

**BIS**

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**POLICY PAPERS No. 4**

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**MANAGING CHANGE  
IN PAYMENT SYSTEMS**

**May 1998**

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**BANK FOR INTERNATIONAL SETTLEMENTS  
Monetary and Economic Department  
Basle**

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## Foreword

BIS Policy Papers are based on papers prepared for meetings at the BIS of senior officials from central banks. They are published by the Bank with the aim of stimulating discussion of the topics with which they deal. The views expressed in them are those of their authors and not necessarily the views of the BIS or the central banks represented.

Recent years have seen unprecedented change in payment systems. The pressures behind this change vary from country to country, but a common theme has been the liberalisation of financial transactions - and indeed economic liberalisation more generally - which, when combined with improvements in technology, has led to rapid growth and innovation in financial markets. At the same time, there has been growing recognition that the significant risks inherent in many systems need to be tackled. Reflecting changes in financial markets more generally, payment systems have therefore had to modernise both to increase efficiency and to reduce risk.

The Committee on Payment and Settlement Systems (CPSS) of the G-10 central bank governors, under the auspices of the BIS, has published reports on many different aspects of payment and settlement arrangements. For example, reports published in recent years include those on real-time gross settlement, securities settlement systems, electronic money, foreign exchange settlement risk and the settlement of exchange-traded derivatives. The analysis in these reports has helped to increase understanding of the way systems work and the implications system designs have for efficiency and stability. The reports have thus played a key role in encouraging the introduction of sound and secure payment mechanisms. However, there is another aspect to the task of reform that is also crucial - namely the *process* of managing the change. For many, payment system reform is unfamiliar territory, and resources and experience are limited. Turning theory into practice is therefore not always easy.

It was with this issue in mind that, in December 1997, the BIS, in conjunction with the CPSS, hosted a Global Conference on Managing Change in Payment Systems. Attended by representatives from more than 80 central banks from around the world, the conference provided a unique opportunity to share experiences of how countries had managed, or are managing, the process of change.

This compendium contains the presentations made by the speakers and panellists at the conference. We hope that this information about the issues that are being faced, and how they are being tackled, will be

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ISSN 1027-6297

useful for all those who are in the process of reform or who are about to embark on it.

With so many central banks represented, the conference had a very wide range of experience to draw on. The participants came from developing countries where the existing payments infrastructure is minimal, from emerging market countries where the infrastructure exists but is becoming stretched by market growth, from countries that are in transition from a planned to a market economy and where a completely new type of infrastructure is therefore needed, and from developed economies where infrastructure changes are driven primarily by the need to cut costs and reduce risk.

Nevertheless, it became clear at the conference that, despite this diversity, there are certain issues that many central banks face when it comes to the process of managing change in payment systems. A common problem is acquiring the necessary information and experience - finding out what the possible options are, learning what other countries are doing, and generally making the best use of available advice. Obtaining the necessary resources and using them effectively is also often difficult - payment system reform can be costly and time consuming, and needs to bring together expertise from a wide range of disciplines both in the public and private sectors. Indeed, building a consensus on the type of reform needed, and how the costs will be shared, is a key issue since it is not unusual for different institutions - and even different functions within the same institution - to start with conflicting views on what is desirable.

Sometimes there are constraints that are external to the financial sector and therefore perhaps harder to tackle - for example, payment system changes may require changes to the law or improvements in communications infrastructure. Where new payment instruments are involved, overcoming public resistance to change can be an even bigger challenge.

However, it would be wrong to over-emphasise the difficulties. Another clear message to come from the conference was that these issues can be - and are being - successfully tackled under a wide range of different circumstances. It was striking how much change has already been achieved or is well underway. The process of payment system reform will not be completed overnight, but the necessary momentum

is there and the goal of safer and more efficient systems is within reach.

Finally, we feel that the global representation at the conference and the many ideas contained in this compendium provide further evidence of the relevance of the work of the BIS and the CPSS for both G-10 and non-G-10 countries: financial markets are becoming increasingly international, and it is in everyone's best interests that global market infrastructures, including payment systems, become more efficient and robust. Our thanks go to all those who participated in the conference and made it such a success.

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# Welcoming presentation

Andrew Crockett

Good morning, ladies and gentlemen. It is a great pleasure for me to welcome you to the BIS for this global conference on managing change in payment systems. Apart from our Annual General Meeting we do not have many opportunities to assemble the global central banking community in Basle to discuss issues of common concern. I was therefore pleasantly surprised by the positive response we received to the invitation which we sent out during the summer to central banks around the world to participate in this conference. We have over 80 countries represented here today from central banks from all geographical regions. Your presence testifies to the importance that your institutions attach to payment system reform as well as to the increasing importance of central bank cooperation in this area, not only at the regional but also at the worldwide level.

## **Why payment system issues are important to central banks**

Payment and settlement issues are important to central banks for various reasons. In many cases, central bank statutes define explicitly or implicitly the central bank's responsibility to promote the "smooth flow of money" or to ensure efficient "clearing of payment instruments". Indeed, in recent years the so-called oversight of payment systems, particularly those that may give rise to systemic concerns, has been made more explicit in statutory provisions in a number of countries.

But irrespective of any specific references in central bank statutes, the oversight functions of central banks include a number of formal and informal arrangements through which they are involved in payment and settlement arrangements in their country. Apart from any explicit regulatory or supervisory responsibilities, central banks can be directly involved as, for instance, operators of interbank funds transfer systems such as an RTGS system or an ACH. Many central banks also operate a central securities depository, typically for government securities, as well

as a settlement system for the transfer of these securities. Operational involvement can also result from the provision of account facilities and other settlement services to banks or clearing organisations.

