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The Payments Systems Reforms and Monetary Policy in Emerging Market Economies in Central and Eastern Europe

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Abstract

The paper discusses the interrelationships between payments system reform and monetary policy implementation in selected countries in Central and Eastern Europe. The reforms in the payments system are viewed as closely interrelated with the development of money and foreign exchange markets and the instruments of monetary policy used by the central banks. Large and variable float balances created special challenges. The paper shows that while departing from very similar origins, there were significant variations in experiences of the countries studied in transforming their payments systems after the start of the reforms towards a market economy, from which certain lessons can be drawn.

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Summary

This paper discusses the experience of four countries in Central and Eastern Europe (Bulgaria, the former Czechoslovakia, Poland, and Romania) in adapting their payments systems to the requirements of an emerging market economy.

An efficient and reliable payments system is crucial for the development of modern money and foreign exchange markets, which require timely execution of operations. Moreover, interbank settlement in the books of the central bank is a prerequisite for the central bank to be able to manage monetary policy through indirect monetary instruments.

Central banks in Central and Eastern Europe have been key players in reforming the payments system in each country. They faced enormous challenges, not only because of the great changes that the whole banking system was experiencing at the time, but also because of difficulties in communications and lack of modern technology. Initially, commercial banks had to hold large reserve balances or obtain on-demand accommodation from the central bank in order to meet their settlement obligations. Large and volatile floats made it difficult for both banks and the monetary authorities to manage liquidity. As a result, central banks resorted to credit ceilings as a key tool for implementing monetary policy.

Progress in reforming payments systems made it possible to introduce market-based instruments, such as treasury bills or central bank securities. Interbank transactions, initially limited only to deposits of relatively long maturities started to provide short-term liquidity. Central banks began to experiment with indirect monetary policy instruments to replace credit ceilings. They also began to tighten access to their overdrafts, in order to improve control over monetary policy. Progress in monetary policy implementation and in the development of money markets created a demand for faster and more reliable payments systems. Central banks not only introduced more modern technology but also revised payments regulations and abandoned practices, such as the obligation for banks to meet reserve requirements on a branch-by-branch basis, that forced banks to immobilize large amounts of funds in excess reserves.

Despite starting with basically the same institutional arrangements, the countries considered in this study have had different experiences in reforming their payments systems. The following lessons can be drawn from the study: first, technology available early on in the reform can improve accounting rules and transportation and processing procedures enough to reduce significantly the level and variability of the float. Second, central banks should play a key role in managing the credit and liquidity risks in payment systems. Third, commercial banks holding accounts with the central bank should settle balances among themselves through those accounts. Fourth, early establishment of a large-value payments system will help in developing money and foreign exchange markets.

I. Introduction

Banking reforms in progress in the emerging market economies in Central and Eastern Europe have had a major impact on the payments system, raising a number of important policy issues which bear directly on the conduct of monetary policy. Some of these issues are similar to those being discussed in the payments literature but others are specific to the situation in these transition economies.

The banking reforms in those countries have aimed at decentralizing decisions on the volume and price of financial products, and at giving market forces a greater role in these decisions. Typically, the initial step in the reform process has been the shift from a monobank to a two-tier banking system. This has been followed by efforts to develop a more efficient framework for monetary management, to provide greater autonomy to central banks in macro-stabilization policies, to strengthen operational capacities and competition in the banking system, to build up a banking supervision system, to foster money and securities markets, and to overhaul the payments system.

The specific components of financial sector reforms noted above are closely interlinked, and have to be pursued simultaneously and in a well-coordinated manner in order to support the stabilization and broader structural reform objectives. 1/

Central banks have been at the center of efforts to develop the payments systems in Central and Eastern European countries. However, commercial banks have generally been active in setting up correspondent arrangements and mutual accounts through which to process interbank payments. In addition, in some cases, payments associations have been established to serve as a forum to exchange views and expedite reforms. However, there is a growing awareness that the monetary implications of payments arrangements require an active involvement of the central bank in regulating and monitoring the system, even if it does not operate it.

This paper focuses on the interactions between reforms in payments systems and in monetary management and illustrates them by drawing on the experience of selected countries. It highlights the importance of these interactions for the overall stabilization -cum- structural adjustment process by pointing out some of the problems that payments systems developments have created for the effective pursuit of reform of the financial sector in general, and monetary management in particular. Section II provides an overview of major linkages between payments system reforms and monetary policy from the perspective of transition economies. Section III illustrates some of these linkages by reviewing the experience of selected countries in Central and Eastern Europe. Section IV draws the main conclusions based on those experiences.

1/ On the linkages among various financial sector reforms and their appropriate sequencing, see Sundararajan (1992), and Bisat, Johnston, and Sundararajan (1992).

II. Analytical and Operational Linkages Between Payments System Reforms and Monetary Policy

The instruments and operations of monetary management, the institutional arrangements for money markets, and the clearing and settlement system for payments are closely interlinked components of monetary control. These linkages become progressively important and transparent during the transition from direct controls on interest rates and credit to indirect monetary management--that is, management of bank reserves using market-based instruments. 1/ These linkages derive from the fact that aspects of clearing and settlement systems--together with the characteristics of reserve requirements and refinance policies--affect the demand and supply of bank reserves, which are the ultimate means of noncash settlement for payments, and at the same time influence the nature of money markets, which are, among other things, a vehicle for obtaining and trading settlement balances.

In many transition economies, the large size and variability of payments float have proven to be a bottleneck in the shift toward indirect monetary management. The term float refers to amounts that have been debited (credited) from a payor's (payee's) account before the corresponding credit (debit) entry has been posted in a payee's (payor's) account. 2/ It reflects the difference in the timing of crediting and debiting of accounts arising from delays in the transmission of payment information and in the subsequent execution of accounting entries. Large and variable lags between the time of crediting and debiting bank accounts with the central bank (bank float), or of customer accounts with banks (customer float), could arise from a lack of operating standards in the processing of payments, inadequate rules and regulations on clearing procedures and settlement methods, poor enforcement ability, and unreliability of systems used (e.g., postal services) for the transport and delivery of payment information. 3/

Both the size and variability of the float are major determinants of the demand for reserves (or central bank overdrafts) and of the central bank's ability to implement monetary policy by managing reserve money. These two dimensions of the float have mutually reinforcing effects. A volatile float makes it difficult to manage liquidity both for the central bank and commercial banks, while a large float entails a large settlement risk for the parties involved, which also tends to increase the demand for bank reserves.

1/ Linkages between payment system, monetary operations, and money markets in developed financial systems are analyzed in Freedman (1990), and in Borio, Russo and Van den Bergh (1991).

2/ For a detailed discussion on float, see Young (1986).

3/ Even in well functioning payments systems, a large float could develop owing to transportation delays and processing bottlenecks that lead to holdover of payment documents, or errors in documents or in processing.

If bank float is quantitatively significant relative to bank reserves, its variability could be so large as to weaken control over the supply of bank reserves, complicating monetary management and hampering the development of the money and foreign exchange markets. For example, the debiting (crediting) of a bank settlement account before crediting (debiting) the receiving (sending) bank leads to a withdrawal (supply) of liquidity; variable lags in such debiting and crediting could result in large day-to-day variations in the size of reserves or of deposits, both in the aggregate and in individual banks. In the face of such large variability, the central bank cannot forecast reasonably well the supply of reserves in order to act on its own initiative. 1/ Commercial banks are either forced to hold a large level of excess reserves or tend to rely on sizeable central bank accommodation. As a result, many central banks have allowed liberal overdraft access--even if at a penalty rate--as a buffer against large shocks to the supply of reserves. Moreover, the factors that cause large and variable float also exacerbate risks in the payments system --discussed later--which could affect the supply of reserves if the central bank assumes part of such risks. 2/

Large shocks to the supply of reserves limit the scope of short-term liquidity management by the central bank, thereby influencing the choice of operating targets and the instrument mix of monetary policy. For example, since variations in the supply of reserves could cause large fluctuations in short-term interest rates, it could be efficient to offset part of these supply variations, with attendant implications for short-run control of bank reserves, and for the design of policy instruments. In order to offset the variation in the supply of reserves and avoid excessive volatility in interest rates, the central bank may have to provide short-run credit facilities with rather liberal access at preannounced rates. In short, the task of managing the level of reserves or the level of short-term interest rates without excessive volatility becomes fairly complicated.

It is crucial for the central bank to have instruments that operate at its initiative, both to achieve its monetary targets and to foster active money and interbank markets. Therefore, the central bank will need to tighten the scope of its credit facilities at preannounced rates (including overdrafts), while increasing the scope of its market-based instruments for targeting bank reserves or a short-term interest rate. In turn, the development of the money market facilitates further refinements in monetary and public debt operations and permits a smooth implementation of monetary and public debt management policy. These interactive and mutually reinforcing reforms in monetary operations and in money and government securities markets cannot be initiated if unpredictable large variations in

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1/ By contrast, a large but predictable float would not create problems for monetary management.

