediate target. This choice depends on the stability of money demand for this aggregate and, thus, on the stability of the transmission of monetary impulses into prices. A given expansion of money supply leads to different degrees of price increases

³ All variables are expressed in logarithms, reflecting percentage changes.

depending on the structure of money demand. If, for example, the income velocity of money increases because agents try to evade the inflation tax and thus reduce their money holdings, a given increase in the money supply is going to result in a larger rise of prices.

Generally, shifts in money demand can have two different causes [Khan/Sundararajan, 1992]. One-time structural shifts occur if administrative restrictions are abolished. Because decisions of banks and non-banks in the socialist banking system were highly regulated by direct controls on the holdings of certain monetary aggregates and on interest rates, agents are likely to adjust their portfolios to the desired composition after these controls are lifted. This implies that the money demand functions that could be estimated for the pre-reform period do probably not reflect the true preferences of the market participants. Hence, the monetary authorities would have no knowledge about the structure of the true money demand, even if that relationship had remained unaffected by the transformation process itself. More realistically, however, the structure of money demand itself will change during transformation, i.e. the elasticities of money demand with respect to income or interest rates will change. Incidentally, a hardening of the budget constraints of enterprises during the transformation process will lead to an increased interest elasticity of money demand from the corporate sector. These considerations imply that monetary targets would have to be adjusted to shifts in money demand. Once a target has been set and money demand increases in an unexpected, yet permanent way, sticking to the original target would lead to an overly restrictive monetary policy, and vice versa.

Measurement of velocity is, in addition, complicated by two transformation-specific factors. First, private sector activity is often not fully reflected in national production statistics. If private sector production is contributing an increased share to total output, actual GDP rises over measured GDP. As a consequence, measurement of velocity by only taking measured GDP into account will lead to an underestimation of true velocity. Another, second, factor leads to an overestimation of true velocity. If a greater transaction volume is settled with interenterprise debt as a means of payment, measured income velocity of the money stock increases. Hence, central banks may react with a tightening of money supply, thus reducing enterprise liquidity even more, and stimulating a further increase of interenterprise debt. In general, because the magnitude of the underestimation of GDP and of the amount of interenterprise debt are unknown, monetary authorities may react to a perceived change in money demand while the true structural parameters have remained unchanged.

2.2. Control of Money Supply

Once an optimal growth rate of the money supply which – assuming a given structure of money demand – is consistent with the inflation target of the central bank has been calcu-

lated, the question arises whether the central bank can actually implement this rate. In this context, two complications arise. The central bank may encounter difficulties in controlling a specific monetary aggregate because some of the determinants of this aggregate are beyond its control. As this is typically the case, the central bank also has an information problem as it cannot readily observe the actual level of the money stock. The bank can thus react to a departure from the optimal growth rate only with a lag and may run an overly excessive or restrictive policy during the interim period.

Central banks can determine the money supply by influencing the level of base money (H) which affects the level of total money supply (M) through the money multiplier (mm):

$$[2] \quad M = mm \cdot H = \frac{cc+1}{cc+rr+er} \cdot H; \quad H = C + RR + ER$$

where cc = the ratio of currency c to total deposits in the banking system, rr (er) = the ratio of required (excess) reserves (RR and ER) to total deposits.⁴ The central bank has a fairly direct influence only on the monetary base which is composed of a domestic component plus foreign exchange reserves. By changing the reserve requirements of commercial banks or by applying other instruments that affect the reserves of the banking system, the central bank can to some extent control the domestic component of the monetary base. Controllability is relatively low, however, if, for example, excess reserve holdings are high such that changes in the required reserve ratio leave the total base money unaffected because banks will simply convert excess into required reserves. Goodhart [1994] notes that the domestic monetary base is also beyond the complete control of the monetary authorities because the guaranteed convertibility of bank deposits into cash forces the central bank to accommodate changes in the public's demand for cash. These unexpected changes in cash demand are particularly high during the early reform period when the separation between cash and non-cash monetary circuits is lifted and when the seasonal pattern of the demand for cash is unknown as yet.⁵ The foreign component of the monetary base is controllable only if a system of flexible exchange rates or if capital controls are in place [Fry, 1978]. In a fixed exchange rate system without

4 This exposition of the money multiplier is, of course, a very simplified one because it does not consider different kinds of deposits and/or different required reserve ratios. See Willms [1993] for a detailed derivation of the money multiplier which takes these specifications into account.

5 A different argument against monetary base targeting does not apply to the situation of the reform countries just because excess reserve holdings are high. Under the condition that commercial banks can optimize on their excess reserve holdings, Goodhart argues that excessive interest rate fluctuations will be observed. At the end of each day banks would offer excess reserves on the interbank market – driving interest rates down – or borrow deficient funds at the central bank's penalty rate – driving interest rates up –, respectively.

capital controls, changes in the demand for domestic money will automatically transmit into changes of foreign exchange reserves.

Even if the central bank has fairly tight control over the supply of base money, however, it cannot control the overall money supply because the latter depends on the money multiplier, that is on the behavior of banks and non-banks. The central bank does have a direct influence only on the ratio of required reserves to deposits. It may raise the required reserve ratio if it intends to absorb excess liquidity in the banking system or lower it if the tax that a reserve requirement imposes on banks is considered too high. As far as the other two components of the money multiplier are concerned, the central bank has both, a control and an information problem [Neumann/von Hagen, 1987].

The control problem emerges because changes in the demand for currency of households as well as in the excess reserve holdings of banks cannot be predicted accurately. Households will decrease their cash holdings if more interest bearing financial assets become available, thus raising the opportunity costs of holding cash. The introduction of new payment techniques may, in addition, reduce the transaction demand for money. There is also no more need to hold cash balances for the purchases of rationed consumer goods. Hence, cash demand can be expected to decline during the transformation process. As a further result of this process, banks will increase their excess reserves if they wish to increase their liquid assets and if no other liquid investment opportunities are available. This may occur, for example, if the quality of the asset portfolio of the banks deteriorates due to the presence of non-performing loans. Even if these (voluntary) excess reserve holdings remain unchanged, involuntary excess reserves may increase due to inefficiencies in the payments system and due to problems with calculating minimum reserves. If the payments system is organized by the central bank, excess reserves would reflect the float that originates from settlement delays. Hence, while excess reserves may in general be expected to decline during the transformation process due to a re-organization of the payments system, temporary upswings may occur as a response to a lack of liquid investment opportunities.

An information problem arises because the central bank can observe the behaviour of the money stock only with a time lag. Whereas the monetary base comprises liabilities of the central bank that are by definition readily observable to the bank, the money stock consists of liabilities of the banking system. In order to observe the actual money stock, the central bank thus depends on information that it receives from the commercial banks. During the transformation process, this kind of information is likely to be inaccurate and delayed. The accounting system and thus the definition of monetary aggregates in the socialist banking system differed markedly from the accounting standards in a developed market economy. After these accounting standards have been adjusted to Western rules, people need time to implement the

changes. As a consequence, the compilation of monetary and banking surveys typically consumes a considerable amount of time. In the interim period, however, reliable data on the behavior of monetary aggregates is not available. Because the shift to a completely new accounting system cannot be achieved overnight, accounting standards tend to be adjusted gradually. This implies that even the post-reform period data sets may not be entirely consistent.⁶ The result are quite substantial delays with which information on the monetary processes is available for monetary policy makers.

While these control and information problems are also common to developed market economies – where, nonetheless, they tend to be less pronounced than in transition economies – another control problem emerges particularly during transformation. This control problem is due to the close interaction between monetary policies and quasi-fiscal activities which may force the central bank to refinance insolvent banks and enterprises [Bofinger, 1994]. Bofinger argues that part of the money supply in transition economies is endogenously determined by the need to keep insolvent firms, i.e. firms which total costs exceed total revenues, liquid. It should be noted that this particular control problem is not of a technical nature as the one above but rather a consequence of the underlying political and institutional structure of the economy. It is assumed that the central bank cannot credibly commit itself to the announcement of a monetary target which disregards the financing needs of insolvent firms. In other words, firm managers and the government have sufficient influence over the process of money creation to ensure that the liquidity demands of the industry are being met.

There are essentially two different, albeit related, channels through which money supply can become endogenous. The first channel is that insolvent firms are financed directly by the monetary authorities. Loans to enterprises may be channelled through the banking system but are essentially earmarked for special recipients. Hence, these credits are indirect subsidies – or part of the quasi-fiscal deficit. The reason for this more or less direct financing of loss-making firms is the political desire to support certain sectors of the economy. This undermines the independence of the monetary authorities and weakens the traditional role of commercial banks. Banks have no incentive to assess the creditworthiness of a borrower and to monitor the efficient use of funds. The allocation of directed credits may be thought of as a first step which leads to a build up of non-performing loans on the balance sheets of banks and thus to banking distress. Hence, a second channel emerges if insolvent banks are kept liquid through refinancing facilities of the central bank even if the quasi-fiscal activities have

⁶ At the end of 1991, for example, the National Bank of Poland introduced new reporting rules for Polish commercial banks which primarily intended to exclude accrued but not yet due interest as well as certificates of deposits of the National Savings Bank from money supply. As a consequence, the reported volume of M2 fell by about 7% [Chopra, 1994].

been fully consolidated into the budget. Banks which receive low-interest refinancing credit can continue to credit insolvent firms because they do not have to fear bankruptcy. Furthermore, they are likely to continue lending to loss-making firms if they see a chance to recover past losses [Perotti, 1993]. Through this channel enterprises do not directly receive central bank credit as a substitute for government subsidies. It may rather be in the interest of the monetary authorities to refinance the insolvent banks because, regardless of political considerations, the authorities assign a positive weight to the stability of the banking system as such. Hence, the solvency of the banks determines monetary policy. The more fragile the banking system, the less able are the monetary authorities to risk its stability by allowing bank bankruptcies. This endogenous component of the money supply is thus the larger the greater the share of insolvent banks which is dependent on central bank refinancing.

