PAYMENT SYSTEMS IN COUNTRIES IN TRANSITION

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1. Introduction

The nineties were a hectic period for many policy makers around the world in respect of payment systems reforms. The increased attention to payment system issues was brought about by increased cross-border competition, innovations, and new communication and information technologies, on one hand, and financial and political integration and changes in European Union and Countries in Transition – CIT, on the other.

The significance of payment system is, inter alia, in its role in, and impact on, financial stability (confidence and certainty) and monetary policy implementation. The payment system is one of the first places where financial stress is manifested, as firms in financial difficulty fail to meet their payment obligations (Summers 1994). In general, payment systems facilitate economic activity and preserve/undermine public trust in financial systems and thus are, for better or worse, under a close public scrutiny with a view to guarding financial stability.

The purpose of this paper is to point out the key problems and general policy issues in the reform of the payment system in CIT, as well as to show the specifics of the payment system issues in the particular economic environments. The major aspects of payment systems operations in CIT presented in the study are *the large-value (payments) transfer systems* – LVTS and *the monetary and banking system aspects of the payment systems reforms* in CIT.

The aims of the analysis are to:

1. Identify the major characteristics of the payment systems.
2. Identify the major problems of the payment system reforms.
3. Suggest possible solutions for the problems and adequate payment system designs.

2. Analytical framework

Given the nature of final payment settlement in an economy (that is in central bank's funds), if central bank guarantees intraday liquidity for payments it may assume the role of the "lender of first resort" thus creating moral hazard problem. In light of the rapid growth in volumes and values of payment transactions and their increased real and potential impact on risks and costs of financial transactions (and not just within

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national borders), *the systemic risk versus moral hazard trade-off* became a part of central banks' day-to-day input choice in their monetary management.

Related to the issue is central bank's involvement in the settlement process, i.e. the choice between the *types of settlement and liquidity provision systems* for large value transactions. Goodhart (1988) has argued that central banks evolved in part out of the need for an independent provider of payment services. A system choice influences value, type and costs of liquidity needed for settlement purposes. In addition, liquidity provision arrangements further determine the risks and possibility of 'spillover' of intraday credits for payments to overnight credits.

Thus, a choice of a Real-Time Gross Settlement – RTGS system for final settlements raises policy questions about: 'daylight overdrafts' and pricing of the credit; guarantee of finality of payments by central bank or queuing arrangements if there is no such guarantee; operational efficiency/smooth transactions versus moral hazard; need to redefine/shorten time horizon of monetary policy operating objectives and, finally, costs of liquidity for settling every transactions in good funds. A choice of a Deferred Net Settlement – DNS system puts public policy emphasis on risk reduction and related issues, such as: bilateral and multilateral credit limits within the system, i.e. caps on exposures, risk/loss sharing arrangements among the participants, other prudential requirements for payment intermediaries, and supervision and early intervention.

Apart from systemic risk and liquidity provision concerns, a strong link between payment systems and monetary policy is the influence of payment systems on available and optimal *choice among monetary policy instruments*. For example, open market operations, which are increasingly becoming dominant instruments of monetary operations world-wide (Borio 1997, Johnson 1998), require efficient and fast payment systems that can convey changes in prices/interest rates for allocation purposes. Well-developed financial markets, as prerequisite for efficiency of these indirect monetary instruments, are shaped by the speed, risks and costs of payment systems. For example, open market operations require payment systems that ensure the transfer of securities through book entries and the rapid settlement of funds through accounts at the central bank (Fry et al. 1998).

A further tie between monetary policy and payment system is *the payment/settlement float*. The direction, i.e. extension/retraction of credit, and size and variability of float influence the level and volatility of banks' reserves and hence demand for money. As the existing technology can easily and cheaply minimise the size of float formed by payment and accounting lags, elimination of the remaining variability of float is a matter of institutional arrangements. As banks may like float as a form of free credit, the monetary policy and institutional arrangements must ensure that central bank does not credit banks' accounts before related debits and that banks do not delay crediting customers' accounts after receiving related payments. The impact of float is particularly relevant to high inflation countries, such as CIT. In high inflation environment payment system inefficiencies and resulting float dramatically increase opportunity cost of holding money. The increased velocity of money and inability to predict and measure demand for money and effects of money supply in those circumstances put everyday monetary operations at risk of being ineffective or counterproductive. Furthermore, the losses

resulting from combined effects of inflation and payment lags can make serious damage to trust in payment and banking system and/or result in deposit withdrawals, increased currency substitution and black market operations.

Finally, the monetary policy/payment system relationship can be observed through analysis of demand for and supply of *bank reserves*. Banks hold reserves to meet withdrawals of deposits and make payments. Central banks have imposed reserve requirements (as a percentage of bank deposits) on banks primarily as a 'buffer' for changes in liquidity conditions, including unforeseen withdrawals. The reserve requirements, however, serve three additional functions: first, liquidity management – as they contribute to offsetting the supply of liquidity generated through autonomous factors; second, monetary control – because they can be used as a means of controlling monetary aggregates; and, finally, income or tax function – as they are a source of revenue for the central bank (Borio 1997). Generally, required reserves balances have evolved so that they can be used for payments. Another significant trend is reduction in reserve requirements over the last decade in all countries (Borio 1997, Fry et al. 1998).

There are some fundamental advantages and disadvantages that central bank may have as a payment services provider. Advantages steam from central bank's immunity to insolvency or default and institutional and/or financial powers. Disadvantages, on the other hand, are in different risk taking profile and flexibility to be selective with regard to the customers and pricing of the services (Ferguson 1998). Central banks still remain the major owners of their countries' large-value payment systems (see Table 1). Furthermore, there is a trend towards central banks' ownership of the countries settlement systems, as the new RTGS systems in central banks' ownership[1] are squeezing out DNS systems.

There are, however, other stakeholders involved in a payment system design and operations. These include: banking supervisors (if different from central bank), government, commercial banks and other financial institutions (both domestic and foreign), organised financial markets and clearinghouses, customers (domestic and foreign) and system's suppliers and operators. In order to establish an efficient payment system, they need to co-operate in one way or another and, critically, to 'buy-in' the design choices and system as a whole (Keppler 1998). The type of co-operation and policy approach, however, will depend on the individual country's circumstances, i.e. stage of development of payment and overall financial systems, and whether a new payment system is being built or an existing one improved.

In general, in recent years, developed countries tended to rely on a more informal and/or market based approach. Development of the payment systems in those countries followed, in the business strategy terminology, a 'bottom-up' approach, whereby the system improvements were a consequence of natural evolution and maturity of financial systems and were financial industry driven. Less-developed countries, on the other hand, usually opt for a 'top-down' approach, whereby the system changes and/or other institutional and regulatory changes were initiated mainly by central banks with a view to promoting efficiency and reducing risks. Thus, these countries are trying to 'leap-frog' into the state of effective and efficient payment systems that can help sustain or promote development of financial systems.

Table 1 – CENTRAL BANKS OWNERSHIP OF PAYMENT SYSTEMS IN THE BANK OF ENGLAND GROUP*

Type	*Industrial*	*Transitional*	*Developing*
RTGS			
Sole	56	86	100
Joint	6	14	0
None	38	0	0
DNS			
Sole	6	44	47
Joint	44	44	37
None	50	12	16

Source: Fry et al. (1998)
Notes: The Bank of England Group comprises of 70 countries that responded to Bank of England Survey on Payment Systems, conducted in February 1998. There are 21 industrial countries, 13 transitional and 36 developing countries.
* Percent of countries in each group

The basic issues and choices that policy makers should be concerned with when designing or improving payment systems are payment system user needs, risk control, payment instruments, legal requirements, system requirements, system's ownership and control and cost recovery and pricing of the services (Listfield and Montes-Negret 1994 and Montes-Negret and Keppler 1995). In particular, the choices are about type of settlement system (e.g. RTGS or DNS) and payment processing system (e.g. individual or batch), type of instruments offered (e.g. paper or electronic or both), operation and ownership of the system (e.g. central bank's, private or joint). The major obstacles in that process of payment system development, as illustrated by the survey of the Bank of England Group of countries (Fry et al. 1998), are: a) legal framework – for developed countries, b) immaturity of the banking system and poor legal framework – for countries in transition, and c) poor technical infrastructure, legal framework and maturity of the banking system, respectively – for developing countries.

However, a thorough macro and micro economic cost-benefit study and situation analysis are not always the starting points in payment system design, as more operational (tactical) approach for payment system improvements and/or trouble-shooting overtakes a 'strategic' approach to system development. These will depend on the state of development of existing payment system(s), business environment and needs, who leads and participates in system design and implementation and a country's institutional, legal and technological infrastructure.

Once a new payment system is in place, policy makers face somewhat different problems, including:

• the choice of type of both oversight over system and further involvement in the system operations by the monetary authorities;

• encouragement of competition and private solutions; and
• influence of increased global financial integration and competition on domestic payment and monetary systems.

3. Data and Methodology

The identified critical aspects of a payment system are assessed by case study approach. The main data sources are the countries' central banks, and to a lesser extent The World Bank (1998). Being involved in both systems regulations and operations, the central banks are the most knowledgeable entities in respect of the payment systems' past and reforms. Therefore, a survey of the central banks, regarding these issues was conducted in the summer of 1998. Given the poor statistical coverage of payment transaction volumes and values in the past, and the relatively short life of the new payment systems, the information is of a 'qualitative nature'. The information gathered from the central banks was mainly in form of specially prepared reports on the countries payment systems in response to the survey, publications, or in a form of answered questions about the systems. The twelve systems for which substantial meaningful information was provided by the central banks or other institutions are analysed in form of 24 mini case studies[2]. The analysis is presented in the two analytical sections – the payment systems developments and the payment system within monetary policy framework.

4. The payment systems developments and reforms in twelve CIT

As the "mono-banking" systems with dominant central banks were being replaced with two-tier banking systems, and with the larger number of financial intermediaries present, the changes in the payment systems had to reflect the less-controlled, multiparty, payment flows. However, not all of the countries had the same institutional arrangements, level of banking system development or had followed the same transitional and privatisation paths. The payment system reforms were also not uniform. The differences lay in whether a particular reform was:

• part of a broader banking and monetary system restructuring programme or not,
• accompanied with adequate institutional and legal changes or not,
• incremental or 'strategic'; thorough or superficial,
• with the involvement of different stake-holders (especially banks) or top-down imposed, and
• in the choice among available technical and organisational solutions for a system's design[3].

Bulgaria

Bulgaria adopted a strategic approach to its payment system reform. The objective of the reform was the creation of a SIC[4]-like RTGS system by the year 1999. Instead of sequencing the steps of the reform, the envisaged system was both the starting and the

end point of the process. Thus, payment system is being reformed in its entirety, and the existing gross system is going to be enhanced into an RTGS system. The system, called "Bisera" is operated and owned jointly by the central bank and the commercial banks through "Bankservice", the system operator. In 1997 the total volume or the payment transactions processed by the system was about 16.5 million.