2/ The extent to which the central bank assumes the risks will depend on specific risk management and risk sharing arrangements in payments systems. See Bario and Van den Bergh (1993), and Hook (1992).

the float prevent effective liquidity management by both the central bank and commercial banks, as has been the case in many economies in transition. 1/ If banks are induced to hold large excess reserves as a buffer against the variability of reserves, this then clearly limits the demand for money market instruments such as Treasury bills and commercial bills. In any event, delays and uncertainties in the interbank transfer of funds would, by themselves, undermine active development of interbank markets, both in domestic instruments and in foreign exchange.

A large and highly-variable bank float can also complicate the measurement and interpretation of monetary statistics. The adjustment of monetary statistics for the amount of payment float poses many controversial questions. 2/ In addition, specific accounting procedures for payments in many transition economies make it difficult to identify the payments float, or grossly distort the size of central bank and commercial bank balance sheets. However, changes in accounting procedures to permit separate measurement of payments float, and to assess the factors influencing it, become highly important for monetary policy. Such measurement would help assess the extent of inefficiencies and risks in the payments system, and estimate and project the magnitude of changes in bank reserves which are due to changes in payments practices (reflecting both structural and seasonal factors).

The initial situation characterized by uncertain delays in clearing and settlements (settlement occurs as, and when, a batch of payment instructions is received and processed) has often exacerbated inflationary pressures or complicated monetary management. Delays in the receipt of payments would sharply erode the real value of receipts under high inflation and increase the demand for credit by both the government and enterprises, similar to the effect of tax collection lags under inflationary conditions. 3/ In the absence of binding rules, the lags in the processing of payments could respond endogenously to changes in inflation and credit conditions. This development, together with the impact of a tightening of credit policies could result in a payments system gridlock--an accumulation of unprocessed payment orders due to insufficient funds in the payor's account, possibly

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1/ Moreover, the development of the money and foreign exchange markets requires market participants to have confidence in the payments system reliability.

2/ Float is typically recorded in one of the components of "other items net" in central bank balance sheets. Whether a debit float--items to be debited such as checks in the process of collection--should be deducted from the recorded bank deposits in computing the money stock has been a contested issue; similar questions arise in the treatment of credit float.

3/ The negative effect of collection lags and inflation on tax revenues is often referred to as Tanzi effect, see Tanzi (1977).

triggered by delays in the receipt of funds. 1/ This could create serious economic disruption and contribute to large inter-enterprise arrears, which, if monetized, could sharply ease the stance of monetary policy.

Moreover, operational breakdowns in the payments system become more likely when the increase in the number of payments (due to a larger number of banks, and emergence of financial markets) puts pressure on existing payment processing arrangements. A build up of backlogs in the processing of payments would raise the size of float, and affect the system's liquidity. The resulting delays in processing and verification of payments create opportunity for fraud. Fraudulent payment transfers could profit from delays in verification and poorly-designed security features, and could result in major losses. Those losses are often borne by the central bank initially, until the affected financial institutions are liquidated or restructured and some of the losses are recovered.

In the face of such difficulties, it is crucial to introduce both transitional and medium-term reforms in the payments system. Some early reforms of the payments system to reduce the size and variability of payments float, based on readily available technology, are crucial for the effective pursuit of monetary policy. Those reforms could be implemented in tandem with the planning and implementing of medium-term reforms based on new technology, and more sophisticated accounting and supervisory systems. Thus, reforms of the payments system should be appropriately sequenced. They should provide immediate support to monetary policy and foster money and foreign exchange markets, and as the markets develop, the payments system could be further modified within a consistent medium-term framework to take advantage of technological progress. In introducing payments system reforms, the appropriate legal and regulatory framework, the supervisory role of the central bank, and the extent of its operational presence have to be clearly spelled out to manage the risks in the system properly and to implement the reforms efficiently.

Medium-term reforms of payment systems could comprise the introduction of gross settlement arrangements for large-value transactions that require finality, a high degree of security, and immediate, same-day or value dated settlements, as well as net settlement arrangements through clearing houses for small payments. Alternatively, depending upon the country size, volume

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1/ In late 1988, in Hungary, it was reported that there were some 100,000 payment orders in a queue waiting to be processed because of insufficient funds and the number was growing rapidly, delaying services generally.

of payment transactions and other initial conditions, a single gross or net system for all payments could suffice. 1/ Some monetary policy implications of payments system reforms are discussed below.

In most countries in Eastern and Central Europe, the initial structure of the payments system was one of gross settlements, but based on slow paper-based clearing procedures and lacking any explicit credit or guarantees to support settlement. As is well known, a gross settlement system without credit typically requires a larger amount of settlement balances than a net settlement system and can lead to gridlock in the face of insufficient settlement balances.

A net settlement system reduces those problems and also drastically reduces the volume of transactions that the central bank has to process. Provided commercial banks (by themselves or with central bank assistance) can set up an efficient clearing arrangement, a net settlement system can expedite the processing of transactions and reduce the float. However, it exposes participants to the risk that one member may be unable to settle after accumulating payables (in excess of receivables) in the interval between two settlements: the longer the interval, the greater this risk.

Settlement risk--either because of liquidity problems (liquidity risk), or because of solvency problems (credit risk)--if not properly contained and shared through appropriate risk management policies (discussed below), may result in a large provision of central bank credit in order to contain the spread of settlement failure from one participant to another (systemic risk). Such central bank intervention could result in an unplanned increase in the liquidity of the banking system. Similarly, provision of central bank credit to prevent or overcome a gridlock in a gross settlement system could also lead to unforeseen credit expansion. 2/

The size and distribution of credit or liquidity risk in payments systems depend upon the length of interval between settlements in clearing arrangements, the types of risk controls and loss-sharing provisions in place, the range of institutions and instruments that have access to the systems, and the specific rules and practices that govern the timing of

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1/ Gross settlement refers to systems where each payment instruction is processed item by item--alone or in batches. Net settlement refers to systems where the incoming and outgoing payments are accumulated and only the net amounts are settled using balances in the central bank or in a clearing bank at prespecified settlement times, usually the end of each day. Finality refers to a situation when a payment instruction, once executed, is considered irrevocable. The guarantee of irrevocability under specified conditions is a desirable feature to foster money and foreign exchange markets.

2/ The absence or lack of enforcement of bankruptcy laws has prevented many insolvency problems from coming into the open. This will be changing as those laws are beginning to be more strictly enforced.

debit and credit entries in banks' accounts at the central bank and in customers' accounts at commercial banks. 1/ Policies governing these factors, which constitute the financial risk management framework in payments systems, provide a first line of defense against the spread of financial crisis, and an initial means to share the losses due to possible failures of participants. This is due to the fact that bank or nonbank failures will immediately prevent the execution of payments, and that the payments system is where the consequences of those failures and incipient financial crisis first appear. Thus, together with banking supervision, well-designed payments system policies help to avoid major disruptions to monetary stability. Reforms in the risk management framework will change the size of float (supply of reserves), the demand for reserves by commercial banks, and the probability of central bank intervention to prevent the spread of crises. Alternatively, the payments system design could be influenced by the desired features regarding bank reserves and the extent of risk borne by the central bank. Some examples will illustrate the above propositions.

The size of settlement balances that banks hold and the characteristics of reserve requirement procedures both influence the architecture of interbank gross settlement system, and vice versa. 2/ For example, if banks hold large reserve balances which they can draw down to honor their settlement obligations, then an interbank gross settlement system is easy to operate and does not require substantial overdraft facilities. That will be the case if a market interest rate is paid on reserves--which encourages banks to hold large excess reserves--or if reserve requirements are large and required balances can be used for settlement purposes through reserve averaging rules. If reserves are low because of low reserve requirements, or banks wish to hold low levels of unremunerated excess reserves, the interbank payments system may require queueing mechanisms (if overdrafts are to be avoided); in this case, multilateral netting arrangements might be preferred for certain payment transactions to economize on reserves. However, clearing arrangements entail systemic risks which have to be balanced against the benefits of economizing on reserve balances. 3/

The architecture of the interbank settlement system and the demand for reserves interact to influence the nature of instruments available in the money markets and the volatility of market rate for bank reserves, hence influencing the transmission mechanism for monetary policy. For example, the following factors strongly influence the demand for reserves and the type of instruments offered in the money markets: whether interbank money market transactions are settled immediately, at the end of the day, or with

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1/ For a discussion of risk control in multilateral netting arrangements, see Bank for International Settlements (1990).

2/ See Marquardt (1992) and Vital (1989).

3/ Thus, the optimal length of the settlement period involves equating the marginal cost of failure of a participant with the marginal cost of holding reserves; see Garber and Weisbrod (1992).

a lag (or whether there is a mixed system), and whether timely information on account positions is available to the participants from the interbank settlement systems. Also, the characteristics of the interbank settlement system would in turn be influenced by the changing composition of payments and the evolving structure of money and financial markets. 1/

In many transition economies, making the interbank settlement system efficient and cost-effective requires changes in the structure of commercial banks' accounts. A consolidation of those accounts from a distributed accounting system--e.g., from the initial position of one account for each branch to one or a few accounts for each bank--is a crucial reform to facilitate the functioning of a gross settlement system and encourage money market development. Account consolidation requires major changes in intrabank clearing arrangements, and sharply reduces the demand for bank reserves by obviating the need to maintain positive balances in a large number of settlement accounts. Also, any significant shift from interbank payment arrangements, based on correspondent banking among some or all domestic banks, toward arrangements requiring settlement with central bank funds (or a shift in the opposite direction) will clearly affect the demand for reserves.