3. Institutional Structure of the Banking System

The prediction, control, and information problems with respect to money demand and supply as well as the potential endogeneity of the latter are to a large extent the result of the institutional structures of the banking systems in the emerging market economies. These factors hamper an effective monetary targeting. In a similar vein, interest rate targeting is hampered by the lack of responsiveness of market participants to price signals.

Hilbers [1993] distinguishes four stages in the transformation of financial systems from plan to market. In a first stage, the monobank system has formally been split up into a two-tier system. Centralized financial planning is still performed, leaving the complete institutional set-up of the monobank system in place. In a second phase, central planning is abolished and prices are liberalized. The institutional structure of the financial system, however, adjusts slowly to the changes in macro-economic policy. Hence, the banking system continues to be segmented, banks remain state-owned, nominal interest rates are gradually increased but real interest rates may turn negative on average, and banks hold excess liquidity due to weak interbank markets and insufficient payments systems. Monetary financing of the government deficit may still occur because the tax system needs time to be built up and because government expenditure cannot be reduced immediately. A lack of liquid secondary markets for government securities and for other financial assets prevents the conduct of open market operations. Legal restraints, in addition, may hamper the provision of assets as collateral for rediscount lending. The third stage is characterized by increased financial liberalization, i.e. increasing competition, privatization of banks, and market-determined interest rates, together with regained macro-economic stability. The turnover and the liquidity of interbank markets increase and secondary market for securities emerge. Hence, budget constraints of banks are hardening, excess reserve holdings decrease, and the potential for open market ope-

rations increases. The fourth stage is that of a developed market economy.⁷ The relevance of the institutional factors that hamper the conduct of monetary policy decreases while economies move from stage one to four. Generally, these factors can be grouped into five categories.

The inefficiency of the payments system, particularly in stage two will lead to long payment delays and to a large float. Hence, excess liquidity in the banking system will be high and difficult to predict [Balino et al., 1994]. In this situation, monetary authorities face difficulties with determining and influencing the liquidity needs of the banking system, and the monetary base may not be affected by traditional instruments of monetary policy. As was mentioned above, total commercial bank reserves which are being held with the central bank may not be affected by changes in the required reserve ratio because excess reserves can simply be converted into required reserves.

An additional problem which complicates the conduct of a market-based monetary policy are soft budget constraints of banks and enterprises. Prior to privatization and to the implementation of a bankruptcy legislation, banks and enterprises are unlikely to react to price signals. In other words, money demand is interest inelastic. A policy which aims at limiting the amount of liquidity in the system by raising the interest rate for central bank credits would thus be ineffective. Ultimately, however, the introduction of hard budget constraints is a function of the monetary policy itself and, more importantly, of the willingness of the government to stop subsidization of certain sectors of the economy and to implement structural adjustment procedures such as privatization and the enforcement of a bankruptcy law. Hence, the argument that the presence of soft budget constraints hampers the implementation of a restrictive monetary policy is somewhat contradictory because an expansionary monetary policy is one important cause of budget softness.

The substitution of bank credit by supplier credit as a particular indicator of budget softness has been described as one mechanism which counteracts restrictive monetary policies [Ábel/Siklos, 1994; Calvo/Coricelli, 1994]. Upon a tightening of central bank credits, enterprises can obtain additional liquidity by falling into arrears with their suppliers. The presence of a weak legal system may, in addition, prevent firms from enforcing their claims on bad customers. If suppliers need time to find new, solvent customers, the trade credit that they grant is involuntary, leading to a large network of interfirm debt obligations. In this situation,

⁷ Although no clear borderlines between these four stages can be drawn, the more advanced Eastern European reform states such as the Czech Republic, Hungary, and Poland have probably reached the third stage in the institutional development of their financial markets. Most successor states of the former Soviet Union, however, would still have to be placed in the second stage, while some have not even abolished all tools of central planning.

it is almost impossible to separate insolvent from illiquid firms and hence to decide whether an increase in interenterprise debt is an adjustment to levels which are being observed in market economies or rather a reflection of budget softness. It has already been mentioned above that the occurrence of interenterprise debt complicates the interpretation of observed velocity and hence an appropriate reaction to changes in it. But interenterprise debt affects monetary policy also through a different channel. Although interenterprise debt is not part of the traditional money stock, it may be monetized by the monetary authorities. Firms will actually gamble on this option the more frequent bail-outs have been in the past or, more generally, the less credible an initial monetary tightening has been. In this sense, interenterprise debt adds an additional layer to the endogeneity of money supply described above. Again, the question is whether budget softness complicates monetary policy or if not monetary policy itself causes budget softness. In any case, policy makers should monitor the development of interenterprise debt. It is, however, not advisable to include interfirm debt into the calculation of the money stock because the central bank has no means to affect the volume of trade credit in an economy by use of its monetary instruments. Interenterprise debt is entirely inside money, i.e. liabilities of the private sector. The central bank, in contrast, influences money supply by creating outside money, i.e. by issuing its own liabilities.

As far as the use of the interest rate as an intermediate target is concerned, the structure of the interbank money market and of the banking system as such has an impact on the ability of the central bank to influence the interest rate level in the economy. In most of the formerly centrally planned economies, the banking sectors are highly segmented. While most deposits are held with the savings bank, this bank often lacks investment opportunities. Hence, the savings bank offers excess liquidity on the interbank market where, again, only a few large banks exercise effective demand. As a consequence, the interest rate on the interbank market may not be an appropriate guideline for the central bank to set its lending rate. Whether the interbank rate would lie above or below the competitive rate depends on the relative strength of the actors on that market. As the savings bank can act as a monopolistic supplier of funds, the interest rate is likely to lie above the competitive market rate.⁸ If this situation emerges and if the central bank takes the interbank rate as the lower bound for its own lending rate, banks which may be able to borrow under competitive terms may not receive liquidity. Hence, the creation of a liquid, competitive interbank market, together with a strengthening of competition, should be one immediate goal in the transformation of the monetary and financial systems. In addition, the dominance of the savings bank on the market for deposits may counterwork effects at raising deposit rates to positive levels in real terms. In the absence of market access to foreign financial markets for depositors, the savings bank

⁸ It is also conceivable that the banks which are in the need of liquidity form a demand cartel and push the price below the competitive market rate. Setting central bank lending rates at or above this rate would thus lead to an excessive supply of liquidity.

may adjust nominal interest rates only insufficiently with respect to inflation. Competition from the other large domestic banks which could drive up deposits rates will be limited. Prior to recapitalization, these banks have to struggle with large portfolios of non-performing loans and can thus not afford higher costs of refinancing.

The institutional deficiencies in the financial markets of the emerging market economies do not only affect the structural parameters that underlie monetary policy making – and hence the choice of appropriate intermediate targets. These deficiencies also hamper the effectiveness of the instruments of monetary policy, i.e. its operative objectives. While it may be necessary to rely on fairly direct instruments of monetary control at the beginning of the transformation process simply because the effects of more sophisticated instruments are unknown or because economic agents are unlikely to react to market signals, those monetary instruments should be chosen that are the least likely to have negative feedback effects on the efficiency of financial markets. Instruments that fulfil these requirements would be those that (a) have limited impact on relative prices, i.e. any potential influence of the central bank on interest rates and operating costs should not favor or discriminate against certain banks, (b) do not preserve oligopolistic market structures, (c) do not have a direct influence on the allocation of credit across different sectors and borrowers, and (d) provide the commercial banks with incentives to engage in an active liquidity management. In other words, while the institutional structure of the banking and financial system affects the choice of policy instruments, those instruments should be chosen that do not preserve these institutional weaknesses. The following part introduces a general classification scheme for instruments of monetary policy and briefly applies this reasoning to the traditional instruments.

III. Choice of Instruments

A general classification of instruments of monetary policy has been proposed by Lindgren [1991] who first distinguishes between direct and indirect instruments. Direct instruments are those which directly control the volume of credit or money, respectively, or the level of the interest rate. Hence, credit and interest rate ceilings as well as restrictions concerning the maximum allowed interest rates spreads of banks fall under this category. Indirect instruments, in contrast, influence the liquidity conditions of banks and – in a more indirect sense than interest rate controls – the interest rate level of an economy. Indirect instruments can again be split into two groups. Statuary indirect instruments (reserve requirements) result in a reallocation of costs among banks and may thus distort relative prices. Market-based indirect instruments (rediscount facilities, open market operations), in contrast, affect the liquidity of the banking system by inducing the banks to change their asset structure voluntarily and as a reaction to price signals. Generally, the move from stage one to stage four in the institutional development of financial systems should entail a shift from direct instruments

to indirect, market-based instruments of monetary control [Lindgren, 1991; Khan/Sundararajan, 1992; Hilbers, 1993].

1. Direct Instruments

Credit and interest rate ceilings have been the traditional monetary instruments under central planning.⁹ By earmarking funds to be lent to specific sectors of the economy, by determining the deposit and lending rates as well as the interest rate spreads of commercial banks, and by separating monetary circuits central planners had great control over monetary flows. After the introduction of a two-tier banking system, control of the monetary authorities over lending and interest rate policies of the commercial banks weakened. The process of money creation now depends on the change of the money multiplier, credit decisions are becoming more and more autonomous, and central banks cannot readily observe all decisions and actions of commercial banks. This also implies that monetary authorities loose control over the implementation of direct instruments.