Indirect mechanisms through which the central bank can exert influence over payment systems can include the operation of monetary policy, the provision of liquidity facilities, participation in industry associations or payment system consultative bodies, the central bank's role as supervisor of individual institutions that participate in payment systems or simply its general moral authority.

I think it is safe to say that payment system oversight is increasingly coming to be recognised as one of the key central bank functions. The major function of a central bank is, of course, the conduct of monetary policy with the ultimate goal of contributing to macroeconomic stability, particularly with respect to low inflation. The other principal goal of the central bank, given its potential role as lender of last resort, is financial or systemic stability. This encompasses its involvement in the supervision of banks and of financial markets more generally and its function of payment system overseer. All these various functions are, of course, intricately related, as the recent period of financial market turmoil has underscored.

### **Increasing concerns about payment system risk**

One reason why payment systems are so important to financial stability is the fact that they are a potential channel for the transmission of disturbances. This was illustrated amply in earlier episodes of financial instability at the end of the previous century and the beginning of this century when pressures on the banking system often originated with the inability of banks to fulfil their settlement obligations in the clearing house. Since then, of course, various safety nets have been built into our banking systems so that the occurrence of individual bank defaults and their possible negative repercussions on the banking system as a whole have been reduced. However, in the past two decades the combined effects of technological advance and deregulation of markets have fuelled a substantial growth of financial market activity – activity that is increasingly global and increasingly innovative. At the same time there has been an understandable reluctance to strengthen – or even maintain – the safety nets to cope with this activity because of the moral hazard implications.

This has led to a growing conviction that the financial market's infrastructure, which of course includes payment arrangements, must be made robust enough to cope with volatility and shocks. As recent events have demonstrated, payment and settlement systems must now be designed so they can withstand the default of one or more participants.

The task is a major one. The impact of technological advance, deregulation, innovation and globalisation on payment systems is perhaps best illustrated by the spectacular increase in the total value of payment transactions. Figures collected by the CPSS indicate that the total average turnover in large-value funds transfer systems in the Group of Ten countries equals about USD 5,000 billion per day. Turnover in securities settlement systems in the same group of countries is approaching USD 1,800 billion per day, of which about USD 150 billion per day relates to cross-border transactions. The total value of global foreign exchange transactions has recently been estimated by the BIS to equal about USD 1,250 billion per day, while S.W.I.F.T. has calculated that the average value of payment instructions transmitted over its network is of the order of USD 2,500 billion per day. Finally, the average daily value of derivatives transactions, including both those executed on organised exchanges and those on the over-the-counter markets can be estimated at about USD 1,500 billion. These are indeed astronomical figures. Given the credit and liquidity risks to which market participants and, in some cases, system operators are exposed in the process of clearing and settling these transactions, it should be no surprise that central banks have become genuinely concerned about the efficiency and safety of the various procedures involved.

### **Initiatives taken by the Committee on Payment and Settlement Systems**

Since there are participants from over 80 countries here today, I think I can safely say that together we represent virtually every conceivable combination of economic and cultural backgrounds. Inevitably this diversity affects the way we approach payment system change. As I am sure we will learn during the conference, there are differences in both our objectives and the means by which we achieve those objectives. And yet the striking feature which emerges time and time again from discussions

on payment systems is how much we also have in common. In this field, as indeed in others, central bankers can learn a great deal from each other.

Joint work by the G-10 central banks on payment system issues started in 1980. The history of this work reflects the changing nature of the G-10 central banks' concerns about payment systems. Initially the rapid growth in the size and complexity of payment systems was seen as a largely technical matter, and central bank discussions took place in a group that was essentially an offshoot of the computer experts group. The transformation of that body into the present senior-level Committee on Payment and Settlement Systems in 1990 was a result of the growing realisation that the risks in payment and settlement arrangements posed a significant threat to financial stability. Payment systems were not only a technical matter but also went to the very heart of central bank policy concerns.

Under the active and enthusiastic chairmanship of Mr. McDonough, the Committee (the CPSS) has played a major role in recent years in ensuring that the world's payment and settlement arrangements are safer and stronger and therefore less likely to disrupt the stability of the financial system. Let me mention just three areas to illustrate the range of work undertaken by the CPSS. First, the strategy to reduce the risk involved in settling foreign exchange deals – an area of growing relevance to all of us given the globalisation of markets. As many of you will appreciate, this work has been of major importance not just in encouraging individual commercial banks to adopt safer practices but also in spurring the world's major commercial banks to develop new multicurrency netting and settlement arrangements, a development that is likely to have a major impact on the future shape of correspondent banking.

The second area I would like to mention relates to securities settlement systems. Earlier work on delivery-versus-payment mechanisms and cross-border securities settlement resulted in an initiative to improve the transparency of these arrangements – the so-called disclosure framework for securities settlement systems. This is a good example of getting the market to, in effect, assess itself in order to bring about better management of risk. This disclosure framework was created by a group that was perhaps unique in the breadth of its membership – set up jointly by the CPSS and the securities regulatory body IOSCO, the group consisted of central bankers, securities

regulators and market operators not just from the G-10 countries but also from major securities markets around the world.

Finally, to illustrate that the CPSS has been taking a closer interest in retail payment systems as well as the wholesale systems that have traditionally been its focus of concern, you may recall that last year the CPSS was largely responsible for an extensive analysis of the possible impact of electronic money. Many of you are regular contributors to the twice-yearly survey of electronic money developments that the CPSS Secretariat here at the BIS produces and I would like to take this opportunity to thank you for sharing information about what is happening in your country. The survey is very useful for us at the BIS, and I hope for you too, in monitoring the development of electronic money schemes and it shows clearly that, although electronic money is still in its infancy, the seeds of its growth are spread widely around the globe.