There are, however, other more fundamental impediments for the efficient payment system functioning. First, according to the central bank, the large amounts of non-performing loans and insolvency of some banks is reflected in the illiqudity of the system and payment delays. Second, there is anecdotal evidence of high foreign currency holdings in Bulgaria, which, when coupled with high cash preference[5], result in lower utilisation of banking channels. Third, non-reformed banks and high inflation in the past are also responsible for lack of trust in banking and payment systems. Finally, the reform came rather late during the process of financial system restructuring, i.e. it did not support new monetary policy nor money market development. These issues are analysed in the second analytical section.

China

China started financial system reforms in the late seventies. By 1984 a mono-bank system was replaced by the system consisting of four specialised banks and the central bank – People's Bank of China. This change was also reflected in the replacement of a centralised record-keeping accounting system by a payment and settlement system. The central bank provided settlement accounts for the banks and 2200 local clearing houses and the specialised banks operated their own inter-branch clearing for non-local payments. The system was paper-based with manual operations. Between 1985 and 1993, new regional and national banks as well as other financial institutions were established which resulted in increased interbank transactions. The paper-based operations resulted in large amounts of float. In response, the central bank and four specialised banks introduced electronic interbank systems. The payment transactions' pricing policy has relied on subsidies rather than full-cost recovery.

Since 1993, efforts have been focused on creating a modern two-tier banking system, with clear distinction between central banking and monetary policy on the one hand and commercial banking on the other. This also included efforts towards the adoption of new accounting principles and modernisation of the payment system. Hence the increased importance of the Chinese National Advanced Payment System – CNAPS project, which started in 1991. It is now in a pilot stage and is expected to be operational by the year 2000.

From the information provided by the central bank, it can be concluded that the long time delays in implementing this and other payment system projects can be attributed to the following facts:

• First, there is no clear strategy for the payment system development as the country's financial system is in the process of transition, which in turn, is not clearly defined. The incremental, but substantial, development of banking and monetary systems require changes in the payment system design and operations, and the problem

is that the payment system improvements are thus always one step behind. This is also reflected in an inadequate legal framework for payments and insufficient risk awareness of the system participants.

• Second, the payment system infrastructure in general and technical framework in particular are still undeveloped, and the payment system needs to be rationalised. As these factors are tackled in a centralised fashion, with little bottom-up initiative and/or contribution, the implementation of a programme is a substantial undertaking for the authorities – time-wise skills-wise and money-wise.

• Third, the payment system is supposed to serve the most populated country in the world, surpass large distances and work for a rapidly changing and growing economy. The implementation of a programme of such proportions certainly takes time.

Croatia

Croatia has 'inherited' its payment system from former Yugoslavia, which part it was until 1992. Thus, in the current payment system credit institutions accounts, accounts of companies, juridical and natural persons, are still kept with the Agency for Domestic Payments (former Social Accounting Service/Bureau[6]). The Agency is a non-depository institution authorised for handling domestic payment operations.

The payment system reform, that started in 1995, was aimed at redesigning the system so that the credit institutions' accounts are transferred to the central bank's books, and the customers' (businesses and individuals) accounts are kept with the credit institutions – namely banks. Therefore, in the new system, the interbank payments are planned to be processed through a RTGS-type of clearing and settlement system, the inter-company payments will be processed via their banks through the RTGS system. The retail payments will be executed through the National Clearing System, a giro-type clearing house that will utilise existing Agency's facilities. Both systems are planned to go live by the end of first quarter of 1999.

It is planned that all payment transactions between accounts kept with different banks, except large value payments, settle at the National Clearing House (NCS). The transactions will be processed on a multilateral net settlement basis. As for large value payments, the transactions will be settled on a gross basis in 'real-time', provided there are sufficient funds on the payer's bank account. The payment orders that are not fully covered will be sent in a queue and processed on either a first-in-first-out or priority basis once there are sufficient funds available. The LVTS transactions will be transmitted using SWIFT proprietary network. All direct participants will be able to monitor executed transactions, account balances and unsettled transactions placed in the queue.

Given the nature of the system design, there may be a few problems in its operations. The successful functioning of the envisaged payment system may be affected by the following:

• First, the separation of payment instructions on large-value and retail payments transactions may not be a clear-cut one. The existence of two, obligatory, settlement systems may create ambiguities about which payment orders can and should be transmitted through each of the systems. Even with an adequate legal framework, the

difficulty may be in deciding upon what is a large value payment and how often should the decision be revised[7].

• Second, related to the first remark, obligatory centralised clearing and settlement of 'small-value' payments may unnecessary complicate the day-to-day operations and increase reliance on the NCS's technical facilities. If the objectives of the reform are, among other things, to make banks the main retail payment services providers and channel funds through the banking system, the control and financial discipline can be catered for by supervision and surveillance of the financial institutions (including licensing procedures). In that case, settlement of banks' net open positions resulting from all small-value payments can then easily be done through the large-value gross settlement system or NCS' facilities.

• Third, with regard to LVTS payments, existence of the queuing arrangements, with no 'guarantee facilities', may be a contradiction to so-called real-time settlement. As indicated by the Swiss case (Heller 1998), the gross system with queuing facilities may de facto function as a net, deferred time, settlement system, as bulk of payments occur late in the day. The possibility to attach priority to payments and to decide on it ex-post in the Croatian payment system contradicts the nature of an RTGS system and has different policy implications.

Czech Republic

In Czechoslovakia, until 1989, payments for the corporate sector were operated by the State bank of Czechoslovakia through its branch network, while the retail payments were the responsibility of the Czech State Savings Banks and the Slovak State Savings Bank. A fully computerised 'real-time' clearing network began operations in early 1992. The central bank established the Clearing and Settlement centre to handle domestic currency payments between banks. After the split of Czechoslovakia in 1993 until 1995, the National Banks of Czech Republic and Slovakia cleared and settled payments between the states. The systems effectively functioned like EU TARGET[8], with domestic clearing centres, but with the difference of two currencies present. Since 1995, when the arrangement was cancelled, the inter-states payments function on the conventional correspondent-banking arrangements basis.

In the Czech Republic, total volumes and values of payments processed by the national RTGS system, owned and operated by the central bank, are 175 million transactions, worth approximately 45,000 billion Czech Korunas. In 1995, the payment system services were provided by just below 3,500 bank operating units. Of the total number of accounts and transactions processed in 1995, the five largest banks accounted for about 90 percent.

The payment system reforms seem to have been approached strategically, with clear definition of the reform objectives and the payment systems' role in the monetary economy. There was, however, no involvement of commercial banks and other financial intermediaries in the reform process and all changes were introduced by the central bank. Also, the oversight of the system is formal and regulated by law. The central bank provides no overdraft facilities and there are queuing arrangements instead.

In spite of advanced technical solutions for the country's RTGS system there were liquidity problems reflected in the payment system functioning. A series of failures among small banks with a resulting liquidity crunch and collapse of the two largest fully private banks ("Kreditni banka" and "Agrobanka" in 1996) have brought the credibility of the Czech financial markets to its lowest point since economic reforms begun. Furthermore, four largest banks that account for eighty percent of all assets of the banking system are yet to be truly privatised. The costs of borrowing are high and the industry is in weak financial state.

Although the clearing and settlement system has improved[9], the interbank market faces many difficulties that are rooted in the banking system itself. For example, despite the improved technology that allows same-day settlement, banks often make delays that may amount to many days (according to international banks present in the system). Also, the system does not effectively function in real-time as many participants are not electronically linked to the settlement system. Thus, payments have been effectively cleared only after one to three days.

Estonia

In Estonia, the majority of interbank payments are settled through the clearing centre of Eesti Pank (the central bank). The centre is responsible for 1/3 of overall payments[10]. The centre processes both debit orders and credit orders on a multilateral netting basis. The great majority of payment orders which account for above 99% of total value of payments are electronic. The system does not distinguish between large-scale and retail payments. The multilateral netting fails into two phases. The first phase ends at 15.00 hours when the information on effected and rejected payments is sent to the participants. After that, the participants have two hours in which to provide the required liquidity to pay for the rejected orders. The money can be obtained from the interbank money market or through trading in the central bank's certificate of deposits. At a certain penalty rate, the banks can also use part of their reserve requirements. At 17.00 hours the final settlement takes place. The uncovered payments are rejected.

Since 1996 a fee for the payment services has been charged to indirect payment systems participants, namely the banks' subdivisions, in order to equalise the position of credit institutions with only one settlement account and put the liquidity management of institutions with several of the accounts in order. In 1997 the central bank decided to design a new interbank payment system, in order to prepare the country's payment system for LVTS payments for 'interlinking' with the EU TARGET and bringing its SVTS payments in compliance with the EU standards.

Two projects have started – one is to develop an RTGS system by September 2000, and the other is to develop a DNS system for retail payments by September 1999. These developments are accompanied with the already effected changes in the accounting principles, unified account statements and replacement of payment order copies by electronic ones. According to the Eesti Pank, the final objectives of the reforms are to accelerate settlements, build confidence in the banking sector and reduce use of cash for high value transactions.

There are several conclusions that can be made about the Estonian payment system that can also serve as lessons on payment system design.

• First, there is no account of/control over all large value payments by the central bank and the payment arrangements and rules of participation are ambiguous. This, although not necessarily risky in its own right, complicates the payment flows and may increase payment system risks as the autonomous flows in an immature or poorly supervised system may reduce financial discipline or neglect social costs.

• Second, some operational measures are used as substitutes for legal or statutory setting. Pricing policy, for example, is not the most effective measure for putting the use of the system or number of participants in order in a 'developing' banking system.

• Third, on the plus side, there is a parallel development of two types of settlement systems. However, although the DNS system is supposed to be for retail payments, there is no provision that it will be the case. What is the interest of the central bank in introducing two different competing systems? Is it not up to commercial bank to try and establish an alternative payment system if necessary? Also, the monetary policy and control consequences may prove to be rather complex for the central bank to deal with.

• Fourth, also on the plus side, the development of a DNS may be a central bank's contribution to retail payment system efficiency, choice and cost reduction. Still, the question is how to arrange it. It is possible to do it: a) in the way described for Croatia – obligatory and by making a distinction between LVTS and SVTS, b) by leaving both systems open for all payments, or c) by creating a giro institution instead of the DNS system – as an additional offering and thus to put pressure on banks to develop retail payment services.

Hungary

In Hungary, the development of a new Interbank Giro System – IGS, costing about US $30 million initially, began in 1987 and took seven years to develop. Settlement was on net basis against participants' accounts. Other clearing institutions include the card companies and "Giro Bankcard Ltd" and the central securities clearinghouse and depository – "Keler Ltd". The National Bank of Hungary has assumed the leading role in the system development and regulation from the very beginning. The interbank clearing system, owned jointly by the central bank and commercial banks, started operations in late 1994. It can be defined as a deferred (next day) settlement, gross clearing, batch processing, system. The central bank has also implemented two additional projects – uniform account numbering and standard paper form in 1995 and interbank clearing for direct debit and direct credit in 1997.