1.1. Interest Rate Ceilings

Interest rate controls specify the minimum (maximum) nominal interest rate for certain kinds of deposits (loans). Instead of determining loan and deposit rates separately, the maximum allowed interest rate spread may be fixed. Under central planning, interest rate controls fixed rates below their equilibrium levels, leading to an excess demand for loanable funds and thus to disequilibrium credit rationing. Hence, in order to stimulate deposit supply and to suppress loan demand, interest rate controls should be abolished from an allocative point of view. Quick interest rate liberalization, however, may negatively affect the solvency of banks which carry low-interest loans on their books. These banks now have to refinance long-term, low-interest loans at higher costs. In this situation, Mathieson [1980] proposes to gradually decontrol interest rates and to constrain competition from outside banks which are not burdened with low-interest assets. An alternative strategy would be to relieve banks from the burden of the past by recapitalizing them early on [Buch, 1994b]. This strategy has the additional advantages to free human resources which otherwise would be needed to fine-tune gradual interest rate adjustment, to establish market-determined interest rates, and to promote competition.

⁹ Note that these restrictions were – under central planning – maintained *within* the monobank system whereas instruments of monetary policy in a two-tier banking system are instruments that the central bank uses to influence asset and liability positions of commercial banks.

1.2. Credit Ceilings

Hilbers [1993] distinguishes four types of credit ceilings. Positive selective ceilings set upper limits for specific types of credits and are typically introduced because of prudential considerations, aiming at the stabilization of the banking system. Banking regulations, for example, may specify that loans to one single borrower may not exceed a maximum share of total loans granted by a bank (maximum exposure) or that one large credit may not exceed a certain multiple of the equity base of a bank.¹⁰ Negative selective ceilings, in contrast, are usually implemented with the intention to finance specific firms or regions by setting lower limits for loans to be granted to these sectors. Hence, directed credits are a typical form of negative selective ceilings. These directed credits should be phased out and be replaced by direct government subsidies because they typically bias credit allocation towards large, state-owned borrowers.

Another distinction can be made between gross and net ceilings. Gross ceilings specify the overall volume of credit in an economy, being tied to the total capital stock or the assets of the banking system or of individual banks. Lending beyond these ceilings is not allowed even if banks have raised additional funds. Net ceilings, in contrast, allow banks to increase their lending over and beyond the ceilings, provided that they have sufficient long-term funds available. Irrespective of which form of credit ceilings is being chosen, one condition for its implementation is that compliance can be observed and that non-compliance can be penalized. Hence, the need to establish effective reporting and legal systems is independent of the form of policy instrument chosen.

There are two reasons why it may be necessary to impose or maintain credit ceilings, respectively, during the transformation process. In the presence of binding credit ceilings, banks tend to hold large excess reserves. The immediate effect of an abolition of credit ceilings may thus be a temporary credit surge, leading to upward pressure on prices. This adjustment reflects a one-time shift from disequilibrium to equilibrium on the market for loanable funds and will not lead to permanent inflationary pressure. Hilbers [1993] has argued that prior to the removal of credit ceilings, excess liquidity should be removed from the system by inducing banks to invest into government securities – if available – or by raising reserve requirements. Provided that excess liquidity can be contained by these measures, stock adjustment processes would not require the maintenance of credit ceilings.

A second argument which focuses on flow aspects emerges if banks have incentives to lend to related entities and to roll-over loans to insolvent borrowers [Begg/Portes, 1993;

¹⁰ Although positive selective ceilings may feed back into monetary policy they are not of concern in this paper.

Schmieding/Buch, 1992; Bofinger, 1992]. These incentives may lead to an uncontrollable supply of credit and thus undermine monetary and financial sector stability. In such a situation, credit ceilings can be maintained until nonperforming loans have been removed from the balance sheets of banks, until banks have been privatized and/or their budget constraints have been hardened. One negative implication of these credit ceilings is that they freeze market shares if the overall credit expansion is divided up among the existing banks. Schmieding and Buch [1992] therefore propose to apply credit ceilings only to large state-owned banks while allowing private banks to expand their lending – and thus their market shares. Experience from Eastern Europe, however, has shown that this proposal needs to be subjected to one major qualification. In many cases, loans that have been granted by private banks have turned out as likely to be non-performing as loans granted by the state-owned banks [Buch, 1994b]. It could be argued whether this development may justify the imposition of credit ceilings on private banks as well. However, due to the fairly small market shares that private banks have and thus because of the limited macroeconomic implications of their lending, together with the ultimate goal to promote private banking, this seems not a reasonable step. Instead, prudential regulations are the appropriate means to promote financial stability.

2. Indirect Instruments

2.1. Reserve Requirements

Minimum reserve requirements specify a certain percentage share of each deposit which commercial banks have to hold in an account with the central bank. These reserves are typically non-interest bearing assets. Banks which do not comply with the reserve requirement can usually borrow deficient funds from the central bank at a penalty interest rate. Minimum reserve requirements increase the costs of financial intermediation through the penalty rate and through the opportunity costs of holding non-interest bearing reserves. Because reserve requirements reduce the amount of loanable funds that banks have available, banks will adjust their asset portfolios as a response to changes in reserve requirement. Whether credit supply decreases by the full amount of the reserve requirement or by less than this amount depends on the way reserve requirements are calculated [Baltensperger/Milde, 1987, pp.70].¹¹ If the deposit base at the *beginning* of the period is used as a reference for calculating the reserve requirement, loan supply decreases in proportion with the higher reserve requirement. If, however, the deposit base at the *end* of the period determines the

¹¹ It should be noted that one situation is conceivable when higher reserve requirements have no impact on loan supply. This will be the case if excess reserves are as high as to fully cover the minimum reserve requirement.

magnitude of the reserve requirement, loan supply decreases less than proportionally.¹² The reason is that banks at the beginning of the period are uncertain about both, the actual level of their reserves as well as the actual reserve requirement at the end of the period. Both depend on the amount of (stochastic) deposit withdrawals during the period. If withdrawals are high, both reserves as well as minimum reserve requirements will decrease. Required reserves thus serve as a buffer against liquidity shocks. A system where banks have to meet reserve requirements ex post and over average holding periods therefore promotes the liquidity management of banks.

Reserve requirements give central banks some control over the monetary base. Even in developed market economies, where banks' liquidity management is quite sophisticated, do central banks therefore retain the minimum reserve instrument. In the transformation process minimum reserves might, in addition, be considered as a source of revenue for the government budget. If commercial banks do not receive interest payments on their accounts with the central bank, while the bank can re-invest the reserves into interest-bearing assets, central bank profits rise with the reserve requirement. Hence, Fry [1988, pp. 108] proposes to impose discriminatory reserve requirements on different types of financial assets, depending on their interest sensitivity, in order to maximize central bank profit or government revenue, respectively. This second-best strategy obviously requires knowledge about the structure of money demand which is, for reasons outlined above, not given during the transformation process. More importantly, however, differential reserve requirements impose differential taxes on financial assets and thus distort relative prices of these assets. Minimum reserves, in general, by raising the costs of financial intermediation lead to higher spreads and thus *cet. par.* to lower savings and investment. These cost effects differ for different types of financial assets if non-uniform reserve requirements are imposed. If, for reasons of an improved monetary control and in order to obtain fiscal revenue, reserve requirements are to be maintained, they should be as uniform as possible, i.e. apply to all banks and to all kinds of deposits equally.

It should be noted, in addition, that minimum reserves are a rather inflexible instrument of monetary control because changes in reserve requirements trigger substantial portfolio adjustments [Lindgren, 1991]. Reserve requirements should thus be maintained at a pre-announced level and not be used for monetary fine-tuning. In order to reduce the financial

¹² The argument that reserve requirements may lead to an increased credit supply and thus to more investment cannot be applied to the transformation process. If the funds that are taken from the banks in the form of minimum reserves are invested into (productive) sectors which do otherwise not receive finance from the commercial banks, overall output may rise as a consequence of the imposition of the minimum reserve [Fry, 1988]. Especially in the context of the reform states of Eastern Europe, however, it is hardly conceivable that central banks engage in such an efficient re-allocation of financial funds.

burden that minimum reserves impose on banks, interest may be paid on reserves, provided that the fiscal situation allows this.

2.2. Refinancing and Interest Rate Policy

Central banks can influence the level of base money through their refinancing policies, i.e. through the conditions under which commercial banks can receive central bank credits. There are three policy parameters that the central bank needs to set in the context of its refinancing policies. First, the central bank must specify the assets that it is willing to accept as collateral for the provision of credit. Second, quantitative ceilings for central bank refinancing for the banking system or for individual banks may be set. At a pre-fixed interest rate, ceilings on lending may lead to rationing of central bank funds.

The third parameter is the central bank refinancing rate. The lower benchmark for this rate is an interest rate level which results in a positive real market rate. Central bank refinancing at negative real interest rates is equivalent to granting a subsidy to the recipient commercial bank which, in turn, can make profits from investing low-interest central bank funds into assets with non-negative rates of return such as, for example, foreign currency deposits. Negative real interest rates are, in addition, usually combined with the administrative allocation of credit, further aggravating resource mis-allocation. It should be noted, however, (i) that to the extent that nominal interest rates on long-term loan contracts cannot be adjusted flexibly, (ii) that some sectors continue to receive subsidized loans, and (iii) that inflationary expectations are wrong, (ex post) average real refinancing rates often remain negative for a considerable amount of time even if the ultimate goal of the central bank is to raise real interest rates to positive levels.