### **The Basle approach**

Over the years the G-10 central banks have strengthened their cooperation by setting up a number of standing committees. The CPSS is now one of three high-level committees that report directly to the G-10 Governors – the other two being the Basle Committee (concerned of course with banking supervision) and the Euro-currency Standing Committee (concerned with the operation of financial markets). Between them the three committees thus cover what we might call the three pillars of the financial system – financial institutions, the markets they operate in and the systems they use to settle their transactions. Each committee, chaired by a senior central bank executive, studies and analyses developments in its respective area of responsibility and, when appropriate, proposes to the Governors specific lines of action.

Let me use the opportunity here to briefly describe to you the so-called “Basle approach” to central bank cooperation. This approach applies not just in the area of payment systems but also with respect to banking supervision, financial developments and, indeed, to monetary policy issues. The important point I would like to make is that the BIS is not a regulatory body. Rather we provide a platform for central banks to regularly meet in order to exchange views on specific matters of interest and to develop common approaches. Examples of joint policy action in

recent years include capital requirements for banks, minimum standards for cross-border netting schemes and recommendations to improve disclosure of banks' exposures to trading and derivatives activity. These proposals are endorsed by the G-10 Governors and published, after which they are implemented in each country by the respective central bank (or other regulatory authorities).

The various G-10 central bank committees have also developed their cooperation with other international regulatory bodies such as IOSCO and the International Association of Insurance Supervisors in order to develop common strategies and policies – I mentioned one of the joint CPSS/IOSCO exercises a moment ago. And the various committees have also developed working relations with individual central banks outside the Group of Ten and with regional central banking groups in order to promote the global acceptance of their recommendations. This flexible, multidisciplinary and increasingly global approach has proved to be very efficient and flexible and has allowed progress to be made in key areas of central bank concern.

You may have noted that I have not mentioned the provision of technical assistance as a BIS role. Indeed we do not consider this to be our area of expertise or responsibility. Our focus is on promoting interaction and cooperation between central banks. That does not mean that our staff does not welcome the contacts with central banks from all countries. On the contrary, such contact is essential if the Basle process is to have truly global applicability. The greater the contact, the more we can identify common concerns and possible common approaches. Increasingly, I hope we can work together to ensure that the world's financial system is both efficient and stable.

### **The theme and goal of the conference**

Sharing views is an important first step in cooperation, which brings me to the topic of this conference. The theme of the conference is Managing Change in Payment Systems. The topic is broad enough to allow for an active exchange of views from participants from different parts of the world and with different backgrounds. The three sessions have been designed so that each brings together speakers from countries with similar recent experiences. The first session will focus on payment system

change in the context of fundamental financial restructuring, particularly with respect to the move from a planned economy to one based on market mechanisms. Mr. Koning from the Netherlands Bank will chair this session, in which we will hear presentations on developments in Russia, China, Vietnam, Armenia and Bulgaria.

The second session will group together a number of countries that have recently coped with the need to modernise their payment systems in order to increase efficiency and reduce risk. I am very pleased that Mr. Al-Suhaimi from the Saudi Arabian Monetary Agency has agreed to chair this session and to introduce speakers from Indonesia, Poland, Peru, Brazil, Malaysia, South Africa and Korea.

The last session, which will be chaired by Mr. Yam from the Hong Kong Monetary Authority, will focus on payment system issues arising from the globalisation and internationalisation of financial markets. Presentations will be given by representatives from the United Kingdom, Singapore, Australia, Japan and France.

As you can see from this overview of our programme, we have tried to bring together payment system experts from different parts of the world and with a variety of different backgrounds. I hope that all of the speakers as well as the general discussions will concentrate on the process of change rather than on the content. We should try to understand not just the success we have had but also the difficulties, constraints and problems that all of us have faced in implementing change in payment systems and the solutions that we have found to overcome them.

It would be useful, of course, if all of us could also return home with a common understanding of how to set priorities in the management of payment system reform. That is why we have programmed a panel discussion at the end of the conference during which senior representatives from the central banks of Germany, India, Hungary and Mexico, under the Chairmanship of Mr. McDonough, will attempt to identify the major themes and issues that will have arisen during our discussions, to draw some general conclusions from our proceedings and to identify some possible areas that central banks could pay attention to in the future.

Ladies and gentlemen, there are many different aspects to payment systems including those relating to legal arrangements, technological and operational issues, financial market infrastructures and the operation of

monetary policy. And it is in payment systems that we see the practical application of so many key central banking concepts. Transparency, access, systemic risk, moral hazard, liquidity and lender of last resort are all concepts with which payment system specialists have to be very familiar. Indeed, it is often noted that payment system policy planning requires a multidisciplinary approach and I have always been fascinated by the wide range of subjects that payment system experts need to be acquainted with in order to carry out their duties efficiently. Not surprisingly there is also a wide diversity of expertise at this conference. As senior payment system experts, most of you also share other senior responsibilities at your institutions or have had long experience in different central banking areas.

I therefore trust that this conference will allow us to share views from many different parts of the world and from many different perspectives. I also hope that the conference will provide opportunities to develop and strengthen personal relations between central bank payment system experts. Finally, I hope that the conference may indicate a number of ways for the BIS and the Committee on Payment and Settlement Systems to further develop their relationships with central banks and central banking groups around the world. My colleagues and I are committed to support existing or emerging regional central bank cooperation. At the same time we intend to further expand our role of providing a global platform for central banks to discuss and work on payment system policy issues as well as on other important central banking aspects.

## Managing change in payment systems

William J. McDonough

It is a pleasure to be here today to open this conference on managing change in payment systems. We have three important topics to cover today:

- payment system reforms as financial markets undergo structural change;
- the challenges resulting from the need to modernise payment systems in ways that reduce risks and increase efficiency; and
- improving payment systems, whether domestic or cross-border, to serve our more open and global financial markets.