As of mid 1997, 44 credit institutions, the National Bank, the Keler and the State Treasury were connected to the IGS. In 1996, for example, the system processed over 40.6 million transactions worth 2.7 times the annual GDP. Only credit transfer orders (in Hungarian Forint only) can be sent through the system, i.e. the payments are always payer's bank initiated. Electronic transfers account for 57 percent of the total volume and 63 percent of total value of payments. There are no limits on the value of transactions and all transactions[11] have the same priority. The prices are set per

transaction and charged to debtor's bank, except in case of multiple direct debit. The pricing allows the full cost-recovery and is revised quarterly. The payments clearing cycle for the period 1992 to 1998 was from two to four days.

In line with the requirements for risk reduction and compliance with European Central Bank standards (connection to TARGET) are the efforts towards creation of an RTGS system. This will also require improvements to the accounting system at the central bank which is still inadequate for the task. These projects are on top of the agenda since the early 1998.

The Hungarian payment system reform and functioning provide a few good lessons for other countries undertaking the reforms.

First, based on the information provided by the National Bank of Hungary, the payment system project suffered *long delays* because of the following problems:

• The task of separating the operations of a modern central bank and all other functions that the central bank carried out in the past, as precondition for setting up a new clearing system.

• Some of the assumptions about the fundamentals turned out to be false. These regarded, for example, the availability and reliability of public telecommunication services and centralised intrabank accounting, and persistence of old business practice and governance.

Second, the involvement of the *central bank and its relationship with commercial banks* was both crucial for payment reforms implementation and a sensitive issue during the reform. Commercial banks are reluctant to change both payment arrangements and co-operate in line with the reduction of other than their private costs (for better or worse) unless the central bank pressures them to do so. In an immature banking system as in a transitional country, this shifts the responsibility for 'strategic thinking', setting of the agenda, and ensuring the compliance with the rules and deadlines on central bank. Moreover, different interests of some large banks may jeopardise the success of the project, as it was the case in Hungary when large banks started exchanging payment instructions bilaterally just before the new system was to go live.

Third, notwithstanding these private versus public cost considerations, the involvement of the commercial banks is critical for the success of the interbank payment system reform. Therefore, a clear balance between the central banks initiative/leadership and commercial banks involvement needs to be found. In the Hungarian case, the banks were less involved than they wanted to. However, it was the *involvement of foreign banks* (bigger than in any other CIT) that contributed to better utilisation of the system, and thus was in line with the central banks policy intentions. The involvement has also contributed to a more mature banking system and better banking practice, the basic prerequisites for risk reduction and monetary policy efficiency with regard to the payment systems.

It can be also concluded that the clearing and settlement were considered for quite some time as a merely operational matter, which had nothing to do with the banking and monetary risks. Nonetheless, the risk awareness and control have gradually increased and the payment system was able to function without major disruptions over the years.

In the very competitive market, with significant presence of foreign banks and investors, the system operated satisfactorily.

Lithuania

The Bank of Lithuania carries out interbank settlements via banks' correspondent accounts held with the Bank. It is done through the Bank's "Settlements Centre" that started operations in 1992 and was an independent entity up to mid-1994. The centre has about 60 employees that run the system responsible for about nine million payments, worth 82 billion Lithuanian Litas in 1997. All banks (12 banks in 1998) participate in the system and the banks' branches (160 of them) may also take part in it. Interbank settlements are performed twice daily – at 11 a.m. and 3 p.m. Banks are supplied by the information on the effected payments also twice daily by E-mail. The telecommunication network is public network, the protocol is "CC:Mail" and the hardware consists of personal computers both at the Settlement Centre and the participants. The membership for clearing and settlement services is open for domestic banks, their branches and foreign banks/branches. The pricing is per transaction, regardless of the value, and per computer system use, i.e. for each KB of information transferred and stored.

Since late 1997, if banks do not have sufficient funds on correspondent accounts for effecting payments at the time of the last clearing, they may use the loan of the central bank for pledged Government securities. The central bank is also an agent of the government in managing auction of Treasury bills. The preparations are under way for establishing an RTGS system.

In short, the Lithuanian payment system illustrates the following issues of interest:

• As the settlement system is based on correspondent accounts, there is the question of the cost of reserves and complexity of multilateral arrangements.

• Mixture of gross clearing and net settlement arrangements is not fully taken into policy considerations. As in other countries that use the same settlement formula, the potential ambiguities and lack of simplicity may be too much for the banking and monetary systems to deal with.

• The system is technologically underdeveloped and had inadequate security provisions.

• Participation of both banks and their branches, as in Estonian case, increases the risks and reduces control and financial discipline.

• Centralised queue management with no guarantee of settlement may be contradicted by the possibility of overnight borrowing, as payment related borrowings may spill-over to overnight borrowings.

Poland

In Poland the reforms started in 1990 when a telex service for large-value payments was introduced. The reforms followed macroeconomic adjustment programme and were aimed at reducing settlement cycle and facilitating monetary policy and control. In

1991, the National Clearing House (NCH) company was appointed. Alongside the central bank, the clearinghouse became responsible for the payment system design and operations. The primary responsibility for the system regulation and supervision, however, remained at the National Bank of Poland. After two years of preparation, in 1992, the first concrete measures were initiated and the NCH was given the task of developing two clearing systems, one for paper and one for electronic payments, both with net settlement. The latter started operation in 1994.

In 1993, the bank accounts were consolidated at the central bank – centrally instead at its 49 branches as before. Thus, the interbank settlement at central bank started. Meanwhile a need for RTGS system has been recognised and the settlement system at the central bank is being gradually improved to function in real-time. Therefore, the payment operations are effected through the three systems: a) "SYBIR" – paper-based DNS clearing system, operated by the NCH[12] b) "ELIXIR" – electronic clearing system, also operated by the NCH, and c) "SORBNET" – large-value intrebank settlement system, operated by the central bank. In addition, since mid 1995, the central bank processes and settles government bills transactions through its automated delivery-versus-payment, book-entry, system – "SKARBNET". Electronic credit transfers are still insignificant and account for about five percent of both value and volume of total payments. Large-value payments are now typically cleared within one to three days. The price of payment services is subsidised, i.e. the participants do not bear the full costs of the services.

Initially, it seems, the objective of the reform was not clearly defined. In eight years there has been several changes in strategies, designs, objectives and systems. This partly reflects the conflict of interest existing between customers, banks and central bank, as well as legal impediments. The slow start and delays were also a consequence of lack of resources and adequate skills. As the Polish case illustrates, a quest for quick results does not favour the execution of the reform and is usually expensive since much work turns out to be unnecessary. With the benefit of hindsight, it can be concluded that a clear vision and strategy can certainly minimise both time and resources required for a new payment system implementation and reduce need for constant changes and conflict among different stakeholders.

Russia

Until 1989, in former Soviet Union's mono-bank system, the State Bank of the USSR was responsible for money and funds distribution, tax collection, credit distribution as well as for keeping all the accounts and making all settlements in the economy. When the financial system reforms started in Russia in the late eighties, as many as 2,500 commercial banks mushroomed to fill the gap in the banking system. It, however, did not create substantial payment and settlement difficulties initially. As the banks usually had no branches and each of them operated in just its respective region (except for the Savings Bank), where they held the accounts at the one of the 80 regional branches of the central bank, the payment operations were settled locally. The payments were in paper form and mostly regional and, thus, bilateral.

Although simple, the payments took up to several weeks to clear. The banks then discovered the potential benefits of free float that resulted from long payment delays and rudimentary payment system. The image of the inefficient payment system was used as an excuse for banks to hold free money. The delays became even longer. In response, the central bank established the system of Cash and Settlement Centres (CSC) and made it compulsory for banks and their branches to pay through the centres. This resulted in a shorter clearing cycle that is by law limited to five days (after that the centres pay penalty rates for delays). The clearing was still mostly regional as poor telecommunications and computer network prevented both fast and truly nation-wide electronic payments. The establishment of the paper-based payment system has been followed by incremental introduction of electronic payments with the ultimate aim of creating a national centralised RTGS system.

The process, however, is burdened with many problems and considerations and, as in China, is a substantial undertaking. Vast distances, eleven time zones, remote scarcely populated places, poor telecommunications network, lack of interbank communication system and inability of some customers to initiate payment orders in an electronic form are the obvious ones. Also, the costs of transferring data are high as consequences of both high demand and poor infrastructure that require state-of-the-art solutions. As there is a demand for improvements, not only because the central bank pays huge penalty rates for clearing delays, there is no time to wait for improvements in the overall telecommunications infrastructure. Thus, the central bank has started building its own "VSAT" network, based on satellite technology. The first satellite, owned by central bank, was launched in late 1997 and should have started operations in late 1998.

There are, however, certain changes that need to accompany the reform of the system to start operating efficiently. Firstly, the legal framework is inadequate for electronic payments, and the authenticity of electronic documents is currently hard to prove in courts. Secondly, operating procedures need to be aligned with electronic payments as they are designed for paper-based payments. Thirdly, the computer infrastructure of the central bank needs to be improved. And fourthly, there is a problem of excess employees coupled with lack of skilled staff. Moreover, the changes are opposed within the central bank's system from both employees and some managers.

The Russian payment system reform provides certain lessons and raises a few questions.

• First, the Russian case is a good example when and why *a central bank can take the leadership* in payment systems development and provision. It seems that the banks do not trust central bank's announcements and policy consistency, i.e. the credibility of central bank is seriously undermined. On the other hand, the central bank does not trust the banks to be capable of implementing socially optimal solutions. Furthermore, banks showed hostility towards each other and no willingness to co-operate. Moreover, there is lack of financial discipline, an immature banking system, and financial and debt crisis in the country. According to the central bank and foreign observers, the banks have shown no risk awareness. Regardless of whether some of this is the central bank's own making or not, in those circumstances one may argue the case for more formal involvement and a regulatory rather than co-operative rout.

• Second, notwithstanding the mentioned circumstances, there are the questions of: a) *the right balance* of the central bank's involvement and private initiative (especially regarding the potential retardation of market forces), b) *costs*, i.e. use of public funds and deciding on priorities, and c) measure of involvement of the central bank in retail payments system development. In general, can some of the objectives relating to trust, discipline and risk reduction be *achieved through proper regulation and/or supervision* instead of operational involvement and huge public investing? These issues are particularly sensitive when a market-based financial system is in its infancy.

• Third, the decentralised system with different standards in its 90 clearing centres (some gross, some net, some RTGS); regionalism and strong autonomy tendencies of the regions; accompanied by the popular preference/inertia for centralised services provision, have all contributed to the choice of centralised, nation-wide, RTGS system by the policy-makers. However, in terms of costs, potential bottlenecks, mistakes, overuse of capacity and system breakdowns, it might have been more effective to implement so-called 'interlinking' solution as for EU TARGET, whereby a particular local RTGS system could be located not on a regional but, for example, time-zone basis. In light of the current practice, for example, with 90 percent of payment orders being sent just before the closing time for payments, the technical robustness of the centralised system will be put on test sooner rather than later.