Provided that positive real interest rates can be established, finding an appropriate level is a complicated task in the economies in transition because competitive money market rates which could be used as a benchmark cannot be observed.¹³ Hence, world interest rates, adjusted by a country-specific risk premium may be applied. As money market turnover and competition on this market increase,¹⁴ observed interest rates on these markets can be used as a lower bound for central bank refinancing. If refinancing rates are set below market rates, demand for central bank credit is in principle unconstrained because banks can make use of arbitrage opportunities. By setting the interest rate on refinancing credit above the market rate, central banks open a lender of last resort facility for (temporarily) illiquid banks. If borrowing at this rate is in principle unconstrained – or only conditioned upon the provision of

¹³ See Leite and Sundararajan [1990] for a discussion of how to determine the adequacy of interest rates.

¹⁴ See section II.2. for a discussion of this issue.

collateral —, the central bank's objective of price stability, i.e. of keeping money growth on a pre-determined path, may temporarily become subordinated to the objective of financial stability, i.e. of providing illiquid but solvent banks with liquidity [Cukierman, 1994, pp. 1444].

Obstacles to the implementation of a refinancing policy which corresponds to the goal of price stability during the transformation process are the soft budget constraints of banks, the lack of assets which can serve as collateral for central bank lending, and the degree of financial distress of banks, combined with the lack of information on the solvency of banks. Budget softness of banks or a lack of profit-orientation implies that an increase in refinancing rates may not restrain credit demand. The lack of collateral has often led central banks to auction off credit instead of requiring the provision of collateral. Again, budget softness of banks may cause problems because banks may bid up interest rates over and above the market rate and may ultimately fail to repay their debt. The last obstacles to a market-base refinancing policy, the degree of financial distress, cannot be overcome with the tools of monetary policy alone. Instead, in order to be able to base its lending decision on criteria of credit-worthiness and to eventually close insolvent banks, the central bank must expand its supervisory activities.¹⁵ A comprehensive solution to the issue of banks' distress can only be found in cooperation with the government and in the context of a recapitalization program which comprises elements that prevent a re-occurrence of financial instability.

2.3. Open Market Operations

The increased reliance on open market operations in government securities and in other financial assets represents the final stage when moving from the use of direct to indirect, market-based instruments. By buying securities from commercial banks, the central bank can expand the supply of base money and, hence, the money supply, and vice versa. This can be achieved either by fixing the amount of securities to be bought, leaving the price to be determined by the market, or by fixing the price, leaving the quantity as the endogenous variable. Obviously, the implementability of open market operations depends on the depth and liquidity of secondary markets for securities. Because these markets are rather underdeveloped and thin in the emerging market economies, open market operations can be mimicked by quasi-open market operations, i.e. by trades that take place on primary markets. Considering the time that is needed to establish efficient secondary market, the necessary reforms should be initiated at the beginning of the transformation process in order to allow the conduct of open market operations later on.

¹⁵ Alternatively, the central bank may delegate banking supervision to an independent institution with which, nonetheless, close co-operation as far as the exchange of data is concerned must be arranged.

To sum up, a monetary policy which is consistent with the criteria outlined at the end of chapter 2, should comprise the following elements:

- quick decontrol of interest rates
- maintenance of net credit ceilings for large state-owned banks until budget constraints have been hardened
- unification of reserve requirements and – possibly – payment of interest rates on reserves
- elimination of preferential central bank refinancing rates and special lending programs
- granting of refinancing credit on the basis of solvency and/or the provision of collateral
- promotion of the development of the interbank money market and of the securitization of financial claims.

IV. Experience of Eastern Europe

This part summarizes the experiences that the early reform states of Eastern Europe, i.e. the Czech Republic, Hungary, and Poland, have made with the conduct of monetary policy and with the move from direct to indirect instruments of monetary control. Throughout the presentation of the empirical evidence, the focus is on the monetary policy instruments that have been used and their impact on the operations of banks. Institutional factors such as the degree of central bank independence, the structure of the financial and the banking system, and the optimality of a chosen monetary policy are not discussed.

1. The Czech Republic

Between 1990 and 1994, the Czechoslovakian National Bank and the Czech National Bank (CNB),¹⁶ respectively, tried to target the growth rate of the money stock M2 (Table 1). Only for 1991 was no official monetary target announced [Hanousek et al., 1994]. The exchange rate and an incomes policy were used as nominal anchors. This over-determination of monetary policy has led to conflicts of interest, especially in 1994 when increased capital inflows boosted the foreign component of the money stock (Table 2). While in 1992 and 1993 net foreign assets contributed less than domestic assets to the growth of the overall money stock, growth of M2 in the first half year of 1994 was almost entirely the reflection of an increase in foreign assets. Net domestic assets stayed almost unchanged. Their structure, however, has shifted away from credit to the government towards credit to enterprises and households. Within the latter category, a significant re-allocation of resources away from the public towards the private sector has taken place. From 1992 onwards, lending to state-owned firms has declined in absolute terms, while lending to private firms increased at above-average

¹⁶ The abbreviation CNB is used even if – for the time before 1993 – the State Bank of Czechoslovakia is meant.

rates. Of course, these shifts also reflect the effects of the voucher privatization. As a consequence, the share of private sector credit in total credit rose from 12.23 % at the end of 1990 to 46.63 % in June 1994. Banking distress has put little financial pressure on the monetary authorities. Total bank recapitalization at the amount of 56 bn Krowns has been financed from privatization proceeds and the issuance of bonds of the National Property Fund. In addition, emergency credit to financial institutions amounted only to 1 bn Krowns at the end of 1993.

Table 1 — *Targets and Assumptions of Monetary Policy in the Czech Republic, 1990-1994.*

	1990	1992	1993	1994 ^a
	<i>(percentage change over the previous period)</i>			
<i>Targets:</i>				
Δ M2	No target set.	12 (20)	17 (20)	15 (24) ^b
Δ Credit to Enterprises and Households	-2 - +1 (1,44)	13-14 (16)	11 (19)	No target set. (16) ^b
<i>Assumptions:</i>				
Δ Real GDP	n.a. (-1.2)	0 (6.6)	n.a. (-0.3)	2-3 (4.8) ^d
Δ Prices ^c	n.a.	12 (13/9.3)	n.a. (18/11)	10 (8/5) ^d
Δ Velocity of M2	n.a. n.a.	0 (- 4.2)	n.a. (- 5.8)	n.a. n.a.
Actual realization in brackets. — a) January-June. — b) Change over same period of previous year. — c) In brackets; first number = consumer prices, second number = producer prices. — d) Estimated by Planecon.				

Sources: Quarterly and Annual Reports of the State Bank of Czechoslovakia and the Czech National Bank, various issues; Planecon, Czech Monthly Economic Monitor (June 1994); Hanousek et al. [1994].

As regards the uses of M2, the share of time and savings deposits continuously increased while holdings of M1 and of foreign currency deposits became less important (Table 2). The important contribution of demand deposits to the growth of M2 in 1993 is a reflection of the fact that people shifted their financial assets away from currency into deposits during the time of the separation of the Czech and Slovak Republics. It was expected that bank deposits would be converted at a more favorable rate than currency holdings from Czechoslovak into Czech Krowns. Due to this shift from currency into time deposits, commercial banks accumulated high excess liquidity. By raising reserve requirements and reducing auction credit volume, the CNB tried to sterilize this liquidity in the first months of 1993.

Table 2 — Sources and Uses of the Growth of M2 in the Czech Republic, 1989-1994.

	1989 ^a	1990 ^a	1991 ^a	1992	1993	1994 ^b
Growth of M2	100	100	100	100	100	100
<i>Sources</i>						
Net foreign assets	-156.03	1.51	18.78	30.15	44.62	98.96
Net domestic assets	...	...	82.85	56.56	55.46	1.04
Domestic Credit	258.98	-20.28	74.58	79.21	85.07	97.09
Credit to the government	290.50	-18.44	-11.8	28.01	-14.68	-26.61
Credit to enterprises and households	-31.52	-1.84	77.29	67.80	93.39	111.43
<i>Uses</i>						
M1	32.96	108.58	54.71	45.41	45.68	26.61
Currency	...	...	9.97	3.21	0.73	27.44
Demand deposits	...	...	44.75	42.19	44.94	-0.83
Time and savings deposits	...	...	32.68	38.89	53.10	71.10
Foreign currency deposits	...	...	12.61	15.70	1.22	2.29

a) Former Czechoslovakia. — b) January-June.

Sources: Quarterly and Annual Reports of the State Bank of Czechoslovakia and the Czech National Bank, various issues; IMF, International Financial Statistics, various issues; own calculations.

Large swings of money demand, i.e. of the income velocity of money, especially during the time surrounding the separation of the Czech and Slovak Republic, hampered monetary targeting (Graph 4). While in 1991-1993 the income velocity of M2 displayed some seasonal pattern, evidenced by a decline in velocity in the fourth quarter, no trend can be detected. This is one reason why both in 1992 and in 1993 actual growth of M2 surpassed the targeted rate; the annualized growth of the money stock in the first half of 1994 with respect to the same period of the previous year was already well above the target for M2. In response to its inability to target to money supply, and because of a limited impact of refinancing rates on market interest rates, the CNB in 1994 decided to target banking system reserves both on an aggregate and bank-specific level.