I am certain that by the end of this conference we will all have gained insights into the functioning of payment systems around the world as well as a strong sense of the work that still needs to be done to accomplish our goals.

We all come to this conference with our own unique perspectives on payment systems, and this variety of viewpoints will add to the success of our efforts over the next two days. In this spirit, please allow me to take this opportunity in these opening remarks to share some of my experiences with you and to briefly review the Federal Reserve's role in the payment system.

### Experiences

I began working with large-value payment systems as a commercial banker, became much more intensely involved as a central banker in one of the world's major financial centres, New York City, and moved on to even greater involvement when I became Chairman of the Bank for International Settlements' Committee on Payment and Settlement Systems (CPSS).

In this later role, I am reminded time and again that, as commerce and finance become more global in nature, it is important to understand the

functioning not only of your own payment systems but also of the systems in other countries around the world. I have found that, while some design features and the degree of central bank involvement vary somewhat from country to country, the basic principles to reduce risk and increase efficiency remain much the same in most places. Many of the research reports produced by the CPSS in recent years came to this conclusion. These reports covered:

- basic standards for netting arrangements;
- securities clearance;
- ways to reduce foreign exchange settlement risk;
- clearance of exchange-traded derivatives;
- security for emerging electronic money products; and
- design of real-time gross settlement systems.

These reports have been valuable, not only to those central banks directly involved in the studies, but also to other central banks around the world actively engaged in modernising their payment systems. Next, I would like to provide you with a description of the payment system in the United States, especially those aspects where the Federal Reserve plays an important role.

### **Federal Reserve involvement in the payment system**

In this part of my remarks, I would like to begin by providing you with a brief description of the Federal Reserve's current involvement in the payment system. With this description in mind, I would then like to give you a sense of the history that led up to the Federal Reserve's current role in the payment system as well as a brief overview of a recent effort we have undertaken to help define our role in the future. The end result, I hope, will be a picture of managing change in the payment system in the United States.

The Federal Reserve's current role in the US payment system is multidimensional. To begin with, the Reserve Banks have supervisory responsibilities for many of the commercial banks that make up the core of our payment system. In addition to promoting the soundness of the banking system through an active role in the bank supervision process, the Federal Reserve has established a set of institutional arrangements

with the banking sector that help to define the Federal Reserve's role in the payments system. The most important of these institutional arrangements, in my view, are:

- the centralised accounts commercial banks hold at the Federal Reserve;
- the flexible terms on which these accounts are maintained;
- the provision of liquidity by the Federal Reserve, both on a day-to-day basis and in unusual situations, that helps maintain payment flows through these accounts; and
- the fact that these accounts at the central bank can be used effectively to settle on a timely basis and with finality other payment arrangements operated by the private sector.

In the United States, Reserve Banks offer additional payment services to the banking system, the United States Treasury and federal agencies, including:

- a book-entry and delivery-versus-payment system for government securities;
- net settlement services for a variety of clearing house arrangements;
- clearing of paper cheques;
- automated clearing house payments processing for electronic retail payments; and
- currency issuance and distribution.

In addition, most foreign central banks hold accounts at the Federal Reserve Bank of New York, and we process a large volume of payments and securities transfers on their behalf.

The Federal Reserve's involvement in the payment system is not a recent development. Beginning with its very inception, one of the primary reasons for the creation of the Federal Reserve was an earlier breakdown in the payment system. In 1907, a financial panic occurred that resulted in a suspension of payments because clearing houses often refused to handle cheques drawn on other banks. Solvent institutions failed as a result. In 1913, Congress passed the Federal Reserve Act, which instructed the Federal Reserve to supply currency as demanded by the public, that is, an "elastic currency", and to establish a cheque collection network that covered the entire country.

The Federal Reserve also established an interbank payment system which became known as “Fedwire” by 1918. Fedwire has been improved continuously over the years, evolving from a rather simple, Morse code operation to today’s use of high-speed, computerised electronic communications and processing systems.

In the second half of the 1960s, the Federal Reserve and US Treasury developed an additional function for Fedwire, a delivery-versus-payment, book-entry system for government securities, operating in real time. Technological restrictions hampered its growth for a period of time by limiting the number of issues that could be maintained but that problem has been resolved. Since 1978, all Treasury bills have been in book-entry form, and all Treasury bonds since 1986. Overall, this system has added greatly to the efficiency and liquidity of this market, including an active market in repurchase agreements. The private sector has added to the overall effectiveness of this market by developing a netting system for trades in government securities.

Today, Fedwire, involving the transfer of both funds and securities, continues to be improved. Hours of operation will be extended later this year for funds transfers to reduce risk in the payment system. Message formatting will be enhanced to conform with the structure of other payment system operators, thereby permitting greater use of “straight-through processing”. To improve efficiency, we have been consolidating processing sites and have begun to reduce fees for processing payments. We also have taken steps to reduce risk to the central bank by charging a modest fee for daylight overdrafts, and a significant reduction in the intraday credit provided by the Federal Reserve – of the order of 40% – has taken place as a result, as banks and their customers now pay much more attention to the intraday timing of their payments. Risk to the Federal Reserve and the payment system, in general, has been further reduced through a requirement that banks with the largest overdrafts – those banks serving the government securities dealers – collateralise their positions with book-entry securities. While we are making progress in controlling the risk associated with daylight overdrafts, these overdrafts still serve as an example of an unintended legacy of a payment arrangement designed many years ago at a time when the potential for growth in payment volumes and the risk implications of intraday exposures were not fully appreciated.