Slovak Republic

The National Bank of Slovakia is by law responsible for payment system co-ordination, integrity and effectiveness. The central bank is the majority shareholder in the Slovak's National Clearing Centre (SNCC), an automated clearinghouse, which provides settlement services for all payments[13]. The clearing is gross but the settlement is not real-time. There are about thirty banks participating in the system and Bratislava Stock Exchange and Authorisation Centre of Slovakia (card payments clearing company) as indirect participants. The transactions processed by the system are either credit transfers or debit orders (collections). There is no discrimination between large and small payments. The system also clears cheques.

The system works on a 24-hour operating cycle and participants can send and receive payments for 21 hours while the remaining time is reserved for necessary processing and system maintenance. The final settlement takes at most t+3 days. The system processes 560,000 transactions on average a day and on peak days up to one million transactions. The average value of a payment order is about 250,000 Slovak Kronas. Since 1993 the average annual growth rate of the payment orders volume is about 20 percent. Approximately 110 million transactions were processed in 1997.

The payments are cleared on a gross basis, meaning that only if there are sufficient funds available to cover payments can the orders be executed. Otherwise, the payment orders are placed in a queue until sufficient liquidity has been achieved. The payments are processed on FIFO principle or rejected at the end of the day depending on funds availability. Banks are required to keep minimal balances on their settlement accounts that are equal to required reserves balances held at the central bank[14]. Banks can

monitor their balances either electronically by using interbank communication system or by telephone. The sources of additional liquidity available to banks are interbank money market and sale of eligible securities to central bank as part of the bank's open market operations.

There are a couple of points about the Slovak payment system that may indicate a non-optimal system design.

• First, one may wonder why there is a gap between clearing and settlement (instant clearing if funds are available versus three-day settlement). According to the central bank information, and given the fact that the payment orders are checked for available funds each time, it is not a matter of technology, even though the technology may need to be improved. It leaves the payment system design/procedures and legal arrangements exposed to criticism. There are certainly risks and costs that arise from the gap and the queuing arrangements. These relate to possible gridlock and inability of the system participants to rely on incoming cleared payment orders.

• Second, it seems that the system functions at its peak capacity (over 400,000 payments a day initially envisaged) and that the capacities are not used rationally. There is a practice of stopping clearing day to process high priority orders[15].

Slovenia

Slovenia has the same payment system background as Croatia and FR Yugoslavia. The payment operations are handled by the Payments Agency directly, without the banks' 'intermediation'. The system functions as end-of-day gross settlement system. Paper-based credit transfers dominate the system and account for about one half of the total volume of processed payments and over 90 percent of the payments value.

The reforms are aimed at transferring the banks' accounts at the central bank and making banks main payment services providers. However, not all banks will participate as the large-value payment services providers. RTGS settlement of interbank payments is to start soon, after extensive preparations. Also, progress has been made in the area of subsystems of low-value payments' clearing, transfer of companies' accounts to banks, public finance and tax collection and changes in payment statistics.

Coincidence or not, the Slovenian payment system reforms and system design resemble those of Croatia and Yugoslavia. The main remarks about Croatian payment system also hold true in the Slovenian case. Some of the payment system design aspects are analysed further in the analytical chapter on Yugoslav payment system.

What is different, however, is the state of these economies and their financial systems in particular. Thus, Slovenia has more favourable macroeconomic environment and political stability than other former Yugoslav republics. Also, Slovenia is a small monetary economy both in terms of territory and population and its payment system reform may be a much smoother undertaking as compared to some other countries.

On the other hand, what may test efficient functioning of the new system is low private ownership both in banks and economy as a whole and possible continuation of 'good-old' relationship between 'social' sector and non-privatised banks. Moreover, there are restrictions on foreign banks' participation and foreign investments, as

compared to the other advanced transitional economies, which may mean reduced pressure on financial institutions to compete and function efficiently.

However, notwithstanding the pressures on Slovenia to privatise and relax the capital flow regulation by foreign investors and institutions, as well as the potential risks of non-privatised banking sector, the policy makers seems to have done a good job so far. Slovenia was able to control the influence of capital flows on domestic inflation and liquidity, alleviate the effect of the international emerging markets crisis, and carry on with the reforms. Nonetheless, the policy makers are faced with a choice of selecting an adequate policy for the future in relation to Slovenia's aspirations towards joining the EU and its competitiveness in the international capital host market.

Yugoslavia[16]

In the early 1996, the national clearinghouse responsible for the payment system operations, became an integral part of the National Bank, formally retaining only its financial and tax control functions, and the banks opened new accounts at the National Bank for that purpose. However, banks still need to readjust their human and technical recourses for the new role. In view of that, it is allowed that what was known as SDK, performs payment operations during the transition thus utilising its good human recourses and technical facilities. The year 2000 was announced as the deadline for the transformation.

One can note that the payment system in Yugoslavia was: a) synonymous with the clearinghouse and b) not only a channel for payment transactions (as it was designed as non-profit institution) but also a powerful and profitable system. As the clearinghouse built its power on its monopoly, the occasional improvements in efficiency were the result only of constant political pressure from the users (companies) and potential competition (banks). On the other hand, because of the centralised organisational structure of the payment system, the investments and improvements benefit all the participants and the system as a whole. By the same token, however, the organisational inefficiency and internal optimisation strategy negatively affect the whole of the payment system.

During the past five years the banks have put a lot of pressure for total abolition of former SDK because of both the frustrations of the past, when SDK had monopoly over the payments, and costs charges and fees that go to the institution. Therefore, beside the issues of efficiency and costs, the banks had a hidden agenda of taking a slice (if not the whole) of the payment fees cake for themselves. Eventually, the debate about the payment system became a battle about who should run it. With the loss of the deposit base, due to the drastic decrease in savings, and bigger importance and potency of transaction money the stakes became higher for the banks.

In summary, the main characteristics of the payment system reforms are:

- Late start.
- Delays and lack of political will for carrying out the reforms.
- Non-systematic approach and ad-hock changes.

• Non-reformed banking and financial system as a hindrance for, and/or danger of, banks becoming the main payment services providers.

Box 1 – OVERVIEW OF THE PAYMENT SYSTEM DEVELOPMENTS IN SELECT GROUP OF CIT

Bulgaria	**China**	**Croatia**
• Strategic approach to the payment system reform, aimed at establishing RTGS system from the outset of the reforms. Late start though. • System operated jointly by central bank and commercial banks. • The economic instability and banking and legal system infrastructure are the major impediments to the reform.	• Incremental changes aimed at improving speed and choice. Sluggish progress. • Centralised approach towards establishing an RTGS system for large-value payments and an electronic netting system for retail payments by the year 2000. • Payment float and lags are still substantial.	• Large-value payments operated by the Payment Agency on a net settlement basis. No bank participation. • Aims of the reforms are to transfer the large-value payments at central banks books and establish an RTGS system by I-Q 1999. • Dominant state ownership of the banks. No changes in the banks' management structure
Czech Republic	**Estonia**	**Hungary**
• Established (RT)GS system. • Leading role of the central bank. It also regulates payment system and keeps banks settlement accounts. • No overdrafts permitted; queuing arrangements. • Obligatory participation of all commercial banks. • Delays and risks in the payment system are the banking system borne.	• Bilateral interbank settlement. Multilateral netting at central bank accounts for only 1/3 of payments. • No distinction between inter-bank and retail payment orders processed by the central system. • Aiming towards an RTGS system for LVTS by the end of 2000.	• Deferred gross settlement. End-or-day settlement but 'good-funds' required prior to payment orders. Queuing facilities offered. • Took long time to develop. • Ambiguities regarding small value and large value payments; and liquidity provision and risk reduction. • Project to develop an RTGS system.

Box 1 – OVERVIEW OF THE PAYMENT SYSTEM DEVELOPMENTS IN SELECT GROUP OF CIT (CONTINUED)

Lithuania	**Poland**	**Russia**
• Designated time settlement through the banks' correspondent accounts with the central bank. Twice daily. No daylight overdrafts. Queuing optimisation. • Participation ambiguities. • No on-line liquidity monitoring by the banks. • Use of open public network, PCs and e-mails raise the questions of the security.	• No clear strategy and/or consensus among the stake-holders resulted in long delays and inefficiencies in the new system design and functioning. • Reliance on manual processing and use of fax and telex. • Towards the establishment of an RTGS system, with no queuing or guarantees.	• Decentralised system, long delays and poor discipline. Some 90 settlement systems across the country. No standardisation. • Poor regulation and supervision. • No risk sensitivity at banks. • Efforts towards centralised orders processing versus poor technical infrastructure and vast distances.
Slovakia	**Slovenia**	**Yugoslavia**
• Single clearing centre – independent legal entity; but central bank is a majority shareholder. • Gross clearing with queuing arrangements. Long settlement. • Use of capacities can be rationalised. • Aim to establish an RTGS in order to get connected with TARGET.	• The same payment system's background as for Croatia and Yugoslavia. • Extensive work towards the establishment of an RTGS, including improvements in payments standardisation and statistics. • Aim to connect to TARGET. • Sound economic and financial fundamentals. • Low private ownership.	• The same payment system past and plans towards establishing an RTGS systems as in Croatia and Slovenia. • Many postponements and delays in the new payment system implementation reflect lack of consensus and unstable economic and political environment. • Non-reformed banking.

5. Payment system in monetary economy in CIT

The experience of transitional countries with the payment system reforms provide illustrative examples of both positive and negative influences that payment system, and monetary policy and control, have on each other. As a rule, payment system changes were initiated to support new monetary policy and banking system platforms. However, the payment systems and monetary policies were not always compatible or without frictions.

The 'conflict' was a reflection of one of the following factors or their combination:

1. Lack of payment system reform to support monetary policy reform or measures.
2. Lack of payment system development strategy.
3. Lack of control over payment system by the monetary authorities.
4. Lack of consistency in monetary policy measures and/or turbulent macroeconomic environment.
5. Lack of understanding how payment system influences or complements monetary policy and vice versa.
6. Lack of consensus or minimal co-operation between parties involved and/or political will.
7. Lack of resources and/or necessary skills for payment system development and operations.

As discussed, the influence of payment system on monetary policy, and vice versa, is either from money supply or money demand side and it manifests itself through:

- Demand for settlement reserves by banks and resulting systemic risk and liquidity provision considerations.
- Positive or negative payment float.
- Speed and reliability of transfer of monetary claims.
- Choice of monetary operations instruments dependant on payment technology.
- Potential 'spill-over' of intraday credits for payments into overnight borrowings.

Overview of the findings is presented in tables 2 and 3.