Reforms in accounting and processing rules for the timing of bank and customer accounts' crediting and debiting also influence the demand for, and variability of, reserves. Examples of such reforms include rules that require telegraphic verification and transmission of large check transactions before accounts are credited, or accounting norms that better synchronize the timing of debit and credit transactions based on "availability schedules". Modifying such rules can induce changes in the timing of debits and credits that can sharply reduce the size and variability of float and even its direction. These factors should be taken into account in implementing monetary policy.

Finally, the introduction of new payment instruments (e.g., new debit instruments for enterprises and households) or changes in the relative attractiveness of different instruments (pricing, reliability) might cause changes in the size and variability of bank reserves, particularly if there are pronounced seasonal or structural shifts in the relative use of credit and debit instruments. The dominance of cash in many economies in transition might also fall, with the increasing access to direct debits, direct credits, and other retail payment instruments such as giro transfers. As has been the case in other countries, the introduction of electronic

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1/ Angelini and Giannini (1993) analyze the value of information to participants in the payments system and the institutional factors governing the features of interbank system. An illustration of the effect of payments system architecture on money markets is the evolution of intraday money markets in Japan following the development of the BOJNET, a large value transfer system; see Horii and Summers (1992).

funds transfers, and other payments system innovations that enhance the liquidity of various saving instruments, can influence the stability of relationships between money and other economic variables.

In market economies, the effects of payments system changes on the money demand and money supply process and on the transmission mechanism of monetary policy are typically gradual, and are often dwarfed by the impact of other financial sector reforms. However, the large one-time changes in the payments system arrangements in many economies in transition warrant close attention to the specific linkages between payments systems and monetary policy.

III. Country Experiences

In many Central and Eastern European countries, the payments system in the pre-reform period was characterized by a separation of cash and noncash circuits, with cash serving the household sector, and noncash payments being used primarily for inter-enterprise payments through a monobank system. The payment order (a credit instrument originated by the payor) and the payment demand order (a debit instrument originated by the payee following shipment of goods) were the main noncash payment instruments. In most countries, payment clearing relied on physical transport of paper documents, and settlement was on a gross basis, with detailed verification and reconciliation procedures. 1/ In all cases, the central banks had a dominant presence in payments processing. The shift from monobank to two-tier banking and subsequent banking reforms led to sharp modifications in these arrangements. It required attention to the distinction between interbank and intrabank settlements, the extent of the operational and regulatory role of the central bank in payments system, appropriate accounting structure and policies toward banks and organizational arrangements created to cope with the interdisciplinary nature of payments system reforms and to build consensus among users.

While countries started from basically similar arrangements, differences in the transformation warrant a separate look at each country. The following discussion focuses on key aspects of such transformations in Bulgaria, the former Czechoslovakia, Poland, and Romania, highlighting aspects with monetary policy implications. Although basically the same issues are considered in the four countries, there are differences in the data used in the discussion owing to the impossibility of obtaining the same information for all countries.

1/ The payments system in Czechoslovakia was an exception with a high degree of automation at the start of reform, based on truncation of payment orders.

1. Bulgaria

As shown in Chart 1, the Bulgarian National Bank (BNB) has had large and variable float balances, which were a major influence in reserve money movements during the period January-July 1992. 1/ The large float in Bulgaria, as in other countries, largely reflected the mechanics of the payments system. Bankservice, a computer bureau, posted the debits and credits to the accounts of the appropriate banks. In the case of inter-district payments, the debiting and crediting of accounts for a given transaction may not be simultaneous, owing to some banks' delays in issuing the instructions needed to debit or credit their accounts with the BNB. 2/

Until recently, the system operated without daily central bank settlement, which resulted in prolonged delays in settling clearing balances. 3/ Moreover, since the BNB was unable to know banks' balances at the time payments were being processed, it processed the payments even if a bank did not have sufficient funds in its accounts, which often resulted in overdrafts of bank accounts with the BNB. Thus, besides creating a large float, the system also resulted in the BNB implicitly providing unlimited overdraft facilities to the banks, which made monetary management difficult and exposed the BNB to a huge credit risk.

The introduction of an electronic queuing facility in October 1992, which places payment orders in a queue according to their time of delivery, is intended to reduce float as well as avoid uncontrollable overdrafts from the central bank. Payments instructions are time stamped when presented for processing at the clearing center. Should a payment order cause an unacceptable overdraft to a bank's account with the BNB, the payments instruction has to wait for sufficient funds to be executed. Overdrafts are permitted only to the extent of required reserves maintained in a separate account with the central bank. 4/

1/ Net float balances ranged between the equivalent of about 12 percent and 20 percent of reverse money. These values significantly exceed those found in developed financial systems. For instance, the corresponding range in the U.S. over the same period was 0.09-0.27 percent.

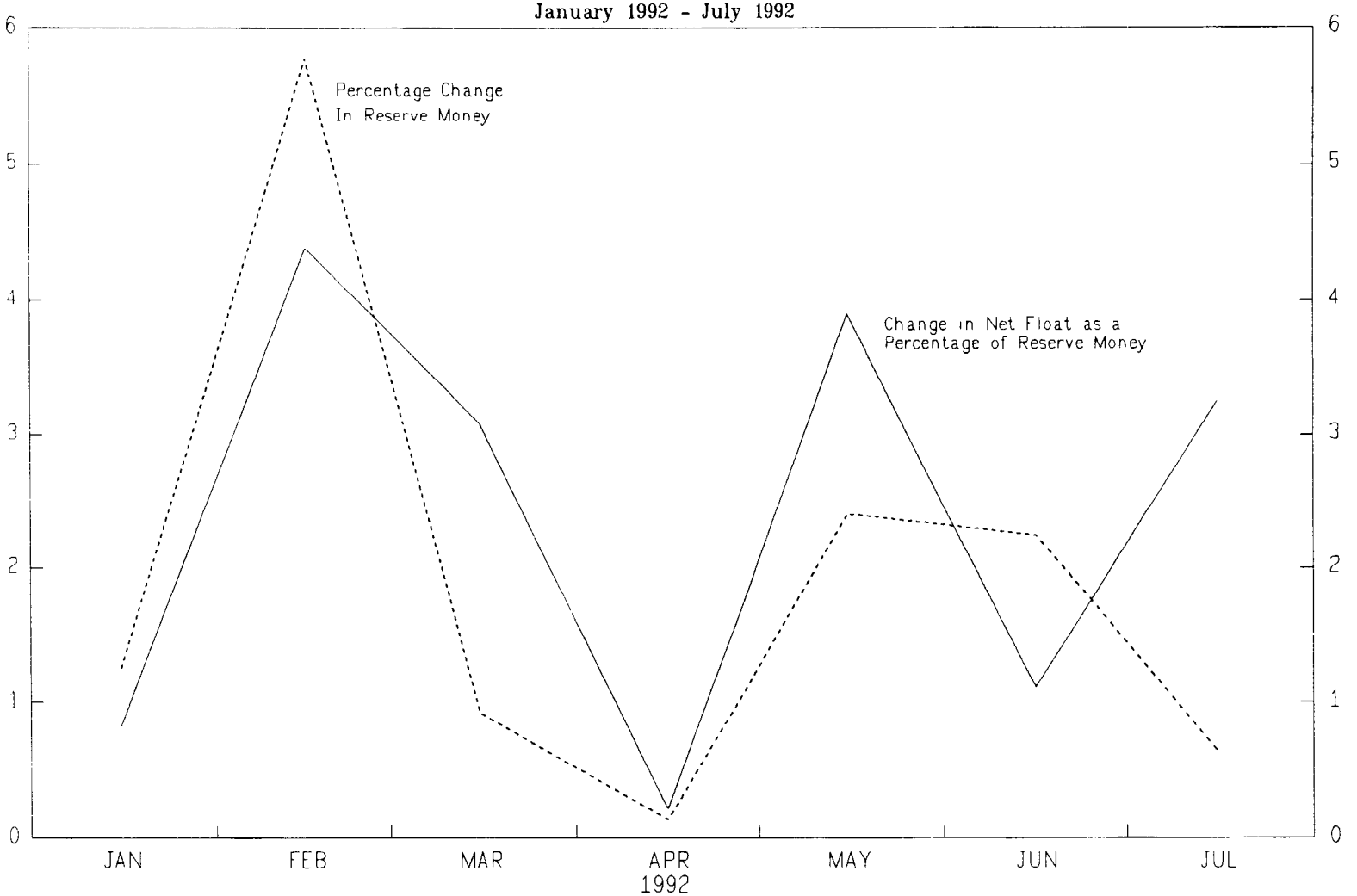
2/ The BNB balance sheet has a set of 700 accounts which correspond to float items. These are synthetic accounts that are updated continuously and show only the outstanding balance in the current year.