The CNB gradually shifted from the use of direct to indirect instruments of monetary control. Interest rate ceilings which limited commercial banks' loan rate to the discount rate of the Central Bank plus a maximum spread were in place between January 1990 and April 1992. The maximum spread was increased from 8 % in 1990 to 14 % in the first half of 1991 and then lowered to 7.5 %. In early 1992, credit ceilings were imposed on banks on the basis of the monetary program for the following quarter. These ceilings were removed for small- and mid-sized banks in July and for large banks in October of the same year. In many cases, banks voluntarily did choose not to exhaust the credit limits. Parallel to the gradual phasing out of direct credit controls, the CNB has introduced indirect instruments such as credit auctions, lombard, and rediscount credit. Yet, while central bank lending to financial institutions was cut down between 1991 and 1993 (Table 13), the share of market-based refinancing in total central bank credit has remained modest and even declined throughout the 1991-1993-period (Table 3). Only in the first eight months of 1994 did refinancing credit increase relative to total central bank lending. The bulk of outstanding central bank credit to commercial banks is redistribution credit, despite the fact that no new redistribution credit has been granted since mid-1991. Hence, the increase in the share of redistribution credit in overall central bank lending in 1992 and 1993 is a result of a less than proportional reduction of this item. More than half of the redistribution credit at the end of 1993 was owed by the Consolidation Bank, which had been founded to take over non-performing loans from the commercial banks. In part as a response to reduced overall central bank lending, commercial banks have increasingly utilized customer deposits as a source of refinancing. The ratio of central bank lending to total deposits of financial institutions decreased from 38.1 % in 1991 to 11.4 % in June 1994 (Table 13).

Table 3 — *Lending of the Czech National Bank to Commercial Banks, 1990-1994.*

	1990	1991	1992	1993	1994 ^a
<i>Change in Central Bank Lending [bn Krowns]</i>					
Total	+ 59.6	- 14.0	- 35.7	- 49.6	+ 0.9
Refinancing credit	+ 35.1	+ 9.1	- 23.3	- 14.0	+ 2.5
Redistribution credit	+ 19.5	- 23.1	- 12.4	- 35.8	- 1.6
<i>Composition of Central Bank Lending [%]</i>					
Total	100	100	100	100	100
Refinancing credit	20.1	27.5	16.8	9.2	12.4
Redistribution credit	79.9	72.5	83.3	90.8	87.6

a) January-August.

Source: Hanousek et al. [1994]; Selected Indicators of Monetary and Financial Developments in the Czech Republic [July 1994]; own calculations.

As regards the interest rate policy of the CNB, four episodes can be distinguished (Graph 1).¹⁷ Between January and July 1992, central bank refinancing rates were substantially below interbank deposit rates. In the second half of that year, the bank switched from providing credit at these low rates towards granting short-term funds through credit auctions at interest rates which highly exceeded the market level. Short-term auction credit, which was the most important source of new central bank lending to commercial banks between July and November 1992, was granted at a maximum interest rate of about 20 % while the market rate was around 12 %. Similarly, the central bank auctioned off funds at interest rates well above the market level in April 1993. The third period of interest rate policy starts roughly at that time, continuing through the end of 1993, and is characterized by a lombard rate which is roughly in line with the market interest rate, the deposit rate being set at about 6-7 percentage points below that rate, and the auction rate at an intermediate level. Already during this period, however, did the lombard and the auction rate have little practical relevance for the cost of refinancing of commercial banks because hardly any new lending was done under these facilities. This trend was even more pronounced in 1994, the fourth period. In the first six months of this year no new lombard or auction credit was granted by the CNB, instead discount lending increased at a rate of 21 % while total CNB claims on the financial sector remained almost unchanged. Hence, through its discount window the central bank provided selected banks with liquidity at below-market interest rates. The timing of the establishment of

¹⁷ Throughout the entire period did the stock of redistribution credit pay an interest rate below the discount rate which was negative in real terms (Table 4).

positive real refinancing rates depends on the choice of the interest rate as well as of the price index (Table 4). If the auction rate and the producer price index are used, real refinancing rates have been positive since 1992, based on the rediscount rate and consumer prices, non-negative real rates could be reached only in 1994.

Table 4 — Refinancing Rates of the CNB and Price Development in the Czech Republic, 1989-1994.

	1989	1990	1991	1992	1993	1994
Rediscount rate	5	5.4	9.8	8.9	8.6	8
Auction rate (< 1 month)	...	...	10.24	12.3	13.24	...
Redistribution rate	...	5	9.4	7.7	8.1	...
Δ CPI	1.4	15	52	13	18	8
Δ PPI	-0.7	15	57	9.3	11	5.5

Interest rates = average rates per period. Prices = percentage change over the end of the previous year.

Sources: Planecon, Czech Monthly Economic Monitor (June 1994); Quarterly and Annual Reports of the Czech National Bank, Hanousek et. al. [1994].

Overall, the monetary policy of the CNB is characterized by a drastic reduction of central bank lending in 1992 and 1993, and a shift from direct to indirect instruments of monetary control. Although being small in volume, preferential refinancing credit such as rediscount lending seems to have become a permanent source of financing a very few, small insolvent banks. Because there was no need to supply the economic system with additional liquidity in 1994 due to the large inflows of foreign reserves, not much can be said about the success with the implementation of market-based instruments. At times, the CNB used discrete changes of the mandatory reserve instrument (Table 14). Yet, this instrument was primarily applied under the special circumstances of the separation from the Slovak Republic. One reason for the success of the Czech monetary policy in terms of a reduction in inflation is that the public sector has not imposed any restraints on the monetary authorities.

2. Hungary

The Hungarian National Bank (NBH) followed a mixed strategy both with respect to its primary and intermediary targets. Apart from the goal to stabilize prices, the official announcement for the goals of monetary policy in 1991 mentions the maintenance of solvency of the country and the improvement of the external position of the Hungarian economy as

additional targets [NBH, Annual Report 1991, p. 75]. While the improvement of the external balance was given priority over the price target in 1990-91, this order was reversed in 1992-93 [NBH, Annual Report 1993, pp. 83]. In each year, a number of further targets such as the improvement of the general investment conditions was added [NBH, 12:1992, pp. 16]. Generally, the stability of the real effective exchange rate of the Forint – measured by the change in wholesale prices – as well as, in 1990 and 1991, the growth of the domestic credit stock, were used as interim targets. In 1992 and 1993, no quantitative target was specified. Instead, the reduction and stabilization of interest rates was envisaged. The exchange rate of the Forint is in principle fixed but was devalued discretely several times since the inception of reforms.

While money supply grew faster than predicted in 1990-1992, it remained below target in 1993 (Table 5). Money growth, however, did not transmit into increases of domestic credit by the same order of magnitude. This can at least partially be explained by an attempt of commercial banks to reduce their exposure to risky assets. Hence, domestic credit generally grew slightly less than originally expected. Despite the deviation of money growth from its expected rate, consumer prices in 1991 and 1992 increased roughly in line with expectations, while in 1992 they rose much faster. The increase of producer prices was over-estimated only in 1992. The fairly close estimates for prices, however, should not hide the fact that the structural parameters of the transmission of monetary impulses into prices have shifted during the observed time period. Income velocity of broad money has fallen by 80 % in 1992 and rose by 3 % in 1993.¹⁸

¹⁸ In addition, it should be noted that expectations about the development of real GDP have – with the exception of 1990 – been overly optimistic.

Table 5 — Assumptions of Monetary Policy in Hungary and their Realization, 1989-1993.

	1989	1990	1991	1992	1993
Δ Money Supply	$\Delta M < Y^N$ (15.2)	12-14 (29.3)	24-26 (28.6)	20-26 (26.7)	21-26 (17.6)
Δ Domestic Credit	n.a. (15.7)	10-12 (9)	10-12 (9.4)	10-12 (10)	11-13 (12)
Δ Real GDP	n.a. (0.4) ^a	-5 (-3.5)	-3-4 (-12)	1-2 (-4)	0-3 (-2.3)
Δ Consumer Prices	n.a. (17)	n.a. (29)	34-36 (35)	20-25 (23)	14-18 (22.5)
Δ Producer Prices	n.a. (15.4)	n.a. (22)	30-32 (33)	16-18 (12)	9-13 (11)

In percent. Actual realizations in brackets. — a) Nominal GDP: 19.2 %.

Sources: NBH Market Letters, 1:1990; NBH Annual Report 1991 (pp. 74); NBH Monthly Report 1992:12 (pp. 16); NBH Annual Report 1992; NBH, Annual Report 1993, p. 86.

As far as the sources of the growth of the banking system's assets are concerned, the situation differs considerably from the observations made for the Czech Republic (Table 6). In Hungary, credits to government have made a substantial contribution to the growth of net domestic assets since 1992 with a share of more than 50 %. Although bank recapitalization with a total cost of 168 bn Forint or about 5 % of the banking system's net domestic assets at the end of 1993 has been financed through the issuance of government bonds, it has raised the financing needs of the budgetary sector. Credits to enterprises which contributed about 50 % (24 %) to the growth of domestic assets in 1990 (1991), declined in absolute terms both in 1992 and 1993, and started to recover only in the first half of 1994.¹⁹

¹⁹ In the case of Hungary, no information is available about the development of private and state-owned sector credit.

Table 6 — Sources and Uses of Assets and Liabilities in the Hungarian Banking System, 1990-1994.

	1990	1991	1992	1993	1994 ^a
Growth of total assets/ liabilities	100	100	100	100	100
<i>Sources</i>					
Credits to government	2.43	26.42	53.27	64.88	51.39
Credits to enterprises	50.83	24.04	-2.88	-2.50	20.22
Credits to households	17.86	-23.87	6.28	7.61	-2.22
Valuation changes	24.99	55.98	32.28	56.34	19.20
Other assets	3.89	17.42	11.05	-26.34	11.41
<i>Uses</i>					
Broad Money	86.59	56.05	90.99	51.52	16.27
Notes and coins	12.52	10.91	18.09	9.38	5.75
Forint deposits	30.07	15.47	58.45	18.97	-2.65
Foreign currency deposits	33.28	18.03	5.96	21.82	10.72
Net foreign liabilities	2.09	23.85	-7.18	45.52	9.58
Other liabilities	11.32	20.10	16.2	2.96	74.15
a) January-June.					

Sources: National Bank of Hungary, Monthly Reports, various issues; own calculations.