Table 2 – POTENTIAL AND REAL INFLUENCE OF PAYMENT SYSTEM ON MONETARY POLICY AND VICE VERSA

Country	Clearing and settlement risks	Payment system costs	Payment float	Slow and/or unreliable transfer of monetary funds	Limited choice of effective monetary instruments	Spill-over of intraday into interday borrowing
Bulgaria	✓			✓	✓	
China	✓		✓	✓	✓	✓
Croatia	✓				✓	✓
Czech Rep	✓			✓		
Estonia	✓	✓			✓	
Hungary	✓	✓				
Lithuania	✓	✓			✓	✓
Poland	✓	✓	✓	✓	✓	
Russia	✓		✓	✓	✓	✓
Slovakia	✓	✓		✓	✓	✓
Slovenia	✓				✓	✓
Yugoslavia	✓		✓		✓	✓

Table 3 Examples of payment system and monetary policy relationship in the CIT

Country	No (timely) payment system reform	Lack of payment system strategy initially	Autonomous payment system functioning	Ineffective monetary policy	Did not understand the relationship	No co-operation or political will	Lack of resources and/or skills
Bulgaria	✓			✓	✓	✓	✓
China		✓			✓		✓
Croatia	✓	✓	✓	✓			
Czech Rep		✓				✓	
Estonia		✓		✓	✓		✓
Hungary		✓			✓		
Lithuania				✓	✓		✓
Poland		✓	✓	✓	✓		✓
Russia	✓					✓	✓
Slovakia		✓		✓	✓		
Slovenia	✓		✓			✓	
Yugoslavia	✓	✓	✓	✓		✓	

Bulgaria

Bulgarian economic reforms, aimed at transition towards market-economy, were characterised by inconsistent macroeconomic polices and delays. The industry, especially manufacturers and exporters, were slow to adjust to the new economic reality and the loss of 'eastern-block' markets. The privatisation of state-owned enterprises, as well as banks, was partial, slow and was missing the political will to support it. Poor performance of the economy and banks' lending decisions were reflected in the banks' balance sheets, where the bad debts resulted in liquidity crisis that became insolvency crisis and finally resulted in run on banks in 1996. The loss of confidence in banks was accompanied by high inflation and substantial currency devaluation.

At the same time, the central bank was trying to accommodate the demand for additional liquidity but, as the credits were not covered by collateral, the proportion of unsound financial assets at the banks only increased. The non-privatised banks expected and asked for credits from the state – the owner, and the central bank was there to provide. The money was then poured back into loss-making state-owned enterprises but they were unable to put it to good use but used it for life-saving 'one-off' infusion(s) to pay out the wages and produce more non-selling goods. The financial authorities had also resorted to bailing-out distressed banks, but the interventions resulted in perpetuation of the problems. Thus, a systemic risk became moral hazard problem, which became systemic crisis.

According to the central bank, open market operations and setting of basic interest rates have become main monetary policy instruments since 1994. But, as the central

bank's policy was ineffective in stopping inflation, the interest rates were inflation led and were getting higher and higher. The high interest rates did not compensate nor stimulate savings, because of the high inflation and inflation expectations, but made harder for debtors to service the debts.

How does the payment system fit in all this? Almost all of the previously mentioned generic factors exercised their influence on the relationship between the monetary policy and payment system in Bulgaria from 1991 to 1997. As the introduction of new payment system started only after the full blow of the financial crisis was over, there was no adequate payment system to support the monetary policy based on interest rate setting. Without an effective payment system there was no efficient interbank money market and fast distribution of money to reduce pressure on central bank as well as to enable better liquidity management and investment opportunities. On the other hand the monetary policy and economic environment would not have been a match even for the latest payment system technology, as the crisis was deeply rooted in the financial system itself.

In summary, the relationship between the payment system and monetary policy in Bulgaria from 1990 to 1997 was manifested through the following:

• First, the demand for settlement reserves was blurred by the demand for liquidity and actual insolvency. They were blended together and there were no procedures, or payment system for that matter, to discriminate between the two.

• Second, the actual debt-servicing difficulties and illiqudity were thus indistinguishable from payment delays. Also, payment system inefficiencies could easily hide behind the overall economic depression.

• Third, the payment system was inadequate to support the new monetary policy instruments as it was not quick or reliable enough. In the given circumstances, effective and efficient interbank lending was also impossible without a state-of-the-art payment system.

• Fourth, the Bulgarian case vividly illustrates place and importance of a payment system in a monetary economy. There is no use of high precision electronic tools (say the latest payment system technology) in mending simple mechanical instruments (ineffective monetary policy). A good tool cannot compensate for poor maintenance or unskilful use of the instrument or for an inadequate instrument. Furthermore, a bad tool is a bad tool, no matter the instrument.

China

A decentralised organisational structure of approximately 2200 central banks' local clearing houses, three-level hierarchical intrabank clearing and mainly paper-based payment instruments and processing procedures have all resulted in an extremely large and variable payment float in the Chinese system. The net positions of bank's branches and local clearing houses were settled only periodically – after one to five days. Moreover, the payments were being finally settled at the central bank's books only once a month. The central bank did not provide intraday overdraft facilities but there is a central bank's guarantee in case of settlement failure.

The new, satellite-technology based, system that should go live by the next millennium provides for faster electronic clearing of payments and more centralised processing procedures. Thus, the system will no longer differentiate national from local payments and inter-bank from intra-bank payments. Given the high level of required reserves and the absence of mature money market, the central bank intends to provide intraday credit to the participants in the system. The overdrafts will be acceptable within a given limit, but no 'spill-over' into overnight borrowing will be allowed. The central bank will charge for the credit. Also the banks' and branches' accounts will be consolidated into just one settlement account at the local clearinghouse for each bank.

From the monetary policy perspective, there are a few illustrative observations for both 'old' and 'new' payment systems.

• Firstly, in the current system there is a clear conflict between efficient market oriented banking system functioning and long payment delays and large float. It could be argued that the real competition in banking and liberalisation of the financial system are still missing and that these are the main obstacles for the efficient banking system. However, inefficient payment system prevents both inter-regional banking competition and active liquidity management of profit oriented banks. On the other hand, monetary policy has to be able to reduce and to control the amount of float, which becomes a more serious matter in a market oriented competitive environment. In a monobanking financial system, with accounting instead of payment flows, the float may not matter significantly but in a market-oriented system it is certainly an issue. The main 'technical' problem may be that the new electronic 'intrabank' system is procedurally and organisationally just the electronic versions of the old 'paper-based' system.

• Secondly, the regional banking and clearing structure, as well as the decentralised banks' accounts, make banking supervision more difficult. Financial discipline and particularly monetary policy effectiveness suffer form the segmented and complicated organisational structure. Financial institutions cannot manage their daily liquidity effectively as the autonomous flows from local branches may contradict bank's overall cash flow/reserves position. This increases pressure and dependence on central bank's provision of liquidity and, thus, payment risks. Centralised electronic payment system and consolidated bank accounts are likely to change that and contribute to the financial system upgrade.

• Thirdly, given the banking system structure with only four major players who have their 'in-house' national clearing on net basis, the central bank would not have as much control over the payment flows as it would like to should the banks become more independent. It has been estimated that about 2/3 of non-local payments volume is cleared through the clearing systems of the respective banks. Therefore, the considerations include whether the banks will become independent systems within the system and will the central bank have the power and the skills to prevent monopolistic tendencies and preserve financial discipline. In the case of non-competitive oligopoly in an immature banking system, it may be difficult for the central bank to carry out consistent and effective monetary policy and to be free of the influence of major players (not to give in under 'systemic risk' liquidity requirements from banks). Moreover, banks may have no incentive to speed up the payments and reduce free float. These

issues will be a considerable treat to the central bank's authority if the loosening of the Bank's grip and more liberalised financial arrangements in the system are not accompanied with the encouragement of competition and effective supervision and surveillance.

• Fourthly, the central bank's provision of liquidity in the new systems, i.e. guarantee of payments may induce 'moral hazard' problem because of the strength of the major banks. Thus, unless there is a timely and effective supervision of banks, the caps on intra-day borrowings and fees for credits may be inadequate measures to prevent 'spill-over' into 'inter-day' credits.

In conclusion, it seems that in the new Chinese payment and monetary system, the relationship between the central bank and the commercial banks as well as the effective supervision and surveillance are key to efficient, risk-less, payment flows.

Croatia

In former Yugoslavia, and in almost all of the newly formed states after their independence, the payment system was a separate organisational and functional entity, independent from the banks and the central bank. Thus, the former Social Accountancy Service, and newly re-named agencies and clearinghouses that were created from its operational units in the respective republics, had control over payment float and were able to create 'quasi-deposits'. Although non-deposit institutions, the clearinghouses held (giro) accounts for all enterprises and banks for payment purposes and were able to prioritise between the payments of different parties and decide on speed of payment orders processing. The services provision monopoly and close ties with local governments, for which they collected taxes, made the clearinghouses (before the break-up of the country and the Service itself) even more detached from the central bank and commercial banks.

Just before the break-up of former Yugoslavia, the regional clearinghouses of some republics were caught red-handed when they started creating autonomous monetary flows, i.e. granting liquidity and effecting payments not covered by their customers giro account balances. It is assumed that the created revenues were transferred to the republic's budgets for whatever purposes. The central bank at the time was thus surpassed as a money-creating authority and was forced in some cases to sell foreign currency reserves in exchange for the newly created money because of the internal convertibility of the currency at the time.

In the newly formed states – including Croatia, as the both central banks and the clearinghouses were under the direct control of the respective governments, the monetary authorities were finally put in charge of the payment and monetary systems. Thus, in Croatia, the payment system is being reformed in line with the reform of the monetary and banking systems, whereby the central bank holds the settlement accounts and controls monetary flows and commercial banks are the main payment services providers.

However, the queuing facilities in the new RTGS system and bimodal processing of queuing orders, as discussed, can under certain circumstances create gridlock and/or

enhance liquidity risk. Therefore, the system may resemble a DNS rather than an RTGS system, hence different monetary policy considerations.

In summary, the case of former Yugoslav republics, including Croatia, illustrates the importance of payment system and monetary policy co-ordination and of determining the ultimate authority for both. It is also an example of payment system potency and importance, as recognised by the policy makers in the respective former-Yugoslav republics both now and in the past.

Czech Republic

The Czech National Bank owns and operates the only, national, LVTS settlement system. It is also involved in retail payment systems development and cheques clearing. In addition, the central bank took the leadership in E-money institutional framework establishment and debate. The Czech Payment system reform is an example of timeliness and strategy and central bank's leadership and involvement, and consequently monetary policy co-ordination. The reform was a part of thorough restructuring of the economy as a whole.

However, the reforms, and overall financial system were not problem-free.

• First, there are the questions of measure of central bank's involvement, type of involvement, and the scope of involvement. Apart from the immediate cost-effectiveness implications on public finances, the central bank's involvement raises a range of long-term policy implication issues. These include private markets development and competition, as well as the private initiative. Also, would the separation of supervision and operational involvement in the payment system benefit the Czech banking system in terms of human and financial resources allocation across the system? When is the right time to pull back from the operational involvement and supervise, and when is the time right to limit the central bank's involvement? An illustrative example of potentially negative consequences of the central bank's involvement is the E-money initiative. The provisional rules and policy guidelines, that approach the issue from the risk-to-the-central-bank point of view, may kill the E-money schemes before they even started in The Czech republic.