3/ The end 1989 balances remained unsettled on the books until August 1990. In that month, the sum designated as due from other banks in respect of the current year jumped from zero to lev 6.5 billion, which more than compensated for the elimination of previous year debts of lev 6.1 billion. Thus, no real settling of balances occurred; instead, the central bank provided automatic credit.

4/ The required reserve accounts are kept separate from the current account used to settle interbank payment obligations.

Chart 1

BULGARIA
Variation in Net Float and Reserve Money 1/
January 1992 - July 1992



1/ Changes are in absolute values.

Sources: BNB and IMF, Economic Information System

The above reforms together with the changes in money markets have not only made the payments system significantly more reliable but have also allowed the banking system to reduce the reserve ratio steadily as illustrated in Chart 2. Just as importantly, improvements in Bulgaria's payments system have been accompanied by a parallel development of money markets and the introduction of market-oriented instruments for monetary management. Thus, interbank lending increased. Although operations remained concentrated in the one-week to one-month maturities, shorter maturities were also introduced.

The BNB has continued to rely on credit ceilings as its key instrument for monetary management and has adapted them to reduce their distortionary effects. In addition, it has steadily added new indirect instruments. These include reserve requirements, a Lombard facility, a discount facility and an auction of deposits. More recently, the latter has been losing quantitative importance, as the BNB introduced open market operations with treasury bills. The BNB also operates an overdraft facility.

The above suggests that the development of the money market, the introduction of new monetary instruments to implement monetary policy, and the improvement of Bulgaria's payments system have been mutually reinforcing processes. There could have been little growth in the money market and in the use of indirect instruments of monetary management in the absence of a system that ensured that large value transactions would be executed in a timely manner. In turn, the development of money market transactions and the tightening of access to BNB facilities gave impulse to the development of the money market.

2. Czechoslovakia

The transformation of the payments system in Czechoslovakia went through several stages, the first of which was the move to two-tier banking in January 1990. The State Bank of Czechoslovakia (SBCS) became a full-fledged central bank, spinning off its commercial banking operations to three newly-created banks: the Commerce Bank, the General Credit Bank and the Investment Bank. Since then, a number of commercial banks have been established.

Interbank transfers were settled through a system of bilateral mutual accounts. The two main commercial banks served as clearing banks: the Commerce Bank for banks located in the Czech Republic, and the General Credit Bank for banks located in the Slovak Republic. An important peculiarity was that instead of the clearing banks holding an account with the State Bank, the latter held clearing balances with the clearing banks. "Settlement" was completed on the books of each of the clearing banks at the end of the day, by debiting and crediting the accounts of the other banks (including those of the State Bank). The two clearing banks settled with one another simply by crediting or debiting the mutual accounts. That "settlement" was more or less mechanical, as no limits or interest charges

applied to balances of banks' clearing accounts. The Savings Banks in the two republics used a similar arrangement to settle with one another, which did not, however, involve the clearing banks.

Those arrangements differed widely from those of a true two-tier banking system. They established mechanical payments relationships between banks which, economically, mimicked the functioning of a monobank. Lack of settlement in central bank funds made the concept of bank reserves meaningless and made it impossible for the State Bank to rely on indirect instruments of monetary control, since it had no control on settlement balances. It also provided no incentive for banks to manage their reserves. As a result, interbank balances fluctuated widely, 1/ there was no incentive for a short-term interbank money market to develop, and it was impossible to implement monetary policy by means of indirect instruments. 2/ Moreover, those arrangements led to very high risk exposure, especially given the lack of knowledge about the solvency of banks. Changes in the unclassified assets of the central bank (of which float had been a major component) had a powerful influence on reserve money. For the period February 1990 - March 1991 3/, monthly changes in the former as a percentage of the latter ranged from less than 1/10 to almost 67 percentage points (Table 1).

To overcome these problems, the SBCS introduced an interim settlement system in March 1991. The clearing banks continued to perform the clearing in the two republics, but final settlement was done on the books of the central bank on a "morning-after" basis. That system allowed the SBCS to improve its monetary management substantially, as it required banks to hold reserves with the SBCS to settle. However, some technical problems remained, particularly unreliability about the timing of payments processing, which discouraged the short-term large-value transactions typical of money markets. Moreover, credit ceilings prevented the expansion of reserve money to increase bank credit in the same proportion, which contributed to the accumulation of large excess reserves in the banking system.

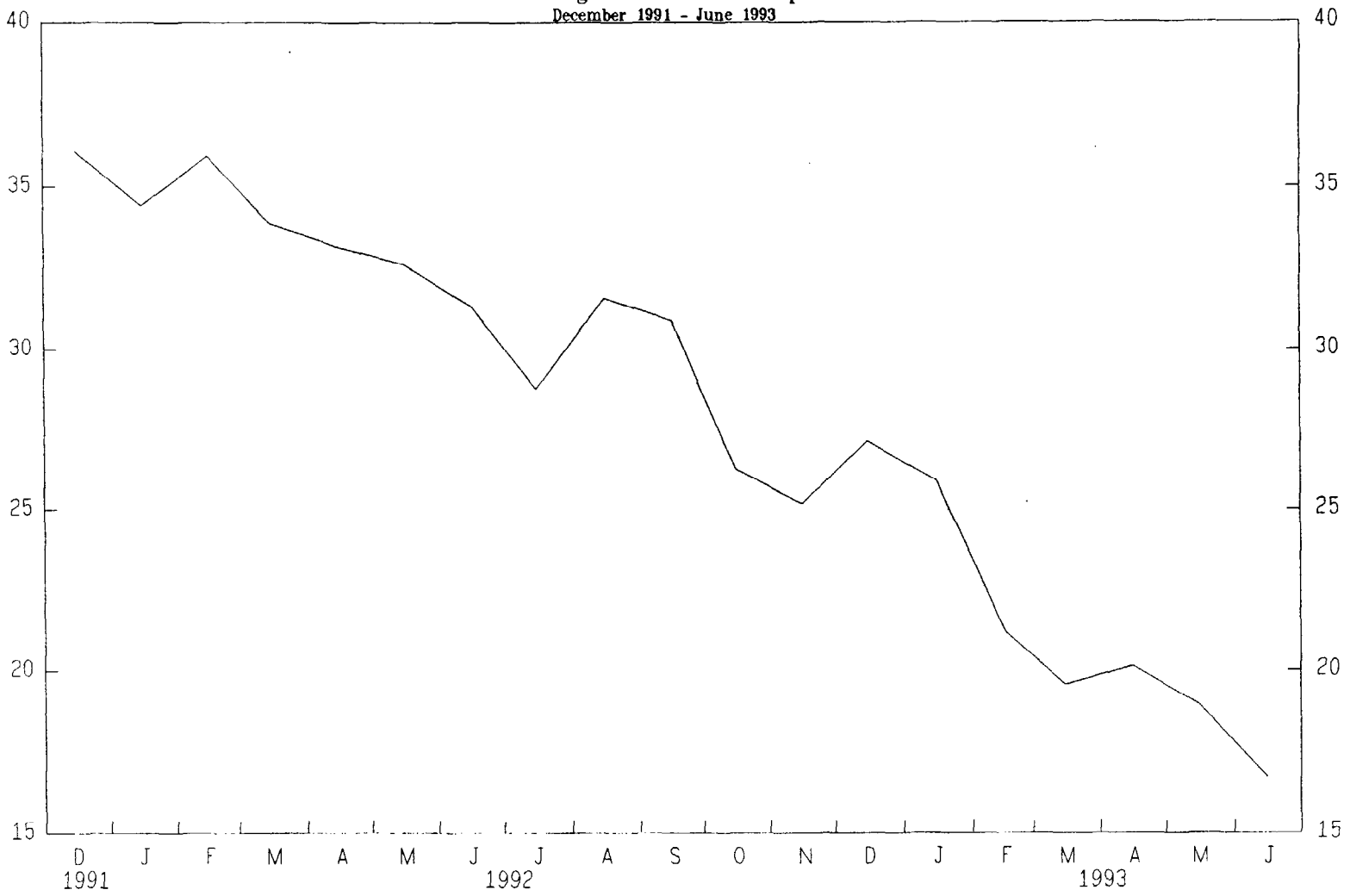
1/ Day to day fluctuations in the interbank settlement balances under the old system could be very large. For example, the Commerce Bank had a swing from a surplus of about kcs 7.8 billion to a deficit of kcs 23.5 billion in a few days vis-à-vis the banks that cleared with it.

2/ To implement monetary policy, the SBCS mostly relied on ceilings on each commercial bank's credit.

3/ The only period for which data were readily available. As noted earlier, data availability chiefly determined the scope of the quantitative analysis in this section and the sample periods of countries used.