On the retail side, the Federal Reserve created the automated clearing house (ACH) system in the early 1970s for processing retail payments electronically. In the beginning it was believed that this system would eventually replace paper cheques, which are a relatively expensive payment instrument to process. Thus far, however, this replacement of paper by electronics has not occurred on a large scale, but we are redoubling our efforts to promote ACH payments, especially for the direct deposit of payroll cheques. In addition, some private sector technology companies are creating front-end applications for electronic bill presentment and ACH payments with personal computers that look very promising. At the same time, we are automating the paper cheque clearing process through greater use of electronics and perhaps truncation as well. The end result of all these efforts, we hope, will be reduced reliance on paper for retail payments.

Access to and the pricing of Federal Reserve payment services were addressed by the Monetary Control Act of 1980. Prior to this Act, the Federal Reserve did not charge member banks for the payment services it provided, in part to compensate for the reserve balances held at the Federal Reserve that did not earn interest. The Monetary Control Act stated that all depository institutions, including non-member banks and thrift institutions, should have equal access to Federal Reserve payment services at prices that permitted full cost recovery. In return, all depository institutions were required to maintain reserves on the same basis.

The role of the Federal Reserve in the payment system, in terms of services provided and institutions served, as well as the degree of cost recovery, has evolved over a rather long time. More change is likely in the future as well. Our banking system, because of technological advances, consolidation and interstate branching, is undergoing significant change. This process could appreciably change the payment system and the appropriate role of the Federal Reserve.

For example, it is possible that in the not-too-distant future the Federal Reserve will not be the only banking organisation in the United States to have a national scope, as a result of recent federal legislation that ended restrictions on interstate branching. In addition, the major credit card associations and ATM networks now have national, electronic payment networks, once a distinction that applied only to the Federal Reserve. In the more distant future, the private sector could well develop

a successful electronic substitute for paper currency; and electronic bill presentment, payments and remittance information could flow freely over the Internet or over some other open communications network. A few years ago, I might have discounted the potential of some of these new systems, but not any longer. A large amount of creative energy is being devoted to automating retail payments.

In the light of this potential for rapid innovation in the retail sector, Chairman Greenspan asked Vice-Chair Alice Rivlin to lead a committee of senior Federal Reserve officials, including myself, to assess whether the Federal Reserve's role in the payment system was still appropriate. Our strategy was to construct several hypothetical scenarios for future Federal Reserve involvement in the payment system, ranging from withdrawal and liquidation of our retail payments business to staying in the business and undertaking aggressive action to promote electronics. We then sought input from various organisations involved in the payment industry, including large and small banks, and leading technology companies. As you can well imagine, we received a broad range of feedback, most of it supportive of continued Federal Reserve involvement in the retail payment business. In addition, many participants at these meetings believed that the Federal Reserve could provide valuable leadership to the retail payments industry by working with commercial providers and others to:

- address legal issues that might have inhibited the growth of electronic payments;
- establish standards and protocols; and
- sponsor education and public outreach programmes on the use of electronic payments.

The effort undertaken by the Rivlin Committee is fairly typical of the Federal Reserve's approach to managing change in the payment system. It was open and consultative, with a wide range of input from the private sector on how we might work together to improve the payment system. In this same spirit, the Federal Reserve typically distributes for public comment any proposed changes in its payment services and has often revised its plans in the light of the comments received.

## Payment systems and change

In working on the Rivlin Committee and the various CPSS projects, I have been frequently reminded that central banks around the world are involved in payment systems to different degrees and in different ways. During this conference, I expect to find out more about central bank activities in payment systems in developing countries – especially the rather unique problems that might be encountered. I suspect that at the end of this conference we will conclude that the work never seems to be done. Payment systems evolve and the needs and preferences of our citizens change, making central bank involvement in the payment system an ongoing effort.

Some basic principles, however, seem rather constant over time. We all know that a sound banking system – one that does not go through periodic crises that disrupt payment flows – is essential to building public confidence that the payment system will operate with integrity and reliability. The range of payment services the central bank provides to the banking system can also affect the development and smooth functioning of the payment system. Finally, cooperation between the central bank and the private sector in improving the integrity and efficiency of the payment system over time has become another well-established principle in the United States and other countries.

In this regard, central banks in several countries have been working actively with private sector service providers of, and participants in, various payment arrangements to review the adequacy of:

- financial risk controls and liquidity sources;
- operational risk controls (including electronic security);
- participant standards;
- the legal foundations of various payment arrangements; and
- disclosure of rules and responsibilities.

It is important for all involved to work hard at anticipating potential problems, correcting the causes of those problems, and avoiding the potentially dangerous task of dealing with all the ramifications of a serious, unexpected payment system problem. Or, to put it in terms of an old saying: “an ounce of prevention is worth a pound of cure”, or, at an international conference such as this one, perhaps I should say: “a gram of prevention is worth a kilogram of cure”.

In these cooperative efforts with the private sector to improve the payment system, the central bank often brings to the table a broad overview of the payment system that may not always be apparent to those people deeply involved in the day-to-day details. Central banks can often provide the necessary leadership by:

- serving as catalysts for constructive change and contingency planning; and
- encouraging cooperation, even among competitors, to achieve goals that benefit the payments industry as a whole.

In this spirit, the Federal Reserve Bank of New York recently hosted two conferences on electronic security, one sponsored by a private sector group and the other by our Bank Supervision Group, to identify “best practices” for electronic security in the banking industry. In addition, we are working very hard, both within the Federal Reserve System and with industry groups, to make sure that the “turn-of-the-century problem” does not create disruptions in the payment system.