• Second, the five largest, still predominantly state owned, problem, banks account for 90% of payments volume and value. The situation exaggerates potential gridlock and moral hazard or systemic risk problems, i.e. there is a threat that a crisis in banking system can both spread fast through the payment system and affect the payment system functioning. The banking and financial system problems reflected, inter alia, in shortage of liquidity, put the payment system and monetary policy consistency at test each time there are no sufficient funds for a large-value payment execution. Furthermore, a concentrated system (with, say, a few dominant large banks) with underdeveloped money market and non-restructured banking system, allows banks with larger market share to drain the liquidity from the system and/or obtain the funds easier than the other banks. Thus, for example, there may be a situation whereby insolvent but liquid banks are the pivots of a payment system. The sooner the future of the institutions and policy actions regarding the issues become transparent the better.

• Third, the Czech 'RTGS' payment system still cannot claim the RT in its name as the payment orders are not cleared or settled in 'real-time'. A gradual on-line connection of banks to the system is nonetheless progressing. In addition, one may argue that the queuing and payment monitoring arrangements make the system less RTGS than the policy makers have made provisions for. As there are different priority levels assigned to each payment order and on-line payment monitoring by the banks, the system can be affected by similar risks as a DNS system. Namely, a party may rely on incoming payments and send a payment order in a queue to be settled when the incoming payment arrives. Although the central bank has been careful not to assume these risks on itself, the banking system characteristics and potential systemic crisis may force it to do so eventually.

Estonia

Since the 1992 monetary reform, monetary policy in Estonia has been based on the currency board system whereby the "Estonian Kroon" is pegged to German Mark. The domestic currency is freely convertible and the exchange rate can only be changed by the approval of the Parliament. Therefore, the money in circulation has to be fully backed by foreign currency reserves. The principle holds not only for the base money but all Eesti Pank's liabilities and guarantees provided. Thus, the use of other monetary policy instruments, including short-term interest rates, is limited. Under the circumstances the credit institutions' liquidity management is effected through their foreign-exchange reserves. In turn, the central bank's monetary policy is almost entirely effected through the "forex" market. However, in order to minimise the effect of international capital flow risks on system liquidity, the central bank introduced additional measures to strengthen the domestic 'liquidity buffers'.

The most significant step was taken in mid-1996, when reserve requirements were allowed to be used for payment purposes. Moreover, the central bank pays interest on excess reserves (over minimum required reserves). The other liquidity buffer was the inter-bank money market, which, however, have had limited impact on the system's liquidity. The banks found it hard to rely on the highly volatile market that is also dependent on the overall liquidity position of the market determined by external reserves fluctuations. In late 1997, the central bank enforced provisional additional liquidity requirement, which was 3 percent of the reserve requirement base. Also, the interest paid on excess reserves was increased to be equal to The German Bundesbank's discount rate.

Introduction of the Estonian monetary policy framework has had specific payment system implications. The potential and real influences of the payment system on monetary system in such circumstances are also evident.

• First, the currency board arrangements determined the choice and use of monetary policy instruments. As the system's liquidity depended on foreign exchange reserves balances and transactions, the banking system liquidity management was constrained to the foreign exchange market. Great fluctuations in overall liquidity, due to the mobility of capital and system arrangements, also shifted the responsibility for

liquidity management to the financial intermediaries. Under the circumstances, from the banks' point of view, the deferred net settlement system provided an optimal payment system solutions regarding the liquidity provision and smooth functioning of the system. Thus, the fixed foreign exchange rate and currency board catered for low inflation and interest rates, and the DNS system contributed to reduced need for liquidity/reserves.

• Second, from the system point of view, the DNS system, as well as the monetary policy measure to allow the balance of deposited funds over borrowed funds with foreign institutions to count towards banks' reserves, made the system exposed to both liquidity and credit risks. The settlement uncertainties and possible unwinding are the price to pay for 'increased liquidity' provided through a DNS system, even more so when the system is not adequately protected.

• Third, the currency board arrangement increases the probability of a run on local currency in case of both internal and external disturbances to the system. Reliance on external liquidity makes the system prone to the attack of speculators. Also, as the central bank cannot manipulate interest rates effectively it cannot create a credit crunch in order to deter the speculators. In the system dependent on the level of foreign currency reserves in such a way, all is well while the confidence and other macroeconomic indicators are favourable to the system. However, if the table is turned, the impact capital flee can be devastating for the immature banking system, especially as the central bank has little space for manoeuvre. For example, the loss of confidence in emerging markets as a whole in 1998 resulted in substantial withdrawals of investors from the local market.

• Fourth, there were other payment and monetary policy arrangements that provided a counterbalance to the threats. The central bank did not provide the intraday credit for payments that can be potentially used for an attack on the currency. Also, the required reserves regulations contributed towards liquidity management for payments in the immature banking system. Furthermore, the central bank paid interest on reserves, thus preventing reserve requirements evasion and stimulating creation of the liquidity buffer. What was ambiguous, however, was charging a penalty for the use of reserves for payment purposes during a period of system reforms. Moreover, it is unclear whether the policy makers have accounted for the potential influence of sale of eligible assets, namely central bank's certificate of deposits, in case of currency attack, as there are no 'haircuts' on the securities.

Hungary

In line with the leading role of the central bank in the payment system reform is the formal oversight policy and risk reduction measures. The central bank does not provide liquidity nor guarantee and thus has no risk exposure. The additional liquidity is available for pledge of securities at the central depository institution, i.e. the overdrafts are 'collateralised'.

Nonetheless, for a long period since the reform started, the Hungarian payment system arrangements did not take payment system risks and costs into account.

Firstly, although the payee banks have the information on payments pending in the queue they cannot assume that the payments will be settled. Thus, even though the clearing is on a gross basis, which is supposed to eliminate the *credit risk*, the system is prone to creation of liquidity, and consequently credit risks, because of the deferred settlement system with little additional risk provisions.

Secondly, also related to the settlement arrangements, the FIFO processing of payment orders was clearly prone to gridlock, not less so because there was no intraday liquidity credit facility. Furthermore, as the payment limits are set at the beginning of the day, based on the amount of reserves, the participants had to rely on overnight borrowing for payment purposes and had no intraday flexibility in raising additional liquidity.

Thirdly, the cost of reserve requirements and gross settlement that the banks incurred in the system with no efficient money market were, thus, not fully appreciated by the central bank.

In summary, settlement delay – gridlock and a possibility of 'unwinding' can occur in a 'gross' system if the settlement is not immediate, i.e. real-time. The combination of deferred settlement and full cover for payment orders (gross clearing), denies the participants the advantages of both reduced liquidity requirements of a net clearing system and elimination of credit risk in a gross settlement system. It may be good as a temporarily measure aimed at introducing financial discipline but is certainly unsuitable for advanced clearing and settlement in an economy. The gap created, coupled with the non-discrimination between transactions, complicates the liquidity management of the participants and functioning of the system. Also, in view of the inadequate queuing arrangements, an ambiguous, hybrid, payment system cannot be treated as a tailor-made solution.

Some of the mistakes, however, were made due to the lack of precedents and consensus on the system design in the payment system theory and practice at the time when the reforms started. Furthermore, the existing system technology can be transformed so that the new system is not built from scratch, there are established rules and discipline in the system and the reform as whole can be viewed as a natural progression and a learning process.

Lithuania

As in Estonia, the currency board was resorted to as a monetary policy anchor in Lithuania. The Lithuanian policy makers, however, become to view these arrangements as 'a ball and chain' that holds them back from pursuing more adequate, up-to-date, monetary policy and 'sailing' towards EU harbour. The changes introduced in 1997, however, have had to be gradual, because the policy has been associated with low inflation, stable macroeconomic conditions, and confidence in the system.

The main points about the Estonian reforms apply to the Lithuanian case too. Thus, among other things, commercial banks were required to keep required reserves at the bank of Lithuania[17] which provided necessary liquidity management flexibility into the system.

Nonetheless, the constraints of the currency board arrangements became evident during the banking system crisis when the central bank was unable to help otherwise solvent banks with the liquidity credits. Thus, according to the central bank, the crisis spread from insolvent to illiquid but solvent banks. This, however, was due in part to the lack of focus and separation between banking supervision and monetary policy functions from the central bank's side.

The Lithuanian experience shows that: a) central bank's lender of last resort function is invaluable in an immature (transitional) market in case of the systemic crisis and b) there is a need for additional liquidity facility other than interbank money market. During the Lithuanian banking system crisis the money market stopped functioning and there was a run on the banks. It is also evident that the banking system supervision and surveillance were not up to the task and that there is a clear role for ex ante policy measures and/or system arrangements. The payment system arrangements, as described in the previous section, only increased the risks without contributing to reducing required liquidity for payments.

Poland

Payment system reform in Poland, part of broader monetary system reforms, was aimed at increasing the reliability and speed of payments to support a market-oriented monetary policy. The reforms, however, were far from frictionless and are illustrative of the payment system and monetary policy relationship in a transitional economy.

Firstly, as illustrated by frequent design changes and implementation delays, there was no clear payment system development strategy and the payment system was not up to the task of reducing payment float, uncertainties regarding timing and execution of payments, i.e. supporting the reformed monetary policy.

Secondly, this was partly a reflection of lack of understanding of the relationship between the payment and monetary systems. The payment system risks and inefficiencies only became an issue after the major payment frauds in 1991.

Thirdly, the incompatibility of monetary policy and the payment system during the first few years of the reforms was also a consequence of lack of adequate resources and skills that needed to be accumulated first.

In terms of the influence that the payment system had on monetary policy, and vice versa, the following characterises the Polish experience.

- Before the reforms, and for some time into the reforms, there were the problems of substantial and erratic payment float as well as the long and unreliable transfer of monetary claims[18]. According to the central bank, the transition to a two-tier banking system transformed an internal float between the central bank's branches into a float involving different institutions. Consequently, the technical difficulties and the lack of competition between the newly formed state-owned banks resulted in long payment delays. The payment transactions took on average about one to two weeks to be completed during the period 1990 to 1995. The central bank's ability to control the float was further limited by the decentralised organisational and accounts structure at the central bank.

• From the system/central bank's point of view, credit float exceeded the debit float, i.e. on average the payee bank's account was debited before the payer bank's account was credited. Therefore, the central bank held large values of funds on its books. There were, however, both credit and debit float present in the system. The float was both large (about 10% of reserve money on average) and variable. The central bank found it hard to set the size or the direction of appropriate monetary operations because they were unable to forecast demand for bank reserves, money and credit aggregates. Therefore the liquidity risk was significant.

• The introduction of new payment system in 1994, resulted in a decrease of credit float over debit float in the central bank/commercial banks relationship. The increased liquidity, however, was not extended to the banks' customers and there was an excess of credit float in the bank/customer relationship. The lack of competition and, partly, inadequate regulatory framework enabled banks to benefit from the free float.

• At the same time, the required reserves were set high at about 20 percent of the eligible assets and banks were allowed to use them for payments. This, the mentioned banking practice and the consequently increased speed of payments to a few days, all resulted in excess liquidity of the banks. The banks were unable to put the money to better use than to invest in government securities.