Chart 2

BULGARIA
Reserves with the Central Bank as a
Percentage of Total DMB Deposits
December 1991 - June 1993



Source: BNB, Deposit Money Banks Accounts

Table 1. Czechoslovakia: Change in the Central Bank's Unclassified Assets - Account as a Percentage of Reserve Money, April 1990-May 1991

Date	Percent
Apr. 1990	-2.07
May 1990	33.91
June 1990	4.27
July 1990	-25.09
Aug. 1990	10.87
Sept 1990	6.34
Oct. 1990	0.07
Nov. 1990	0.15
Dec. 1990	66.67
Jan. 1991	-11.07
Feb. 1991	14.89
Mar. 1991	-43.82
Apr. 1991	25.63
May 1991	-2.59

Source: IMF, International Financial Statistics.

In April 1992, the SBCS introduced a new settlement system, which uses sophisticated technology and required banks to send magnetic tapes to the clearing center in Prague. That center processed payments, and simultaneously debited and credited banks' accounts with the SBCS. The system has operated as follows: all banks keep accounts with the clearing center, to which they submit information in computer tapes or diskettes. 1/ After the information is verified, processing begins. The clearing center operates on a gross settlement basis. It checks whether the bank that has to be debited has enough funds in its account and if so, it registers the debit and simultaneously credits the account of the receiving bank (which has immediate access to the funds). If funds are insufficient, the payor bank is notified and can either seek short-term financing from another bank or borrow at a penal rate from the central bank. Since the

1/ Until the dissolution of the Federation, the SBCS operated the system. Since the dissolution of the Federation and of the monetary union, the Czech National Bank operates the clearing center in the Czech Republic and a separate entity (closely linked to the National Bank of Slovakia) operates the Slovak clearing center.

split of the Czech and Slovak Federal Republic, the Prague clearing center has processed about 300,000 transactions on average per day; that volume has sometimes reached 500,000 transactions.

During much of 1992 banks continued to hold large and variable amounts of excess reserves (Chart 3). However, several developments led to a rapid decline in banks' aggregate excess reserves over the last quarter of the year. 1/ Those developments included the phasing out of credit ceilings, better monitoring of bank reserve positions, and the ability of the new clearing center to provide next- or same-day settlement with a high degree of reliability. 2/

In 1993, separate clearing and settlement centers were established in Prague and Bratislava, owing to the dissolution of the Czech and Slovak Federal Republic and the creation of the Czech National Bank and the National Bank of Slovakia as successors to the SBCS. To minimize disruptions to payments, the two republics entered into a payments agreement, which basically provides for payments to be cleared and settled through the two central banks, using the ecu as the unit of account and also as the currency for settling balances which exceed the mutual credit limits agreed by both central banks. 3/

The improvements in the payments system, particularly the move to settlement in the books of the central bank, made it possible for the SBCS to phase out credit ceilings and replace them with indirect instruments of monetary control without compromising its ability to manage monetary policy. 4/ The phase-out started with the introduction in 1991 of auctions of SBCS credit to banks, a Lombard window, and an overdraft facility at a penal rate. Open-market type operations in SBCS and Treasury paper were introduced in 1992. Moreover, like in Bulgaria, the interbank money and

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1/ The impending dissolution of the Czech and Slovak federation led to sharp differences in the reserve position of banks. Banks in the Slovak Republic tended to have liquidity shortages and those in the Czech Republic, surpluses.

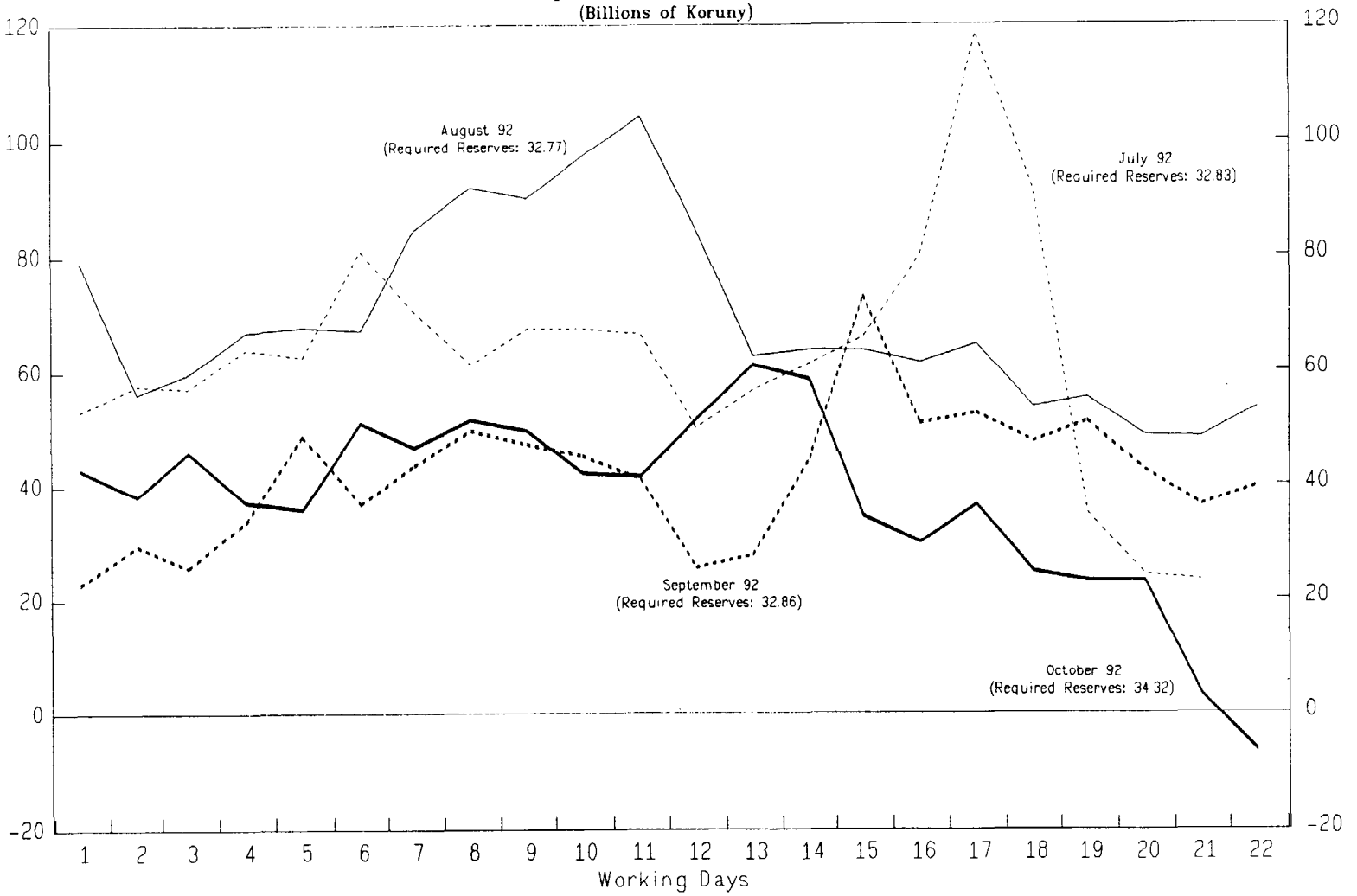
2/ The lags and other features of a settlement system, such as the accounting rules governing clearing and settlement, the terms and conditions of access to central bank credit (to settle payments), and the rate of remuneration on excess reserves, are some of the key elements that determine the demand for excess reserves; see Khan and Sundararajan (1992), Freedman (1990), and Bank of Canada (1991). In countries such as the U.S. and Germany, excess reserves on average are less than one percent of required reserves.

3/ The settlement arrangement included in this agreement raises some issues, such as exchange restrictions, of which the analysis is beyond the scope of this paper.

4/ Credit ceilings, reserve requirements and a directed credit facility were the initial tools that the SBCS introduced when the country shifted from a monobank to a two-tier banking system in January 1990.

Chart 3

CZECHOSLOVAKIA
Bank Excess Reserves as a Percentage of
Required Reserves in CSFR
(Billions of Koruny)



Source: State Bank of Czechoslovakia

foreign exchange markets became more active. In particular, the interbank market began to include overnight operations instead of solely longer-term (above 15 days) interbank loans. 1/ Such short-term operations would not have been possible until participants could be sure that funds would be transferred on the books of the central bank on the intended dates. For the same reason, foreign exchange operations have benefitted from more reliability in the execution of the domestic currency counterpart of the transactions.

The developments in the payments system in the former Czechoslovakia illustrate several key points. First, settlement in central bank funds is a prerequisite for a true two-tier banking system, for the development of the money market, and for the central bank to be able to implement monetary policy with indirect instruments. Second, unreliability of the timing of processing transactions and delays in providing information to banks can force the system to hold large excess reserves, which imposes heavy costs to banks. Moreover, the variability of excess reserves makes it very difficult or impossible for the central bank to rely on indirect instruments of control. Third, a reliable payments system and appropriate monitoring of the reserve situation by the central bank can create the conditions for the rapid development of a money market and facilitate the growth of the foreign exchange market.