Over the years, the Federal Reserve has worked with the private sector to bring about many other improvements in the payment system, including the movement of most securities from paper-based systems to book-entry depositories, the transition from next-day to same-day settlement, reductions in daylight overdrafts on Fedwire, and other risk reduction controls for the interbank systems and the major depositories. Many of you are probably already aware that in the United States Fedwire is not the only large-value interbank payment system; we also have another system with the acronym CHIPS, which is a multilateral netting system operated by the New York Clearing House. Over the past few years, CHIPS – with the Federal Reserve’s encouragement – has improved its risk controls considerably, and it has provided simulations that show it could now settle successfully even if the largest two institutions in net debit positions failed to perform on their obligations. In addition, the management of CHIPS continues to study ways to reduce risk in this payment arrangement that processes well over US\$ 1 trillion of transactions each business day.

Even with all these cooperative efforts aimed at reducing payment system risk, I am often reminded that one of the most important ways a central bank can promote an efficient payment system is by attaining and

maintaining price stability through an effective monetary policy. High rates of inflation reflected in high levels of nominal interest rates often result in an unnecessarily large amount of resources being devoted to cash management and hedging against inflation. Attaining and maintaining price stability, in my view, can only help to achieve the goal of an efficient payment system, at the same time contributing to the general economic well-being of our citizens. Therefore, as the central bankers here today consider the appropriate role of central banks in the payment system, as well as the design features for payment systems that reduce risk and increase efficiency, I believe we should not lose sight of our most basic responsibility, price stability. It too has important payment system implications.

## Conclusions

In conclusion, the purpose of this conference is to identify and discuss the key policy issues that arise when modernising and improving payment systems. A sound banking system and a monetary policy focused on price stability would seem to be important conditions for creating and maintaining an effective payment system. Further improvements can be brought about over time through:

- central bank and private sector cooperative efforts, with the central bank often taking on a leadership role; and
- central bankers sharing their experiences, both successes and disappointments, with one another – a process we will be intensely engaged in over the next few days.

## Changes in financial markets and payment systems

Jaap Koning

The subject of this CPSS conference has been well chosen indeed. For a number of reasons the G-10 central banks' attention has increasingly focused over the last decade on the safety and reliability of payment systems, a concern that has been reflected in a large number of CPSS reports on payment systems and related subjects that as a rule have been made public. The presence of a large number of central bank representatives from all over the world at this conference shows, moreover, that this interest is not confined to the G-10 central banks alone.

One motive for central bank interest in payment systems is, as you are all aware, the crucial role of these systems in the implementation of monetary policy operations, as these require an instrument through which liquidity can be efficiently provided to, or withdrawn from, the markets. For this reason, central banks often operate a payment system of their own, usually based on real-time gross settlement. In addition, however, central banks have a more general interest in the well-being of payment and settlement systems. This is not only because major disturbances in such systems might influence the functioning of financial markets as such, but also because payment systems are the vehicle through which transactions in the real economy are effected, and hence the smooth functioning of such systems is of the utmost importance for day-to-day life.

There are a number of fundamental changes in the financial markets which have an impact on payment and settlement systems. The above-mentioned increased awareness of the risks involved in payment systems has triggered a number of modifications to these systems.

Another important factor is the high speed of technological progress. The immense advances in information technology over the past decades, notably in terms of greater computer power, declining processing costs and innovative network developments, have made it possible to realise the tremendous growth in national and international payments.

A further fundamental change in financial markets concerns the internationalisation of financial flows. In my view, a main factor that has contributed to this heightened interdependence is the liberalisation of financial markets, in combination with the introduction of innovative products such as options and futures, to name but two. This has greatly increased the financial flows that have to be processed each day. To facilitate this, an interconnection of financial centres has been realised, allowing trades to be conducted on a 24-hour basis worldwide.

From a central bank standpoint, these developments, although in principle to be welcomed because of their contribution to the efficient allocation of financial resources, require close attention, as the interrelationships between worldwide financial markets could also give rise to a propagation of risks. After all, if a major participant in one market should fail to honour its obligations, the impact might no longer be restricted to an isolated market segment, but could have much broader repercussions. In recent studies this phenomenon is usually referred to as the domino effect. For this reason, and also because the extremely high investments needed for worldwide operations might drastically limit the number of financial institutions operating on a truly global basis, the financial soundness of the major participants in the financial markets, and the robustness of the infrastructures in which they operate, are of the utmost importance.

Having said this about the more general trends which may give rise to changes in the traditional patterns in the area of payment and settlement systems, I do recognise, of course, that in each individual country the national environment will be different. In addition to these general trends, therefore, changes in national circumstances may equally cause changes in payment operations and infrastructures.

In Western Europe countries will have to adapt their payment systems to meet the demands of increasing cooperation. Here I am referring in particular, of course, to the integration process in Europe, i.e. the creation of economic and monetary union, or EMU, to which most members of the European Union have committed themselves. For those countries that meet the admission criteria, and have not decided to opt out for the time being, EMU will start on 1st January 1999 with the introduction of the euro as the single currency. On that same date, the European Central Bank (ECB) will commence its operations as the independent central bank for the Union, and the

national central banks will become part of the European System of Central Banks (ESCB).

This integration process will have consequences in a great many areas, one of which will be the way in which the payment systems in the European Union are organised. The exact form of the changes in procedures and infrastructures of private sector credit institutions is still unclear, but one may be sure that the disappearance of a large number of the present currencies, which will be replaced by the euro, will lead to increased competition, especially in the money and capital markets, to which market participants will be bound to respond.

For the national central banks of the participating countries, the outlook is more clear. As from 1st January 1999, they will use the euro in their administrative and payment systems, although some of them may offer conversion facilities for a limited period of time to those of their customers who still use the national currency. Furthermore, in order to facilitate the monetary policy of the ECB, the RTGS systems of the national central banks will be linked, to form an EU-wide payment infrastructure, called TARGET. Although TARGET will primarily serve as an instrument for the ECB to perform monetary policy operations, the system will also be available for private sector institutions as a mechanism for making cross-border payments. As such, it will be a competitor to other payment infrastructures, like the clearing organised by the EBA or traditional correspondent relationships.