In summary, both the payment system and monetary policy had a negative influence on each other. The payment system arrangements, with dominant manual procedures and the predominant use of fax and telex, prevented the central bank from measuring the demand for settlement reserves and thus assessing the risks created by the payment system. Also, the monetary policy could not rely on the system to transfer the monetary claims in a fast and reliable fashion. Furthermore, the choice of monetary policy instruments (especially indirect ones) i.e. their effectiveness was, therefore, limited. On the other hand, it was a duty of the monetary authorities to set up the framework and decide on what would they prefer the system to be like, especially as they had authority over the payment system functioning. For example, the debiting and crediting accounting practice, regulatory framework and system design were all under the central bank's control. In addition, the central bank failed to control inflation, which, for example, in 1996 exceeded 600 percent.

It is tempting to criticise the 'learning by mistakes' process. The costs of the trial-and-error approach could have been mitigated by an adequate system development strategy. However, as noted for Hungary, the countries that lead the transition process were prone to making the mistakes because of the gaps in the theory, lack of precedents and, not least, lack of skills and resources.

Russia

The new fully centralised RTGS system will operate from 4a.m. till 8p.m. Moscow time, in order to function in real-time in all eleven time zones. All the participants will be able to check their accounts and make or receive payments. All the payments will be treated as irrevocable and final. The intraday credit will be provided at no charge but should be covered by collateral. Only the state bonds will be accepted for the purpose.

The intraday credit provision will be automatic upon pledging of the securities, as the National Depository Centre and the settlement centre will be connected on-line. The overall amount of daily liquidity and collateral will be set every day in advance for the system as a whole. If a bank fails to pay back the credit at the end of the day, the intraday credit will become a three-day credit with a penalty rate, which is twice the bank's lending rate.

The central bank should be given credit for the effort put into establishment of the new system and the strategic approach to the matter, even though the real quality of the new system will only be tested once the system is fully operational. There are, however, certain issues that seem likely to emerge in the day-to-day functioning of the system and that may worry the monetary authorities.

Firstly, real-time gross settlement will put a pressure on banks for higher reserves and/or better liquidity management, and thus may result in high demand for additional liquidity from central bank, especially as the money market will take some time to develop. Moreover, the current practice of late payment orders delivery to the system (towards the end of working day) is likely to continue because banks will try to compensate for the loss of intraday incoming payments liquidity. The potential gridlock situation may become a serious matter every time there is increased uncertainty or macroeconomic turbulence (not an unlikely event in Russia), as any bank may fear making the payments first[19]. Also there may be some technical difficulties in executing the concentrated payment orders. These problems will require a) a policy aimed at spreading out the payment orders during the day, say through pricing, b) firm and timely supervision and surveillance, and c) probably a payment optimisation mechanism[20].

Secondly, because the overall amount of intraday liquidity available through pledge of the collateral will be determined in advanced and limited, some banks may drain out all the liquidity for themselves. Auctions, for example, leave the possibility for some large players to corner the market. Therefore, the immediate task is to set up the policy or guidance for liquidity allocation. Possible criteria for the allocation range from the bank's asset size to average payment values, but are potentially burdened with 'side-effects', i.e. discretionary decisions or flexibility restraints.

Thirdly, as there is no charge for the intraday credit, the central bank should consider the introduction and daily revision of 'hair-cuts' on the collateral to account for potential fall in value of the securities. For example, the state bonds will be significantly reduced in value in case of political and/or economic crisis, even more so if the central bank wants to prevent inflation or preserve value of the currency by increasing the interest rates. Moreover, a bank's default is more probable in those circumstances which is calling for a significant discount on the collateral in the turbulent macroeconomic environment.

Fourthly, even though there will be stiff penalty rates charged for a spill-over of intraday to interday borrowing the central bank needs additional mechanisms to prevent the possibility in case of the system crisis. Therefore, the role of supervision of financial institutions is both significant and critical for the efficient payment system functioning.

Slovakia

Slovak and Czech payment and banking systems share the same origins and, thus, possess similar characteristics regarding payment system and monetary policy relationship. The most significant similarity is the banking system ownership and the assets structure, i.e. dominance of a few large state-owned banks in the system. Therefore, as in the Czech Republic, the best share of the payment orders volume and value is effected through these banks, which are affected by the bad debt and X-inefficiency problems. The bad debt problem genesis is similar as described for Bulgaria, only with less severe consequences to date. According to the central bank, the share of non-performing loans reached over 50 percent of the total banks' credits in 1995 and is still estimated to exceed one third of the credits in 1998.

Therefore, the Slovak monetary authorities should also worry about a potential banking system crisis spreading fast through the payment system and affecting the system as whole as well as the liquidity and competition issues, as described for the Czech Republic.

In addition to the bad debt, system concentration and related issues, a similarly important factor was the lack of consistency in monetary policy and turbulent macroeconomic environment that characterise the system. Thus, monetary policy was simultaneously pursuing two, to a large extent conflicting, goals – money supply targeting, and currency convertibility with fixed exchange rate. Furthermore, the proportion of autonomous money supply (beyond the central bank's control), comprising of net foreign assets and net credits to the government, ranged from 90 to 100 percent of the monetary base. The efforts towards sterilisation of the effect of foreign capital inflow on the money supply were both expensive[21] and, to a large extent, unsuccessful.

As noted for Estonia and Lithuania the influence of capital inflow and outflow have different and serious implications on the monetary system and its relationship with the payment system. Under the circumstances the payment system in Slovakia, described in previous analytical section, was open to liquidity, credit and systemic risks relating to the institutional arrangements and legal constraints. This is partly a reflection of lack of understanding of the payment system/monetary policy relationship as well as lack of skills and resources for developing technically advanced and unambiguous payment system.

The similarities with other countries do not end there. Hungarian payment system was also organised on a gross clearing, batch processing, deferred settlement basis. The remarks regarding the need for increased transparency, simplicity and efficiency of the Hungarian system can be repeated for the Slovak system too.

Finally, as some other Eastern European countries, Slovakia aims at surrendering its monetary policy to the European Central Bank by becoming an EMU member. This is, of course, coupled with the efforts towards developing a national RTGS system.

Slovenia

Slovenia is an open and small monetary economy, prone to exogenous monetary shocks. The ability of the Bank of Slovenia to regulate the exchange rate by sale and purchase of foreign currency is certainly limited. With excess supply of foreign currency through the foreign investments, the central bank was only partly successful in sterilising the effect of the capital inflow on inflation. Pursuit of a low inflation policy, when successful, resulted in restrictive monetary policy and exchange rate appreciation. Relative stability of the monetary system and not very high interest rates were only possible because the central bank had strong indirect control over state-owned banks, which had dominant market share. Also, there were restrictions on the foreign investments and foreign bank entrance. In light of the likely privatisation of the banking sector, pressures for liberalisation of capital flows and preparations of Slovenia to join the EU, it is difficult to achieve both desired level of interest rates and the currency exchange rate stability. For example, should the exchange rate stability become a prime target of monetary policy the interest rates are bound to increase.

In relation to the payment system, the monetary policy and banking system settings in Slovenia illustrate the following issues.

• The central bank's control and involvement in the system as well as concentration of different responsibilities in the central bank should be reviewed against:

a) the implication on the private sector initiative and development,
b) foreign investments in the banking system,
c) the preparations for joining the EU, and
d) the cost-effectiveness of the arrangements.

For example, the central banks' discretion in granting licences to foreign banks was assessed (OECD 1997) as the most important factor in preventing foreign banks from entering or investing in the market.

• Also, separation of supervision and monetary policy functions, i.e. the appointment of another institution for the supervision of the system may be a viable and effective option. This may both strengthen supervision, and help the preparations for joining the EU. For example, the central bank would focus on the monetary policy and its compliance with the requirements for entry into EMU, and the supervisory body would be acting in line with the financial discipline and present and future banking system stability, in line with the BIS requirements. Thus, the payment system would be a) an explicit responsibility of the supervisory body and b) more integrated into the monetary system through the potential reduction of payment risks and costs. If the responsibility for Slovenian monetary policy is handed over to the European Central Bank, the reward for the separation of the functions would be reaped.

• In light of the banking system concentration, ownership structure, bank/client relations, as well as slow privatisation, there is certainly a threat of systemic risk should the main players fail. As banks will become main providers of the payment services the payment system implications are evident. Political considerations have slowed the privatisation and liberalisation processes in the banking sector, but as the processes may be 'externally' driven, completion of banking system restructuring is a matter of

urgency. A sound banking system, clear of bad debts and political lending decisions, with effective ownership and management structure, is the best guarantee of financial stability, favourable monetary policy environment and risk reduction in the payment system.

Yugoslavia

In the previous system in Yugoslavia, the clearinghouse (SDK) – instead of the National Bank – had the control over the amount of float for grants to the banks (as well as to the firms!). Although there were loopholes in the regulatory framework that didn't make the activity illegal, the very activity of SDK undermined the monetary policy and contributed to the hyperinflation. In effect, the institution acted as a financial intermediary, i.e. a credit institution, and, therefore, had perverse incentives and sub-optimal efficiency from the social best-practice perspective. Because SDK had monopoly on payments, the longer the delays the more float at its disposal it had, and the bigger the float the more powerful and profitable the institution became.

On the other hand, 'controlling' for the inefficiency of the payment system, the payment system users built in the prices of goods and services the opportunity costs, which were becoming bigger and bigger as the inflation was becoming a psychological phenomenon. Therefore, as a payee fear that a delay resulting from the payment system itself will help inflation eat up the receipts, the higher the inflation rate the higher the adjusted prices, and the higher the inflation adjusted prices the higher the inflation. It should be stated, however, that the payment system in its own right was not the major contributor to the hyperinflation in Yugoslavia[22].

Among the principle that are, or are planned to be, incorporated into the regulation of the payment system are the following. The first major provision in the regulatory framework and the central bank's policy is the one of tying the ability of the users to make payments to the liquidity of the institutions they have the accounts with. Second, there is no provision of the central bank's guarantee of the finality of the payments. In line with the principles and desire to strengthen monetary control and discipline is also the regulation on the license withdrawals from illiquid institutions.

In respect to the new payment system design principles and the legislation there are a few points to be raised. Although these principles and provisions are not controversial in their own right, there are certain considerations that arise because of them. Firstly, the freedom of choice of a payment operations provider and the parallel existence of the clearinghouse's giro and banks' current accounts systems, leaves the businesses the option not to transfer their transaction balances to the banks to date. If their ability to make payments is tied to the institutions' liquidity, the users will prefer the SDK network and system of accounts, as SDK, by definition, cannot lose a licence as it cannot become illiquid. In 1996, for example, out of 2.6 billion Dinars of transaction money in giro-accounts (on average a day) only 114 million Dinars, about 4 percent, was held at the banks' accounts (Nesic 1996). The lack of trust in the soundness of non-restructured banks will continue to put off the transformation of the payment system.