3. Poland

Since the move to two-tier banking in February 1989, the payments system in Poland underwent various changes. Initially, each branch of a commercial bank kept a clearing account with the local branch of the National Bank of Poland (NBP). Moreover, each branch had to fulfill its individual reserve requirement (maintained in frozen accounts that could not be used for clearing purposes). Thus, it was common for banks to have large current account balances in some branches, and at the same time be paying a penalty for reserve shortfalls in other branches. Each commercial bank branch was allocated a threshold refinancing limit, up to which it paid a basic rate. Borrowing in excess of the threshold carried high penalty rates.

The above system was inefficient, cumbersome, and created significant credit risk exposure. Branch-by-branch settlement generated extra traffic, which aggravated delays in processing payments. Also, the multiplicity of settlement accounts--coupled with the practical impossibility of rapidly transferring balances between branches--prevented an efficient management of

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1/ These longer-term loans largely reflected the strict separation of banking for enterprises from banking for households which existed in the centrally planned economy and which resulted in the Savings Banks (one in the Czech Republic and another in Slovakia) having a large excess of deposits over loans, while commercial banks were in the opposite situation.

bank reserves, forcing banks to hold large excess reserves on which no interest was paid, thus raising intermediation costs and slowing down money market development. 1/

A large and variable float was another major problem of the Polish payments system, caused chiefly by complex procedures and erratic delays in processing payments. More specifically, causes included the system of multiple clearing accounts discussed above, reliance on postal communications (combined with physical transportation of floppy disks and tapes), and requirements of detailed paper documentation for each transaction (sometimes involving all parties).

Float is registered on the books of the central bank under the item "interbank settlements of the NBP" (other items (net)) on a net basis--either positive or negative depending on the relative value of debit and credit transactions. 2/ Net positive float (i.e., an excess of gross debit transfers over gross credit transfers) has been less frequent than negative net float.

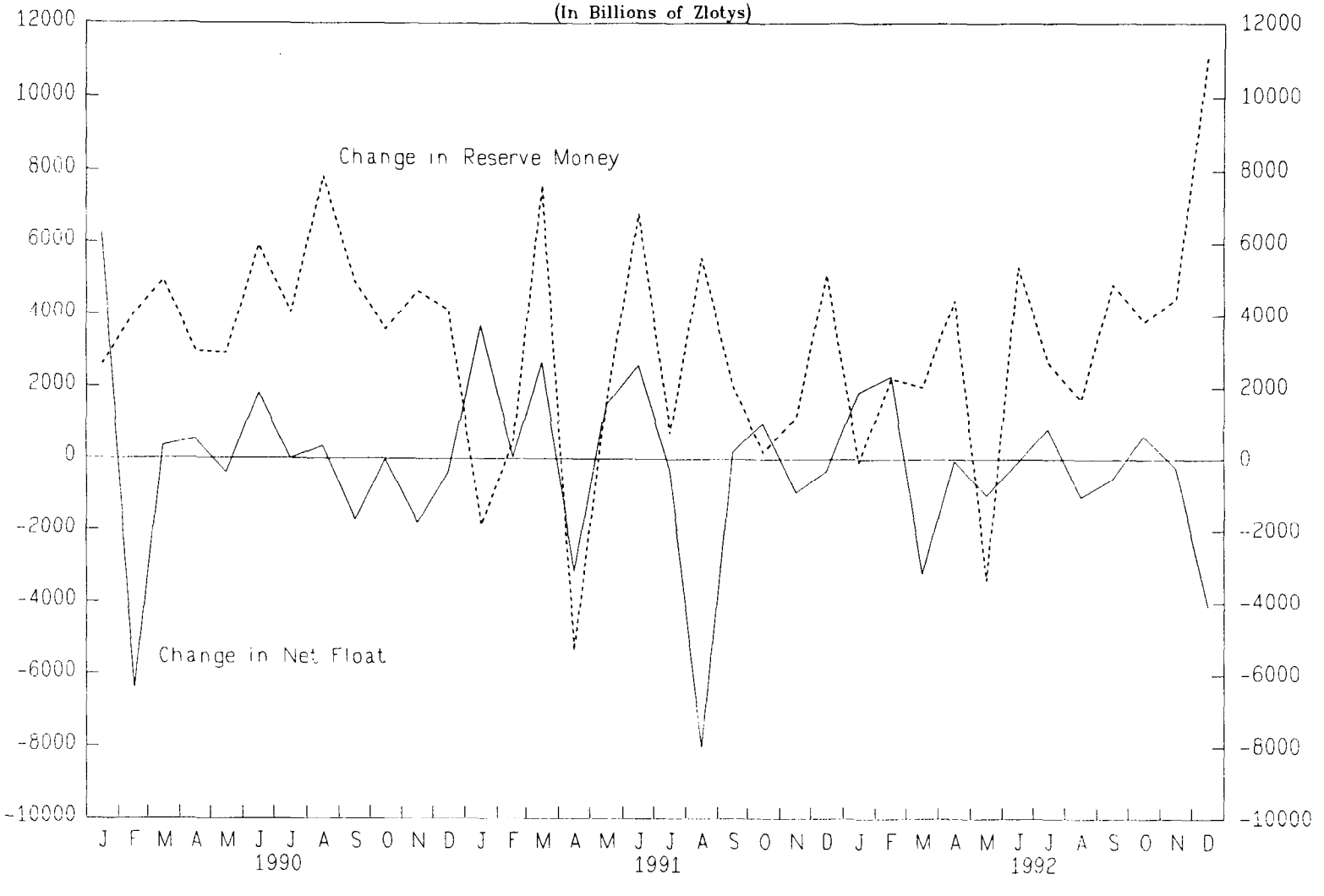
Chart 4 shows the large size and variability of net float relative to reserve money; for instance, in 1990 it fluctuated widely, ranging between Zl 2.4 trillion to Zl 5.3 trillion--the latter was equivalent to about 6 percent of reserve money (as of end 1990). Chart 5 shows that the variability of net float reflected variability in both gross credit and debit float. Finally, Chart 6 compares the size of float in Poland and the United States, just to illustrate the relative magnitudes and variability.

1/ In January 1990, when interest rates were freed, prime lending rates ranged from 38 percent to 55 percent monthly, while rates on short-term deposits were between 10 percent and 33 percent.

2/ Credit transfers (or push transactions) are transactions originated by the payor whereas debit transfers (pull transactions) are originated by the payee. In the former case, typically the central bank debits the payor's bank immediately on receipt of a message, but credits the payee's bank with a lag. This results in a credit float (also called negative float), which lowers bank reserves. Debit transfers result in the receiving bank (the payee's bank) being credited before the debiting of the sending (payor's) bank. This results in a debit float (also called positive float), which increases aggregate bank reserves. Float terminology can be confusing, because it can be viewed from the perspective of the central bank or of the commercial banks; in this paper, we view it from the central bank's perspective.

Chart 4

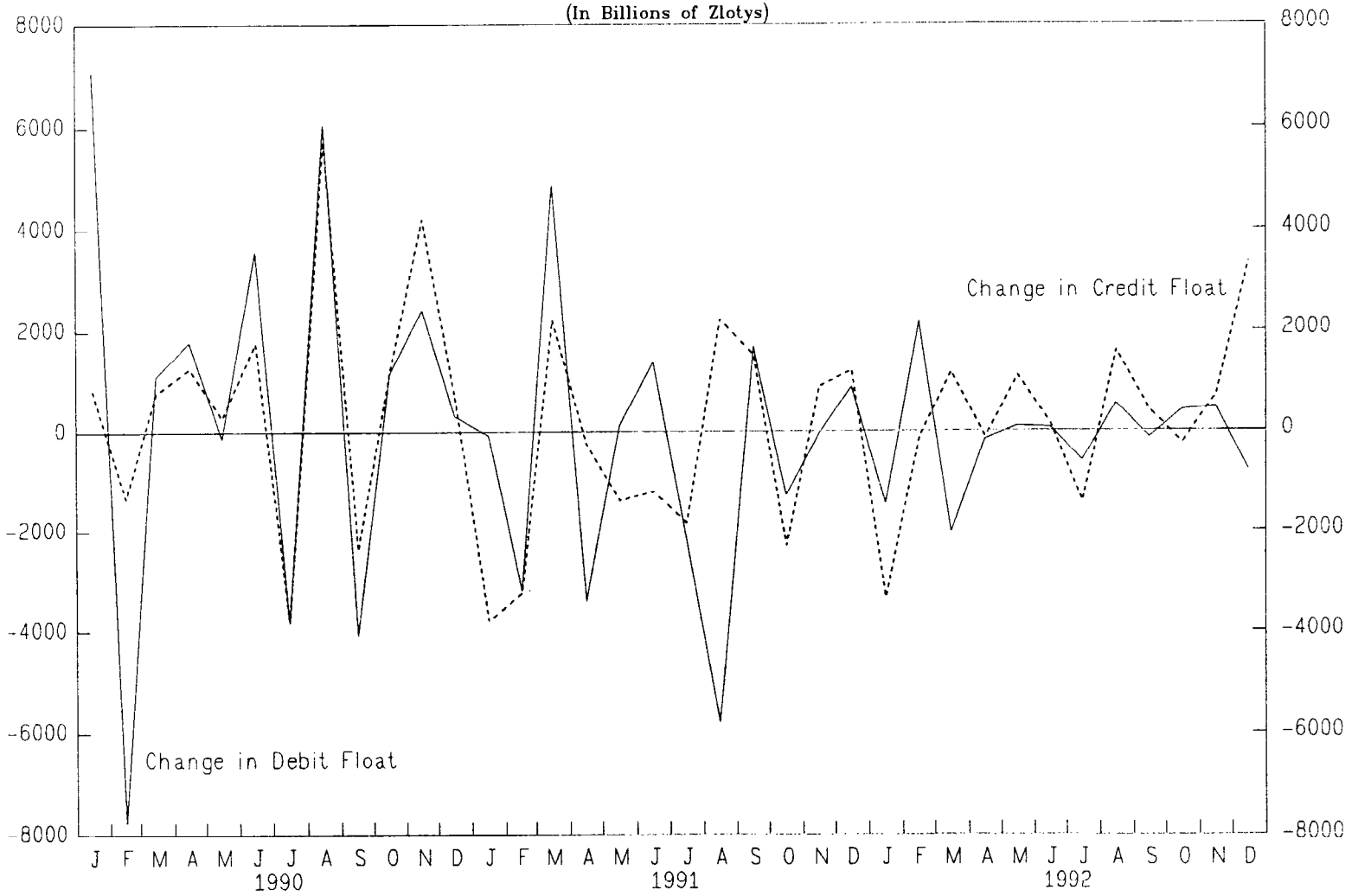
POLAND
Monthly Change in Central Bank Net Float and Reserve Money
1990-1992
(In Billions of Zlotys)