Another group of countries which are affected strongly by institutional changes are those which are moving from a centrally planned economy to a market economy. For these countries the modernisation of payment and settlement systems is even more complicated, as they usually have to move at the same time from a centralised system to a more decentralised one. Therefore, in addition to responding to the changes brought on by worldwide developments, they have to evaluate to what extent a continuation of (part of) the previous payments infrastructure is still feasible and desirable. As I see it, other central banks and international organisations like the IMF and the World Bank can provide invaluable expertise in this area.

I have tried to identify some of the elements that in my view are important when discussing developments in payment systems in the years to come. As I indicated, however, national situations may differ considerably and we may all benefit by learning from each other.

# **A long way to RTGS in Russia: problems and solutions**

Sergey Alexashenko

## **Where to start?**

The existing payment and settlement system in Russia is paper-based, and so is highly decentralised. And the central bank's payment system is the core of the national one. Historically the bulk (65%) of interbank payments have been executed via the central bank's payment system. Another 20% of payments are intrabank, and the rest are settled through interbank correspondent accounts.

The disintegration of the USSR, combined with the appearance of hundreds of banks around the country and poor telecommunications or even a lack of them in some regions, forced the central bank to establish a huge number of Cash and Settlement Centres (CSCs), more than 2,100 as at mid-1992. The purpose of these centres was to supply (and withdraw) cash to (from) commercial banks and to serve as a link to the central bank payment system, receiving paper payment orders from banks.

In view of the fact that 70% of payments are carried out within one administrative unit<sup>1</sup> and that Russia incorporates 11 time zones, the pillars of the central bank payment system are 80 Regional CSCs (RCSCs) which receive banks' payment orders from CSCs, settle all intra-regional payments and exchange banks' payment orders with other RCSCs. As the need to establish a new payment system in 1992 was urgent, there was no single technological solution for the RCSCs and many decisions were made on a regional basis. This resulted in more than 30 different types of hardware/software combinations at the RCSCs. Some used the gross settlement principle, some the net one; in CSC-RCSC and inter-RCSC communications, e-mail, telegraph and even postal messages were used. It

<sup>1</sup> Russia is made up of 89 administrative units (oblasts), nine of which were created after 1991. There is a central bank branch in every unit except those newly established.

could take a week or more for a payment to become final. Banks with branches in different regions of the country had to decentralise their resources into multiple accounts at different CSCs in order to carry out clients' payment orders. As a result, towards the end of 1994 the central bank payment system was recognised as being extremely inefficient even by the central bank authorities.

The new Law on the Central Bank of the Russian Federation (Bank of Russia) adopted in April 1995 provided that the bank is obliged to settle all intra-regional payments within two working days and inter-regional payments within five days. That was the start of the transformation process for the Russian payment system. Since it was realised that telecommunications are the key problem in speeding up settlements, the bank has launched a construction programme linking its CSCs with existing telecommunication facilities which is to be completed by mid-1998. Moreover, the bank has recognised that the current telecommunications infrastructure in Russia cannot be the foundation for the future settlement system and that there is a need for more advanced technology. It has therefore decided to launch its own satellite in order to ensure the ongoing transformation.<sup>2</sup>

In mid-1996 the Bank of Russia's Board of Directors adopted ambitious plans for upgrading its existing settlement system using state-of-the-art technology (upgrading and harmonisation of hardware and software) and defining an RTGS project. The latter was prepared within nine months and adopted by the Board of Directors in April 1997.

## **The RTGS concept**

Modern technology for processing and transmitting data permits the centralisation of settlement functions to a large extent. The planned real-time gross settlement system will be a single-tier system under which the accounts of credit institutions and of the clients of the Bank of Russia are concentrated at the Federal Settlement Centre (FSC).

The FSC will be a specialised settlement unit of the Bank of Russia for the settlement and bookkeeping of transactions between credit institutions and clients that hold accounts at the Bank of Russia.

<sup>2</sup> The satellite was successfully launched in November 1997.

All RTGS participants should have a terminal for the electronic exchange of documents and data with the FSC. If participants have no such terminal, they will exchange documents with the FSC via the central bank's workstations installed at the CSCs. The only limitation on participation in the RTGS system will be the need to comply with the operating conditions set by technical specifications.

The main objectives of the RTGS system are the following:

- to increase the speed of transactions within the banking system and to reduce the banks' settlement risk by finalising interbank settlements within the shortest period of time;
- to provide for the possibility of intraday liquidity management by participants;
- to settle transactions in organised securities markets the same day; and
- to allow participants to consolidate their resources in one location.

Payments within the framework of the RTGS system will be:

- irrevocable (after debiting to the account of the paying credit institution) and final (after crediting to the account of the receiving credit institution);
- carried out continuously during the business day (given the 11 time zones in Russia, the unified banking day for all regions will run from 4 a.m. to 8 p.m. Moscow time for the FSC and credit institutions; during these hours any RTGS participant will be allowed to settle anywhere in the Russian Federation);
- booked to the respective accounts of RTGS participants and reflected immediately upon their acceptance (information about the current balance on their account will be available to participants);
- effected in electronic format between RTGS participants.

Participants in the RTGS system should have a dedicated terminal with specialised software/hardware installed at their offices or at the specialised offices of the Bank of Russia. Such specialised offices are to be set up in order to provide access to RTGS for those who are unable to acquire their own terminal, and will allow the input and transmission of payment orders. These offices will perform the functions of operational units responsible for receiving and processing the settlement documents in paper format and transmitting instructions through their RTGS

workstation. Their number and location will be defined during the implementation of the RTGS project.