Secondly, if there is no central bank guarantee of finality of payment transactions, i.e. no overdraft facilities from the central bank, it will be hard to restore trust in banks or transfer the payment operations to the banking system. The provisions appear to be in line with the restoring of financial discipline, but they may hamper the development of efficient monetary system and money market. Although the moral hazard is, therefore, supposed to be reduced to a minimum there is still a constant threat of systemic crisis that inversely influences trust and discipline. The economy with weak firms and many insolvent banks may not be well suited for any queuing system and/or potential gridlock problems, because:

a) There is no efficient money and interbank market to provide liquidity.

b) The system users and their banks will fear making the payments first as there may not be planned incoming funds later in the day.

c) The payees may prefer cash or even barter as the delivery-versus-payment is not ensured because of a possibility that a financial institution, not a payment counterpart – payor, becomes illiquid[23], and

d) Queuing arrangements resemble a DNS system and may not discharge the risks (unless there are additional risk provisions) that are supposed to be eliminated by a RTGS system.

The payment system design, however, should not be confused with the banks restructuring and restoring of the monetary control. Provision of intra-day liquidity by a central bank in a system that efficiently sanctions against insolvent and risky banks wouldn't mean loosening of the monetary discipline. Furthermore, the central bank can limit the risks of daylight overdrafts by charging fees and limiting the overdrafts like, for example, US Fed. Finally, the rationalisation of the number of the banks and establishment of their viability should be a part of a thorough restructuring plan not a by-product of the liquidity control measures and payment system design.

6. Conclusions and recommendations

The analysis demonstrated that the critical elements of a successful payment system reform are its compatibility and co-ordination with the monetary and banking systems' restructuring. Clear development strategy and understanding of the place and role of payment system in monetary economy are the decisive factors for achieving that aim. The major obstacles are the lack of real political will to carry out the reforms and, to a lesser extent, lack of skills and resources.

The central banks played and still play the lead-roles in the respective systems and reforms. The reforms were all top-down initiated and supervised. This has contributed to relatively fast payment systems development in transitional countries, on one hand, and lack of private solutions and systems, on the other.

Therefore, the *main characteristics* of the CIT payment systems are:

- Wholesale payment systems have been dominated by credit transfers due to the 'giro' nature of the systems, emphasis on inter-company payments, and provision of the clearing services by a central national institution (either central bank or clearinghouse).
- There is a clear trend towards establishing national RTGS systems. In European

CIT, especially those that plan to join EU, the process is motivated further by the 'convergence compliance'.

• Monetary policy considerations were the main motives for the payment system reforms. The monetary policy and payment systems compatibility was albeit not achieved in many a cases.

• Given the 'mono-banking' past and monetary policy modernisation impetus and concentration of power, skills and resources in the central banks, it is no wonder that the central banks initiated and led the payment system reforms. The operational involvement of the central banks is still significant.

The *common problems* that CIT are faced with relate to monetary policy/payment system co-ordination, banking and legal system development, improvement of technical infrastructure and encouragement of competition. The public policy implications, thus, relate to how best to achieve overall risk reduction, financial discipline and trust in the system, trading off the policy objectives with long-term and secondary effects on competition, moral hazard and private initiative.

The following *lessons and propositions* for policy makers in Countries in Transition can be extracted from the evaluated payment system reforms and developments:

1. It is very important to get the reform process right from the start to avoid expensive and unnecessary corrections because of both very limited resources and potential opposition to the reforms. The first major step is to *determine objectives and priorities* of a payment system reform and how it fits with overall banking and monetary systems and/or reforms. A clear payment system *development strategy,* compatible with the present and/or envisaged monetary policy, will help the policy makers reap the reward for being involved in the payment system design.

2. If the objectives of the payment system reform are to promptly strengthen monetary policy and control and facilitate efficient large value transactions, this requires a *major involvement of the central bank* in the process of establishing and operating the system. As domestic commercial banks in CIT may not be strong, disciplined or risk-aware enough for initiating the process, a top-down approach would seem to be in line with a faster achievement of the objectives.

3. The engagement, however, *must be transparent and balanced* with a view to the long-term implications on private initiative, competition, and for motivating banks' involvement in the process. In addition, the reforms were originally initiated because of the need to replace 'monobanking' systems and centralised payment services provision in consideration of the new market-orientation paradigm. Therefore, the central banks' leadership and operational involvement can be subsequently replaced with system oversight and regulation[24]. Also, involvement in and 'ownership' of the payment system reforms by the commercial banks is critical for success of the reforms.

4. The payment system and associated banking arrangements *depends on credit as a normal part of financial operations*. If there is underdeveloped money and interbank market, it is the central bank that is responsible for providing liquidity to the system. If RTGS system is imminent in the payment systems' development, than a central bank should offer something in return to increased reserves required from banks. If, on the other hand, there is no guarantee of the finality of payments, i.e. credit facilities

provided by central bank, the system may as well be designed as a DNS system as it provides banks with the needed flexibility and liquidity. The risk control can be then achieved through caps, collateral, penalty rates and most importantly through regular supervision and surveillance of the institutions. The oversight is also indispensable for achieving trust and discipline in an RTGS type of system.

5. Thus, *system oversight* – that includes licensing, prudential requirements and supervision – may be an important part of the answer to systemic risk/moral hazard dilemma, i.e. it can contribute to the effective balancing of the two considerations relating to the payment system policy. Therefore, if a central bank provides 'daylight' liquidity, in response to lack of efficient money market and/or market-based monetary policy instruments, the moral hazard issue can be catered for, inter alia, by the supervision. This may also require *separation of monetary policy* and control function and regulation *and supervision* function, in order to focus the efforts and make rules simpler and more potent in achieving the public policy goals whilst taking care of encouraging competition and private initiative.

6. Even the latest payment system technology cannot compensate for poor *technical infrastructure* and inadequate or feeble *legislation* and its implementation. Just and effective legal framework is a milestone of trust and certainty needed for stable payment system functioning. Notwithstanding, regulatory flexibility is required to prevent shocks to the system and to enable the development of new instruments and services, especially in a young market economy. Also, technical (telecommunications) infrastructure needs to be improved and not only because of the payment system requirement. However, payment system cannot be too far ahead of the infrastructure if it is to be fully and effectively used. As the world cannot wait for the fundamentals to be improved to start functioning, the integration of the technology and infrastructure is needed in a short to medium term.

7. *Banking system restructuring* in CIT is essential for risks and costs reduction and speed, reliability and choice improvements. Only a system without significant proportion of bad debts, unclear or ineffective ownership and/or management structure on one hand, with improved skills and risk control on the other, can establish discipline and trust in financial system. Increased capital base, risk provisions and risk awareness, new management and shareholders' structure, better liquidity management and market based incentives may, however, be hard to achieve without government/central bank's support. An additional option, compatible with an organised system restructuring, is the encouragement of the involvement of foreign service-providers and competition. The experience of some transitional countries with the banking system reforms, foreign competition and investors and integration of payment and banking systems show the opportunities and threats of the processes.

8. Regardless of the type of settlement system and general arrangements chosen, payment system reform involves *'fine tuning'* for bringing the system design into public policy objectives function. Thus, successful monetary policy and control, risk reduction and efficient interbank money market can be achieved only if: a) the choice of clearing and settlement arrangements is accompanied with various risk reduction and/or liquidity provision measures available for different systems, b) there are

adequate supervision and surveillance, licensing procedures and clear and consistent rules regarding the services providers, c) legal framework and technical infrastructure and the selected system are in tune with each other, and d) the banking system practice and efficiency are accounted and provided for in the system design.

In summary, the lessons can be grouped into five generic recommendations for policy makers in Countries in Transition:

- *monetary policy and control have priority in a system design,*
- *financial institutions' involvement and competition should be encouraged,*
- *subsequent emphasis should be on supervision,*
- *retain regulatory flexibility, and*
- *banking system restructuring is the key to risk reduction and efficiency of payment system*.

Notes

* I wish to thank to the central bankers from Bulgaria, China, Croatia, Czech Republic, Estonia, Hungary, Lithuania, Poland, Russia, Slovakia, Slovenia and FR Yugoslavia for their co-operation regarding the survey of their countries' payment systems.

[1] Belgium and UK are the rare examples of countries in which RTGS system is not in central bank's ownership.

[2] In general, these are advanced transitional countries in terms of financial and monetary systems reforms or countries that have stared the payment system reforms as such.

[3] An overview of the analysis is given in Box 1 on page 13.

[4] Swiss Interbank Clearing system

[5] For example, cash in circulation to narrow money ratio is about 60 percent, and cash to GDP is approximately eight percent.

[6] "SDK" for short in Serbian/Croatian/Slovenian/Macedonian.

[7] Furthermore, if, for example, the upper limit for small-value payments is set at a low level it will increase the need for liquidity required for large value payments. If, on the other hand, the limit is proved by the practice to be to high, the banks might want to utilise the net settlement arrangements of NCS and increase the risks that are provided for by the RTGS system.

[8] Trans-European Automated Real-time Gross Express Transfer system - a wholesale payment system for Euro payments.

[9] There were a few technical hiccups though, including the late establishment of back-up facilities (in 1997).

[10] Other are mainly intrabank payments and payments settled 'any other way' (according to the central bank).

[11] Bank to bank payments, customer payments and non-clearing (non-value messages) transactions.

[12] The NCH processing is DNS and the system is owned jointly by the central bank and commercial banks.

[13] The Centre is jointly owned by the central bank, commercial banks and the ministry of finance, with the central banks owning 40 percent of the shares.

[14] The settlement accounts mirror banks reserve accounts. The former are held at the clearinghouse and the latter at the central bank. Therefore, the accounts at the clearinghouse are only provisional 'technical' accounts linked to the real settlement accounts at central bank.

[15] Versus no differentiation between LVTS and small-value payments during the regular clearing hours.

[16] Federal Republic of Yugoslavia

[17] Estonia, for example has followed more rigid currency board arrangements, and introduced the 'liquidity buffer' at a later stage of the reform.

[18] The float can be a result of payment lag but it is also a consequence of operational, i.e. accounting procedures. They are particularly relevant in case of paper-based payments, when clearing is not real-time.

[19] The system does not provide for queuing mechanism and there is no guarantee of payment orders by the central bank.

[20] The options range, for example, from banks' internal queues or even a private DNS system to introduction of centrally located queue.

[21] The central bank had to issue and service its own bills at competitive rates.

[22] The major reasons are a) huge public expenditures, caused by the war and sanctions (which resulted in high unemployment, number of refugees and claims on other social benefits) and b) the political lobbying of the banks and their owners - loss making enterprises for additional funds from the central bank.

[23] Lack of liquidity and bad debts have resulted in so-called 'compensations' (obligatory debt netting for banks and companies occasionally organised by the clearinghouse) or bilateral or multilateral exchange of goods and services between the companies.

[24] Thus, the engagement of financial authorities can fall into two stages – the first, where the active role of central bank is aimed at initiating and co-ordinating the payment and monetary systems' reforms and the second, when the central bank steps back and puts emphasis on financial stability and competition implications of already placed payment system rather than operational involvement and monetary policy tasks for a payment system.

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