The interest rate policy of the NBH is characterized by two main tendencies (Graph 2). First, the base refinancing rate of the NBH has over some periods of time been set below the average yield on treasury bills, giving commercial banks the opportunity to borrow from the central bank in order to invest into government securities [Pugh Piper et. al., 1994, p. 14]. Profit opportunities of this kind arose in the first half of 1992 as well as between September and December 1993. Hence, the NBH has indirectly been financing the state budget through its refinancing window and lost control over money supply. This window was closed when the NBH raised its interest rate on repurchase agreements over and above the average interest rate on treasury bills in early 1994. Second, despite efforts at establishing positive real refinancing rates, which were reached in 1993 at the latest,²⁰ a number of preferential refinancing rates such as on export trade and existence loans are maintained (Table 7). Export trade credits, for example, were granted at annual interest rates of 10 % in 1991-1992, and loans to refinance existence credits were granted at an annual rate of 13.2 % in 1992 and 3 %

²⁰ The base refinancing rate of the NBH has been positive in real terms since 1991 if the change of producer prices is used as a basis of reference and since 1993 if the change in the consumer price index is used.

in 1994. In September 1994, seven different preferential loan programs were still in place [NBH, 1994:9].

Table 7.— *Refinancing Rates of the NBH and Price Developments in Hungary, 1989-1994.*

	1989	1990	1991	1992	1993	1994 ^a
Base rate	14	20	22	21.6	20.3	22.5
Repo rate	...	...	-	20	23	24.2
Export trade loans ^c	...	...	11	11	11	11
Existence loans ^d	...	...	16.5	12.6	3	3
Δ CPI	17	13.3	35	23	22.5	19.5 ^b
Δ PPI	15.4	22	32.6	12.3	10.8	10.9 ^b

Average interest rates per period. — a) January-June. — b) Price increase in the first six months at an annualized rate. — c) Loans maturing over 180 days but within 1 year. — d) Loans to refinance existence loans (75 % of base rate).

Source: NBH, Monthly Reports and Annual Reports; own calculations.

There is no detailed data available which would allow an assessment of the importance of preferential lending as a share of total central bank lending to commercial banks. Data on the balance sheet of the NBH only allows a differentiation between short- and long-term refinancing credit, repurchase, and rediscount lending. This data shows that in 1993 and 1994 the NBH has increasingly made use of the repurchase agreements while cutting down rediscount and general refinancing lending (Table 8).²¹ The structure of refinancing credit is increasingly dominated by long-term lending which has also increased in absolute terms. Some of this lending are loans from abroad or from international financial institutions that the NBH channels to the recipient firms. Using the National Bank as an agent of this kind, however, has at least two serious disadvantages. First, the NBH continues some commercial banking functions which it should delegate to other, specialized financial institutions. Second, long-term lending by the NBH is promoted. This runs counter to the goal that central bank lending should, in the first place, even out short-term liquidity needs.

²¹ Repurchase agreements are based on the provision of T-bills as collateral, and on a fixed interest rate.

Table 8 — *Lending of the NBH to Commercial Banks, 1989-1994.*

	1989	1990	1991	1992	1993	1994 ^a
	<i>(in percent of total NBH lending to commercial banks)</i>					
Refinancing credit	89.8	62.8	57.4	81.6	58.5	56.6
< 1 year	27.6	11.7	9.4	13.6	1.0	0.9
> 1 year	62.1	51.0	47.9	68.0	57.5	55.7
Repo	0	0	0	0	32.9	19.1
Rediscount	9.9	5.9	1.1	0.6	0.4	0.2
F/X deposits ^b	0	18.7	33.7	12.2	5.5	21.6
Other	0.27	12.6	7.8	5.7	2.6	2.5

a) June. — b) Credit provided against foreign exchange deposits.

Sources: NBH, Monthly Reports, various issues; own calculations.

Mandatory reserve requirement were actively used in 1990 and 1991 to reduce excess reserves of commercial banks. However, this policy has only temporarily been effective (Table 14). As the only country analyzed in this paper, the NBH pays interest rates on mandatory reserves although these interest payments were substantially lowered to only 2 % annually in 1992. In addition, voluntary deposits held with the NBH pay interest rates not too far below the market rate. Considering the payment services that these accounts can provide, these interest payments create substantial incentives for financial institutions to hold excess reserves with the NBH. From October 1992 onwards, however, no new interest bearing voluntary deposits could be made. In view of this fact, the increasing share of excess reserve holdings as a share of total commercial bank deposits with the NBH in the second half of 1992 and in 1993 is surprising.

In contrast to the Czech National Bank did the NBH constrain nominal lending to commercial banks only in 1992 (Table 13). As one consequence has the reliance of commercial banks on central bank credit as a source of financing remained fairly high. The ratio of the liabilities to the NBH over total commercial banks' asset was reduced from 23.7 % in 1989 to 12.9 % in 1994 (June). It was then about twice as high as in Poland and in the Czech Republic. Excess reserves of commercial banks are the highest in the region and have even shown an upward trend in 1994. That may be a result of the policy to pay interest on reserves, but is probably also reflecting institutional problems with the calculation of mandatory reserves and with the payments system. As far as the refinancing and interest rate policy of the NBH is concerned, the high share of long-term lending as well as the existence of preferential

loan programs are obstacles to the use of indirect, market-based instruments of monetary control.

Table 9 — *Sources and Uses of the Growth of Assets and Liabilities in the Polish Banking System, 1989-1994.*

	1989	1990	1991	1992	1993	1994 ^a
Growth of total assets and liabilities	100	100	100	100	100	100
<i>Sources</i>						
Foreign assets	26.75	47.60	-3.19	24.99	15.84	30.68
Domestic credit	73.25	52.40	103.19	75.01	84.16	69.32
General government (net)	14.00	-11.18	58.15	48.60	47.78	31.01
Non-financial public enterprises	56.82	52.30	1.72	6.61	10.74	9.80
Private sector	2.44	11.29	43.32	19.79	25.64	28.51
<i>Uses</i>						
M2	169.95	87.10	43.19	71.72	64.19	70.17
Money	37.24	56.01	8.09	19.98	20.29	17.83
Quasi-money	132.72	31.09	35.10	51.74	43.90	52.34
Other	-69.95	12.90	56.81	28.28	35.81	29.83
a) January-June.						

Source: International Financial Statistic, IMF; own calculations.

3. Poland

According to official announcements, the main task of the Polish National Bank (NBP) has been the promotion of price stability [Osinski/Slawinski, 1994]. The variable that the NBP used as an intermediate target between the beginning of the transformation process and the year 1993 was the nominal growth of total money supply, including foreign exchange deposits. However, no detailed information is available concerning the actual targets. Obviously, money and credit expansion was constrained by the pre-announced crawling peg exchange rate which required the differential between domestic and foreign price increases to be no larger than the planned nominal devaluation of the Zloty, should a real appreciation of the currency be avoided. In 1993, the NBP started to use the short-term interest rate as an operational target. The interest rate that the bank uses for its repurchase and reverse repurchase

agreements is determined on the basis of the pre-announced devaluation, foreign interest rate developments, and interest rates on the domestic money market.

Apart from general problems with monetary forecasting during the transformation process,²² financing needs of the public sector are one main reason for the inability of Polish monetary authorities to affect growth rates of money supply.²³ Table 9 shows that net lending to the government sector has been the most important source of money growth in 1992-1994, while lending to state-owned enterprises dominated in 1989-1990. This indicates a shift from financing the enterprise sector through directed central bank credits towards subsidization through the budget (or through extrabudgetary funds which often depend on financing from the budget). It should be noted that 1991, the shift from credit to state-owned enterprises towards credits to the budget has primarily taken place within the last quarter. Hence, it coincides with the Ministry of Finance taking greater control over the banking sector. Parallel to the declining importance of lending to the enterprise sector, the share of private sector credit in total domestic credit has increased from 5.2 % in 1989 to 59.2 % in 1994.

The refinancing rate of the NBP (Graph 3), i.e. the rate at which short-term loans and central investment credits are granted, has been used as a reference rate by commercial banks in 1990 and 1991. Commercial banks which intended to index loan contracts to inflation used the NBP-rate as an official projection of inflation [Chopra, 1994, p. 30]. Throughout 1991 and most of 1992, the interbank rate exceeded the refinancing rate which means that central bank refinancing could be obtained at below-market rates instead of reflecting the highest cost of obtaining funds. Another interesting feature emerged in 1992 when the effective yield on treasury bills exceeded the refinancing rate.²⁴ Commercial banks could thus make arbitrage profits by borrowing from the central bank and investing these funds into T-bills. In 1993, the Polish Ministry of Finance started to align the effective yield with the refinancing rate and directly borrowed additional funds which the market was not willing to provide at this rate from the NBH [Chopra, 1994, p. 25]. Apart from other factors that may have increased the demand for government securities, this profit opportunity induced banks to adjust

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- 22 Income velocity is displaying both, seasonal patterns as well as trend movements (Graph 5). In the fourth quarter of each year, velocity tends to increase slightly. At the same time. Since early 1991, there is a trend of the velocity of M1 to increase and of M2 to decrease [Polanski, 1994, pp. 8].
- 23 It must be noted that the cost of bank recapitalization have not to a substantial degree fed back into monetary policy because the bulk of the funds needed was financed from foreign loans. However, in 1994, commercial banks received 12 trillion Zloty in liquidity assistance which is equivalent to 9.6 % of the growth of NBP assets between January and August 1994.
- 24 Note that this effect is obtained because the T-Bills were sold below face value, thus raising the effective yield above the coupon rate.

the structure of their asset portfolios towards the holding of government securities in general and T-bills in particular (Table 10).