Sources: NBP and IMF, Economic Information System

Chart 5

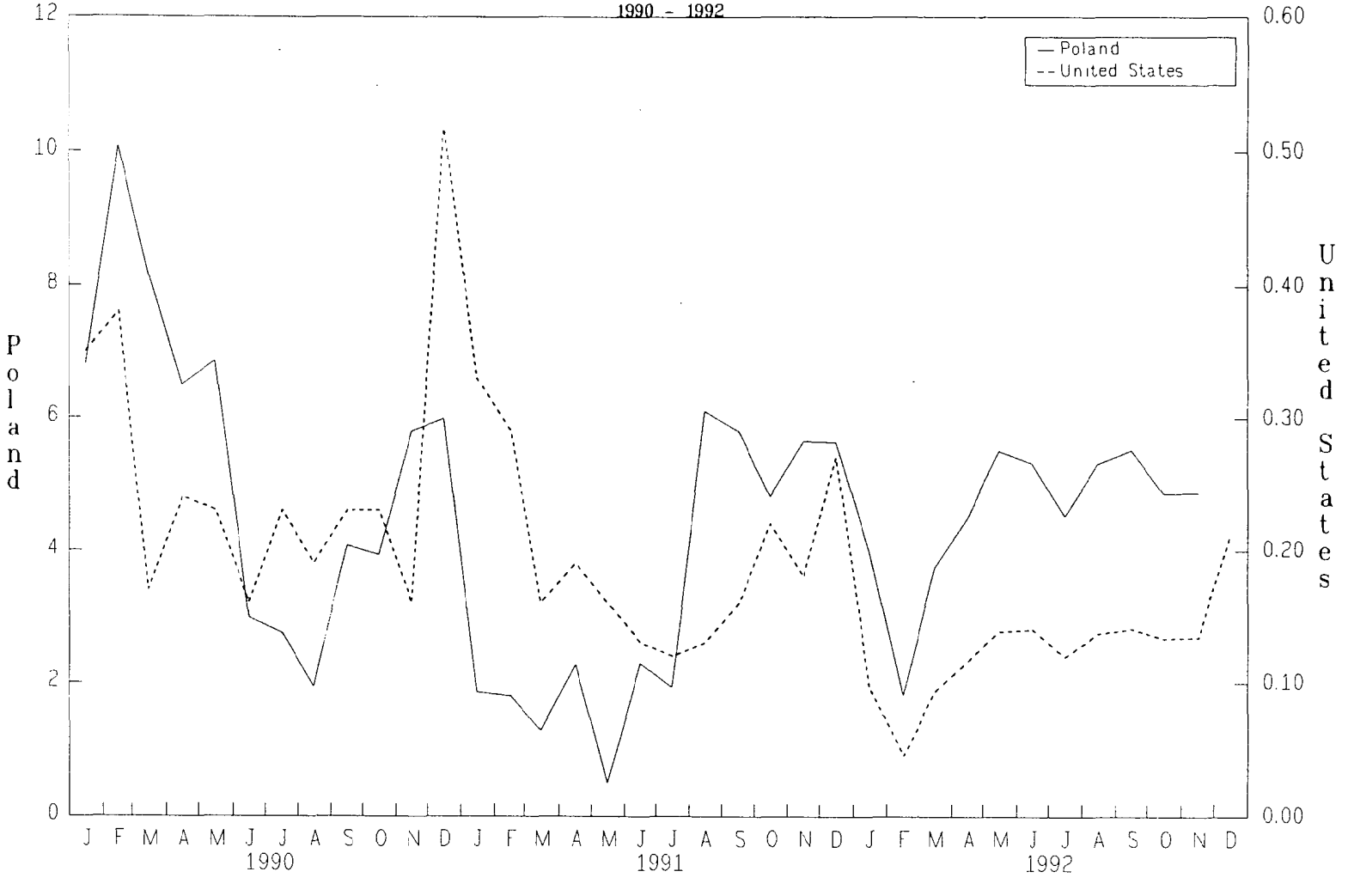
POLAND
Variability of Change in Central Bank Monthly Float
1990-1992
(In Billions of Zlotys)



Source: NBP

Chart 6

POLAND
Net Float as a Percentage of Reserve Money
in Poland and the United States
1990 - 1992



Sources: NBP and IMF, Economic Information System

Such a large and variable float complicated monetary management, particularly because movements in the float were difficult to predict and therefore impossible to offset in a timely manner. 1/

Positions arising from debit float were left open for up to two weeks, which exposed the participants to significant credit risk, in addition to their effect on banks' liquidity. Besides credit risks assumed by both the commercial banks and the NBP, these arrangements were widely exposed to fraud owing both to delays in settlement and to the specific rules governing settlement. In particular, mirroring the NBP accounting treatment of payment transfers, banks granted immediate credit to the payee in a debit transfer (the debit instrument typically was a "guaranteed" check) whereas the payor was debited only after its bank received the check. Two well-publicized fraud episodes took place within a short period of time. In the summer of 1990, the NBP supervisory authorities intervened in one of the joint-stock banks (Agribank) owing to payments system fraud. Also, in August 1991, a large scale check-kiting scam was uncovered, perpetrated by a private holding company (Art-B). 2/ About one half of the NBP's check float (about Zl 5.0 trillion, equivalent to about 5 percent of reserve money at the time) was directly attributable to the scam, which turned around net float (from negative to positive) during March, June and July of 1991. 3/

The discussion above highlights the serious payments system risks and inefficiencies which existed in Poland: a large and volatile float, unreliability of the timing of execution of payments orders, a high degree of credit risk, and the inefficiencies caused by multiple clearing accounts and the lack of reliable clearing arrangements. Moreover, the float volatility greatly complicated monetary management, while the unreliability of the payments system impeded the establishment of efficient commercial practices in the private sector and the development of the money and foreign exchange markets. Fraudulent transactions to exploit payments system flaws ultimately resulted in large losses to the NBP.

1/ In order to be able to forecast the level and direction of float, it is important to know when large payments, such as salaries, are made through the government sector or when tax payments are made; the NBP has not had the information necessary to project these items adequately. Also in early 1990, the NBP regulations on foreign exchange settlements required daily settlement of export receipts or import payments through loro accounts of the NBP held with foreign exchange banks, causing large day-to-day fluctuations in the zloty accounts of these banks.

2/ The offenders took advantage of the delays in processing of checks by writing out large value checks, collecting the money and then covering the check (a helicopter was used to move around the country) when the time of debiting approached.

3/ The large increase in guaranteed checks in total bank clearings as a result of the scam vastly increased the value of the debit float.