Table 10 — *Structure of the Asset Portfolios of Commercial Banks in Poland, 1991-1994.*

	1991	1992	1993	1994 ^c
	<i>(in percent of total assets of commercial banks)</i>			
Claims on non-financial sector	40.3	36.3	33.8	33.3
Claims on budgetary sector	3.1	4.1	2.1	1.8
Claims on households	1.5	1.8	2.4	2.5
Treasury-bills ^a	0.4	7.8	9.3	10.1
Treasury-bonds ^b	10.5	6.6	9.6	9.5

a) Denominated in Zloty. — b) Denominated in US-Dollar. — c) June.

Source: NBP, Monthly Information Bulletins, various issues; own calculations.

The timing of the implementation of positive real refinancing rates – after highly negative rates had been realized in 1989 and 1990 – differs according to which price index and which interest rate are being used (Table 11). Based on consumer prices changes, real refinancing rates stayed negative until 1994, measured against producer prices changes, refinancing rates were positive in real terms already in 1991. The real discount rate was negative throughout if consumer prices are used as a basis of reference, and was positive with the exception of 1993 if computed with producer prices.

Table 11 — *Interest Rate and Price Developments in Poland, 1989-1994.*

	1989	1990	1991	1992	1993	1994 ^a
Refinancing rate	61.3	104.8	53.6	39.0	35.3	34.0
Discount rate	...	57.3	47.4	34.0	29.3	28.5
Interbank rate	...	90.3	56.6	40.8	31.5	30.2
Δ CPI	251.1	585.8	60.3	44.4	40.6	32.2
Δ PPI	212.8	622.4	35.7	31.5	37.6	26.5

a) Interest rates as of September 1994, inflation rates of August over August of 1993.

Source: NBP, Monthly Information Bulletin, various issues; own calculations.

While the NBP has increased its nominal lending to the commercial banking sector in 1993 and the first half of 1994 (Table 13) quite opposing movements can be observed for the various forms of refinancing credit, on the one hand, and credit which is disbursed through open market operations, i.e. repurchase and reverse repurchase agreements, on the other hand. Open market operations have, in the aggregate, been used to withdraw liquidity from the banking system whereas lending under the various refinancing programs increased in nominal terms. If one sums up the total amount of liquidity that the NBP has withdrawn from the banking system in 1993 and in the first half of 1994, this adds up to an amount of 232,727 billion Zloty while the total amount of new refinancing credit that has been granted during this time only adds up to roughly 20 % of this sum (48,971 Zloty by June 1994).²⁵ Because most refinancing credit is in the form of central investment credit, an increase of nominal credit outstanding mostly reflects capitalized interest payments.

As regards the structure of central bank receivables from commercial banks, two observations can thus be made (Table 12). First, refinancing credit as a share of total financial sector receivables increased sharply from 35 % in 1990 to about three-quarters of total central bank lending since 1992.²⁶ Parallel to this development, second, the share of central investment credits in total refinancing credit has increased from one to two-thirds. These refinancing credits are granted to finance investment in progress as well as for the capitalization of interest [NBP, 12:1993, p. 11]. They are guaranteed by the government and some carry preferential interest rates, the difference to the market rate being covered by the budget. All interest is capitalized and paid at maturity. In June 1994, the second most important source of refinancing credit – apart from central investment credits – were current account facilities (27 %). Discount credits (2.8 %) which primarily finance agricultural banks, repurchase agreements (5 %), and lombard credits (1.1 %) play only a minor role.

²⁵ These numbers have been calculated from Osinski/Slawinski [1994]. Note that the balance sheet of the NBP gives a somewhat misleading picture of these processes because most transactions have a maturity of less than one month and do thus not show up in the end-of-the-month balances.

²⁶ The marked increase in refinancing credit between 1991 and 1992 is a consequence of a sharp reduction of non-specified receivables of the NBP from the commercial banks in November 1992.

Table 12 — *Lending of the NBP to Commercial Banks, 1990-1994.*

	1990	1991	1992	1993	1994 ^a
Total	100	100	100	100	100
Refinancing credit	34.6	45.3	72.4	74.5	75.5
Central investment credit	10.9	19.3	42.4	43.6	45.5
Other	75.4	54.7	27.6	25.5	24.5
a) June.					

Source: NBP, Monthly Reports, various issues.

To sum up, the NBP increasingly relies on market mechanisms in affecting the liquidity of commercial banks. This is evidenced by the fact that the volume of open market operations by large exceeds the volume of central bank lending to banks under refinancing arrangements. At the same time, central bank refinancing plays only a minor role in the total financing of commercial banks because the share of central bank liabilities in total liabilities of commercial banks declined from 37 % in 1989 to 7.9 % in June 1994 (Table 13). This implies that centrally allocated investment funds do not to a significant extent influence the portfolio decisions of commercial banks. However, subsidized central bank lending puts those banks which obtain these funds at a competitive advantage over those banks which do not receive low-interest refinancing. Because the discount window is primarily open to banks in rural areas, subsidized lending may serve as a barrier to the market entry of new banks into these markets.

V. Conclusions

The Czech Republic, Hungary and Poland each experienced the expected problems with implementing monetary policy during the transformation process. While the central banks had initially announced the intention to target specific monetary aggregates, they switched to interest rate and other targets later on. Yet, meeting any target has proven difficult because of the inability to forecast the development of structural parameters underlying the transmission of monetary impulses. The endogeneity of money supply as a consequence of the financial needs of loss-making enterprises seems not to have been a major concern if only direct central bank lending to firms is considered. Equally, the liquidity needs of insolvent banks have not severely constrained monetary policy because recapitalization programs could largely be financed from privatization proceeds, from foreign loans, or through the issuance of government bonds.²⁷ In Hungary and Poland, however, increasing financing needs of the official budgetary sector have counteracted restrictive monetary policies and potentially contributed to the crowding out of private sector investment.

The reform process is characterized by a gradual switch from direct to indirect instruments of monetary control in all three countries. Initially, direct instruments were used for different reasons. Interest rate ceilings were often maintained at the very early stages of reforms as a legacy from central planning. These ceilings – such as limits to the interest paid on households deposits – were thus phased out quickly after the introduction of market-based financial systems. Other interest rate regulations (maximum spreads, limits to the degree of indexation) did instead restrain the pricing policy of banks, intending to shield borrowers from high interest rates. In contrast, the main reason why credit ceilings were introduced in the Czech Republic and in Poland was the intention to limit overall credit growth by restricting lending of the largest banks and thus the growth of overall money supply. While this goal was reached in the Czech Republic, money growth in the Polish case was substantially influenced by credit demands of the budgetary sector. Because this credit demand was also met by central bank lending, credit ceilings for commercial banks proved ineffective with respect to containing money growth.

The monetary authorities increasingly relied on indirect, market-based tools since 1992/993. The timing of this switch is similar for all three countries although in Hungary and Poland banking sector reform had started earlier than in the Czech Republic. The developments show that creating the institutional framework for a market-based monetary policy consumes quite some time and should be initiated early on. Despite the progress being made

²⁷ This is not to say that selective bail-out operations of the central banks may not have promoted moral hazard, thus distorting incentives in the commercial banks system.

in reducing the monetary-policy-induced distortions of the banking systems, at least four areas remain to be addressed.

First, the level of taxation that minimum reserves requirements impose on the commercial banking systems of Hungary and Poland as well as – in the case of demand deposits – in the Czech Republic remains very high and contributes to high interest rate spreads. Domestic banks which have to meet these requirements are thus put at a competitive disadvantage over foreign banks abroad that have to comply with home country regulations. In addition, because reserve requirements differ for domestic and foreign currency deposits, savings in domestic currency are discouraged.

Second, apart from the already high level of minimum reserves, commercial banks hold substantial amounts of excess reserves. Because deposits with the central banks do pay below-market interest rates, these excess reserves are the result of inefficiencies in the payments system and of insufficient flexibility in the calculation of minimum reserves.

Third, commercial banks continue to rely on central bank refinancing as a source of finance to a quite substantial degree. Even in the Czech and Polish cases where the share of liabilities to the central bank in total liabilities of commercial banks is comparatively low, it was yet twice as high as in a developed market economy like Germany.²⁸ For some segments of the banking system, notably the beneficiaries of preferential loan programs, these ratios are even higher. Hence, the deposit base that commercial banks can actively utilize needs to be broadened. The central banks can support this process by reducing minimum reserve requirements and by reducing the need for high excess reserve holdings.

Fourth, the central banks do maintain subsidized lending facilities, albeit at different degrees. In the current situation, phasing out these programs would probably not put the overall stability of the banking systems at risk. It would, however, raise the credibility of the central banks not to bail out commercial banks in the future.

²⁸ See Table 13. In Germany, the average ratio of central bank liabilities to commercial banks' assets (deposits) was 3.8 % (5.1 %) in 1988-92 [Deutsche Bundesbank, Statistische Beihefte – Bankenstatistik, Monatsberichte].

Table 13 — *Indicators of Commercial Bank Liabilities and Receivables from the National Bank in the Czech Republic, Hungary, and Poland, 1989-1994.*

	1989	1990	1991	1992	1993	1994 ^a
<i>Growth of Central Bank Lending to Financial Institutions [% change over the respective period of the previous year]</i>						
Czech Republic	...	52	- 8.0	- 17	- 41	0.5
Hungary	11.8	39	17.5	- 29.7	25.7	4.6
Poland	457	251	- 1.3	- 35	30.1	2.4
<i>Ratio of Liabilities to Central Bank to Total Assets of Commercial Banks [%]</i>						
Czech Republic ^b	...	...	...	...	6.9	5.6
			(38.1)	(25.1)	(11.9)	(11.4)
Hungary ^c	23.7	25.9	19.8	12.9	14.0	12.9
Poland ^c	36.6	33.3	19.7	9.8	8.7	7.9
<i>Excess Reserves of Commercial Banks [in % of total deposits with the Central Bank]</i>						
Czech Republic	...	...	...	42	40	27.4
Hungary	68.3	75.3	65.9	60.9	69.7	74.9
Poland	88.1	38.6	35.8	40.5	28.5	24.8
a) June. — b) In brackets: liabilities to the Czech National Bank over total deposits of clients of commercial banks. — c) Data for 1989-90 and for the following years is not entirely comparable.						

Sources: Hanousek et al. [1994], Monthly and Quarterly Reports of the National Banks, National Bank of Hungary, Annual Report 1993, Selected Indicators of Monetary Development in the Czech Republic, various issues, IMF, International Financial Statistics, various issues; own calculations.

Table 14 — Reserve Requirements in the Czech Republic, Hungary, and Poland, 1989-1994.

	1989	1990	1991	1992	1993	1994
<i>Czech Republic</i>						
Demand deposits ^a	5	8	9	9	9 ^b	12 ^c
Time deposits	...	...	9	9	3 ^b	3
<i>Hungary</i>						
All deposits and savings accounts	...	18	...	16	14	...
<i>Poland</i>						
Current Accounts	15	30	30	23	23	23
Saving deposits	10	30	25	0	0	0
Time deposits	5	10	10	10	10	10
Foreign currency deposits	...	...	...	...	...	0.5-0.75

a) 1989: primary crown deposits. — b) In February-May 1993, reserve requirement for large banks were raised to 12 % for demand and 4 % for time deposits. — c) September.

Sources: Polanski [1994], Hanousek et. al. [1994], NBH Annual Reports, various issues, NBP Monthly Reports, various issues.

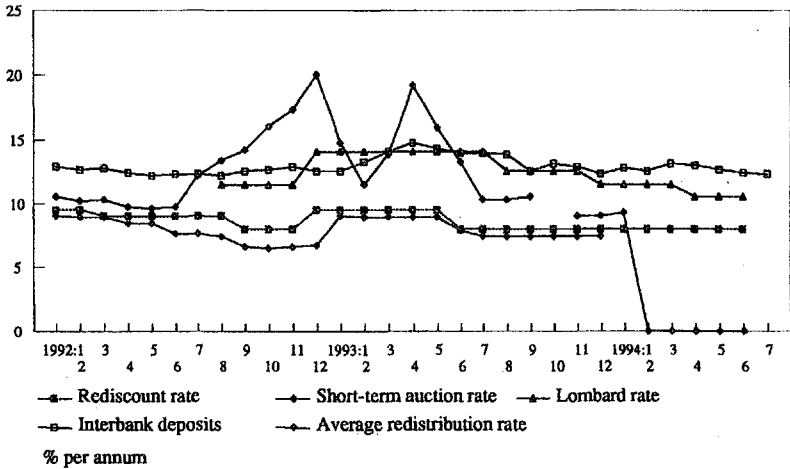
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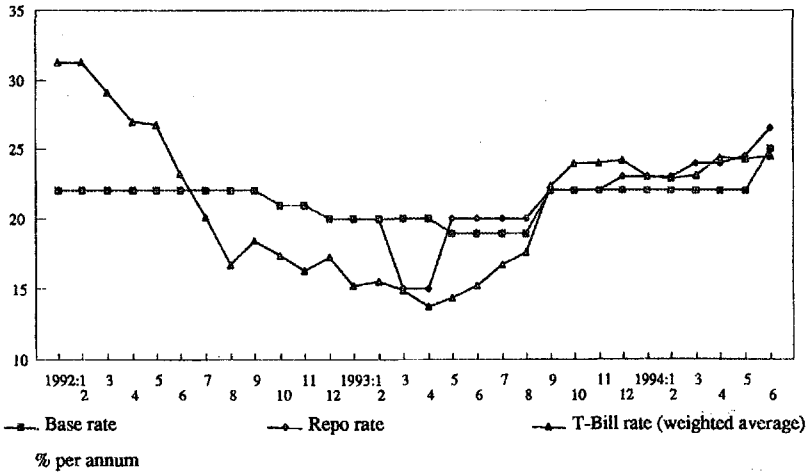
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Graph 1 — Interest Rates in the Czech Republic, 1992-1994.



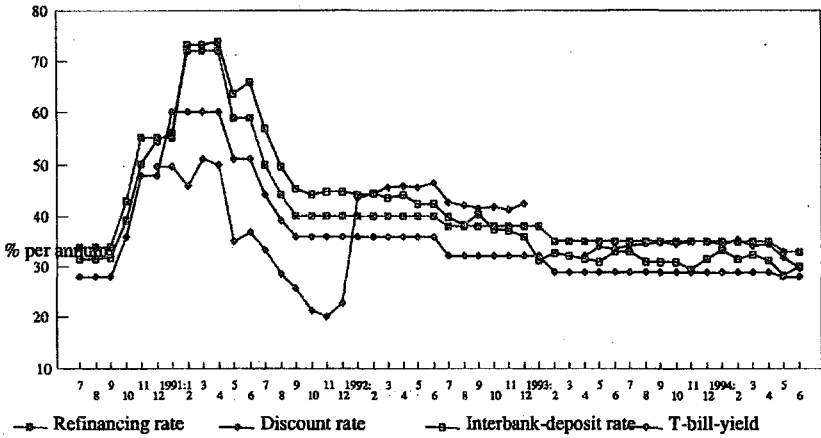
Sources: Hanousek et al. [1994], CNB - Financial Statistical Information, Selected Indicators of Monetary Development.

Graph 2 — Interest Rates in Hungary, 1992-1994.



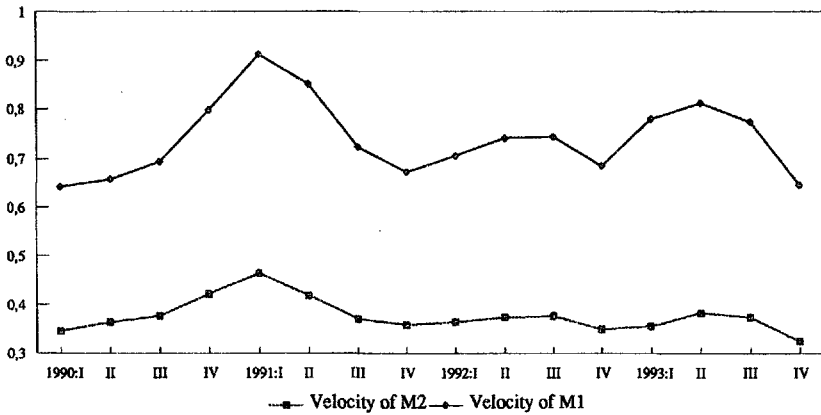
Sources: National Bank of Hungary, Monthly Reports, various issues.

Graph 3 — Interest Rates in Poland, 1990-1994.



Sources: NBP, Monthly Information Bulletin, various issues.

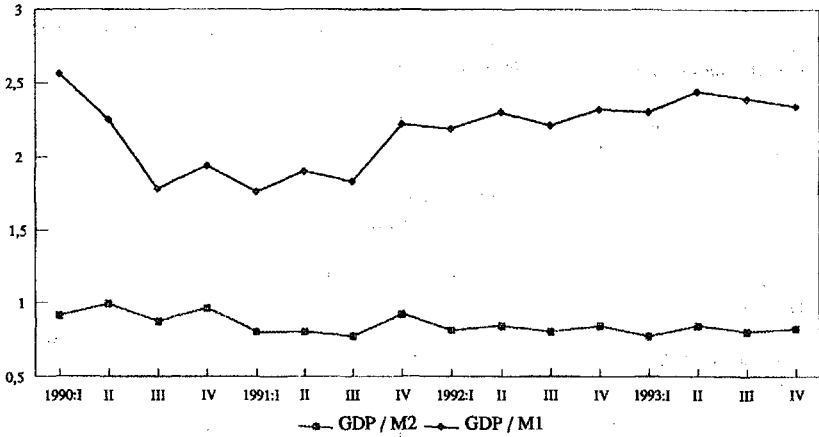
Graph 4 — Income Velocity of Money in the Czech Republic, 1990-1993.



1990-1991: Czechoslovak data.

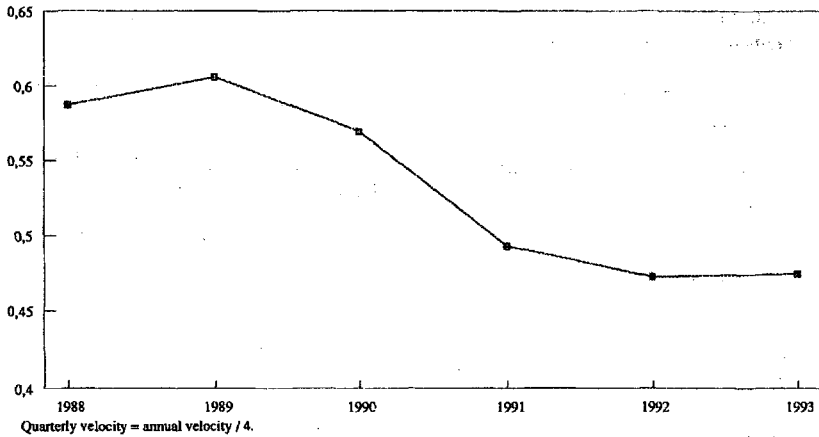
Sources: IFS, Planecon.

Graph 5 — *Income Velocity of Money in Poland, 1990-1993.*



Sources: Planecon, IFS.

Graph 6 — *Income Velocity of M2 in Hungary, 1988-1993.*



Sources: Planecon, IFS.