The NBP has been making significant progress in addressing the above problems, and has been implementing the following measures: One, to address the issue of the multiplicity of clearing accounts (which made it difficult for banks to manage their liquidity and forced them to hold large excess reserves), the NBP decided to consolidate banks' clearing accounts into a single account per bank. The process began in April 1991 and will be fully completed by mid-1994. In preparation for the operation of the National Clearing House in April 1993, the accounts of the clearing house members--which represented over 80 percent of the value of the clearing--were moved to the books of the NBP head office in Warsaw. The NBP simultaneously ended the automatic provision of settlement credit. 1/ Two, to manage the new settlement system and oversee the development of an integrated interbank payments system, the NBP established the Interbank Settlement Department. Three, the NBP adopted several regulatory changes to deal with the scandal of August 1991 and prevent its recurrence, which aimed at better synchronizing the crediting and debiting of accounts. 2/ Together with stricter bank observance of payments regulations, those changes reduced the net float, mainly through a sharp decrease in gross debit float. 3/

The establishment of the National Clearing House (NCH) has helped in building an efficient payments system. The NCH, a private organization established in 1991 by 17 major commercial banks and the NBP, began operating a new system for the overnight clearing and settlement of paper payment instruments (of which the two most important are the payment order and the settlement check) in April 1993. 4/ The system operates on the basis of 17 regional clearing centers, which transmit the information to the NCH headquarters in Warsaw. The National Clearing House (NCH) rules reflect the increased focus on credit risk, and bar any bank unable to settle from participating in the overnight clearing center for one year. These measures succeeded in reducing float and making the system safer.

The above improvements in the payments system, along with the parallel development of the government securities markets and NBP instruments of indirect monetary control, have created the basis for more active and

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1/ As new members join, their accounts will similarly be moved to Warsaw, a process which should be completed by mid-1994.

2/ These included notification of the paying bank by telex of a guaranteed check, of zl 100 million and above, notification by telex of confirmation checks of zl one billion and above, and--for settlement of ordinary checks--the withholding of the crediting of the payee bank until the paying bank received and acknowledged the check.

3/ The debit float declined from zl 10.3 trillion (equivalent to almost 11 percent of reserve money) in June 1991, to zl 2.7 trillion (equivalent to about 2.6 percent of reserve money) in October 1991.

4/ The settlement check is an instrument given by the payor to the payee. The payee presents it to his bank and his account is credited after his bank collects the funds from the payor's bank.

efficient securities markets. The consolidation of clearing accounts has reduced banks' need for excess reserves, has facilitated banks' liquidity management, and fostered the development of the money markets.

Since 1992, the interbank deposit market has become better established and increasingly active. It has broadened to include about 38 banks, although it is dominated by the largest ten. The daily volume of interbank transactions is presently in the order of about Zl 2 trillion (approximately 2 percent of reserve money). The interbank market is now widely quoted in the press and WIBOR (Warsaw interbank offered rate) has become the established benchmark for the cost of funds. A remaining issue is the reserve management system which does not permit the use of required reserves for intraday or end-of-day settlement. As a result, and with the tightening of overdraft facilities, banks still need to maintain high current account balances--despite the account consolidation--to facilitate settlement. This situation makes for a volatile interbank deposit market, particularly for same-day funds, and complicates monetary management but to a lesser degree than in the initial period of reforms.

The NBP bill auction was introduced in mid 1990, and treasury bill auctions (offering bills with maturities of 8 weeks, 13 weeks, 26 weeks and 52 weeks) were introduced in May 1991. Treasury bills have become a very important source of funding for the Government with the outstanding balance rising to over 80 zl trillion in the first quarter of 1993, equivalent to more than 25 percent of budgetary expenditures in 1992. The NBP discontinued its bills in January 1992 in light of the expanding treasury bill program and replaced them with repo and reverse repo auctions in treasury bills.

The NBP established a brokerage facility that also cleared and settled operations in treasury and NBP bills. This facilitated secondary market trading and contributed to the expansion of the market for those bills. The NBP provided screen-based information on bids and offers, and facilitated the transfer of funds for the trades that were concluded. This transfer was done without the physical movement of securities by issuing an equivalent security to the buyer against payment.

Plans are advanced for additional improvements to the payments system. First, the NCH intends to develop and implement an electronic system to clear interbank payments, which will eventually replace the current paper-based system and clear both credit and debit payment instruments. Pilot testing is scheduled to take place before the end of 1993. Second, the NBP intends to establish a system of electronic large-value payments (NBP Wire), and a book-entry securities system, which will utilize the recently developed microwave communications network and provide continuous settlement services for interbank and other payments, as well as facilitate same day settlement of securities transactions. These systems would greatly facilitate further development of the money and foreign exchange markets.

- improvements in accounting rules and in transportation and processing procedures based on readily available technology should be implemented to reduce the size and variability of float.

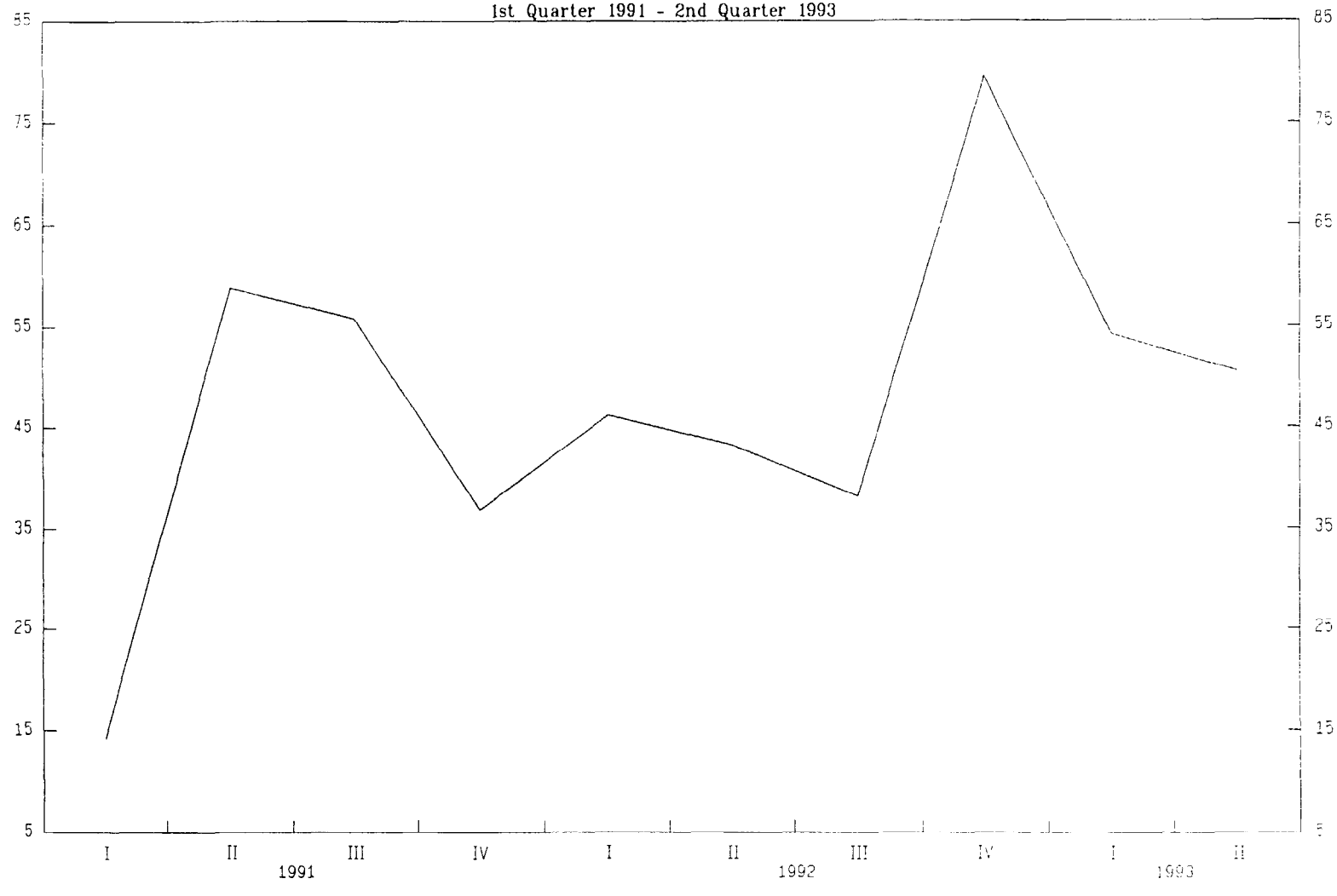
- central banks should pay close attention to financial risk management and loss sharing aspects of payments systems, and play an active role in managing the credit and liquidity risks in the payments system to avoid disruptions to stability. This is particularly important since the banking system in many transition economies is in a state of flux owing to large structural changes, and the liquidity and solvency problems of banks and enterprises will first manifest themselves in the payments system.

- final settlement of interbank transactions for banks which hold accounts with the central banks should be effected through these accounts. Tendencies toward settlement through mutual accounts among banks should be addressed through clear and transparent conditions and rules for banks' access to and use of settlement accounts with the central bank.

- an early implementation of a large-value transfer system, initially using the readily available technology, would greatly facilitate development of the money and foreign exchange markets. This would benefit the effective and efficient implementation of monetary and exchange policies. That system would ensure that transfers above a minimum size between banks would be guaranteed to be secured, irrevocable, and offer immediate or same-day settlement in accounts with the central bank. Appropriate rules and conditions have to be set for such a system to operate safely.

Chart 7

ROMANIA
Reserves with the Central Bank as a Percentage
of Total DMB Deposits
1st Quarter 1991 - 2nd Quarter 1993



Source: IMF, Economic Information System

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