Bearing in mind the size of Russia and the need to construct a telecommunications network in a number of regions of the country, the Board of Directors decided to build the RTGS system on a step-by-step basis. During the first stage intra-regional RTGS is to be established in every region. Intra-regional RTGS will allow real-time settlements to be made within a region while settlements with other regions are executed on a traditional basis. To date, 43 out of 80 regions in Russia have intra-regional RTGS.

In 1999, when intra-regional RTGS will be operational in the 15 regions with the greatest volume of payments, the national RTGS system will be launched. From the start, the national RTGS will link these 15 regions. The other regions will be incorporated subsequently upon completion of their telecommunications infrastructure. All regions of Russia should be linked to the RTGS system by the end of the year 2000.

### **Risk and liquidity management in the RTGS system**

In May 1993 the Ministry of Finance and the Bank of Russia launched an electronic Treasury bill trading system. This system now comprises a network of more than 2,500 terminals located in the eight largest cities across seven time zones. The trading is organised daily in real time and in the eight cities simultaneously. Settlements (both funds and securities) are carried out the same day. The stock of Treasury bills currently exceeds 425 trillion roubles (US\$ 72 billion).

Since the spring of 1996 the Bank of Russia has used Treasury bills as collateral for its lombard credits (from 3 to 30 days). 50% of Russian banks that hold Treasury bills have access to this facility. In April 1997 the Bank of Russia launched two-day repo operations with primary dealers in the Treasury bill market. There are 40 primary dealers, all of them banks. In August 1996 the bank introduced a non-collateralised overnight credit facility to enable primary dealers to finalise settlements. These credits are provided at a penalty rate (refinancing rate plus 30%).

With the establishment of RTGS the Bank of Russia is planning to redevelop the current refinancing facility so as to be able to provide liquidity to banks in order to avoid settlement queues. The new facility

will be based on a link between the RTGS and Treasury bill trading systems and the Treasury bill custodian. This project is facilitated by the fact that the Bank of Russia created the trading system and is now supervising and regulating all trading and technical aspects of this system. The bank, together with MICEX (owner of trading system), is also a shareholder in the custodian.

During the first stage Treasury bills will be used as collateral for overnight credits from the Bank of Russia. This will allow the bank to reduce its interest rates and will enable banks to use the facility in order to make all necessary payments. Furthermore, the bank intends to develop a system of intraday credits (also collateralised by Treasury bills) to enable intraday payment queues to be avoided.

In order to avoid intraday liquidity shortfalls, ensure a smooth settlement process, reduce systemic risks and prevent the build-up of payment queues, the following measures are envisaged:

- centralised management of payment queues during the day;
- the possibility of using optimised queue management algorithms on the basis of agreements concluded with credit institutions in the event of critical situations; and
- arrangements to ensure an even flow of payments throughout the business day.

Credit risks in the RTGS system will be managed by setting limits on the volume of credits provided to banks by the Bank of Russia and, primarily, by the use of collateral. The bank will guarantee the provision of intraday liquidity within the limits and on the conditions which it defines.

Moral hazard will be managed through the use of conditions on the granting of intraday liquidity, a tariff policy which will encourage an even inflow of payments during the business day and early submission of payments, and the imposition of sanctions for any violation of the rules of the settlement procedure.

Technical risks will be managed through hot reservation of hardware and software and data replication, the use of autodiagnosics, the establishment of an integrated system of control of telecommunication and information resources, upgrading of the professional skills of staff, timely servicing, the maintenance of climatic conditions in accordance with the technical specifications and the application of standard technological requirements to the hardware

and software of the credit institutions interfacing with the RTGS terminal.

The role of private clearing houses in providing special interbank settlement mechanisms ensuring guaranteed net settlement will be another important factor for intraday liquidity management by banks effecting settlements through the RTGS system. The Bank of Russia will support the operation of such clearing houses by drawing up the regulatory framework and providing the technical facilities for their interaction with the participants in its own clearing and settlement system.

### **The stages of RTGS implementation**

The development of the RTGS system will proceed stage by stage in conjunction with the creation of a regulatory framework, the installation of technical equipment and the provision of software and organisational support to the settlement units of the Bank of Russia.

The transition period will comprise two stages.

In the first stage, a two-tier settlement system will be introduced, with the Federal Settlement Centres (FSCs) constituting the first tier and the RCSCs the second tier.

The corresponding accounts of all banks and clients of the Bank of Russia will be transferred to the RCSCs and centralised processing of accounting and operational data will be launched at the regional level, with intra-regional payments being channelled via the RCSCs and inter-regional payments via the FSC.

The FSC will open accounts for inter-regional payments for each RCSC participating in the RTGS system as well as transit accounts for the booking of transactions between RCSCs located in different time zones in the event that payments are not entered in the recipient's account by the close of the business day at the RCSC which serves the receiving credit institution.

The FSC will keep the accounting records of every payment routed between the RCSCs as well as reconcile and record, on a daily basis, the end-of-day results of gross settlements between the RCSCs participating in the RTGS system.

During the first stage, the RTGS system will operate in parallel with the Bank of Russia's existing settlement system and will remain a relatively autonomous subsystem integrated into a single accounting and operational complex.

Among the factors determining the sequence of linking different regions to the RTGS system will be the volume of the inter-regional and intra-regional payments turnover and the availability of adequate telecommunications and computer capabilities.

Before the system is introduced, steps will be taken to optimise the region's settlement and data-processing networks.

The intra-regional RTGS components will be commissioned concurrently with the creation of the FSC.

Prior to the start of operations by the FSC, it may be that RTGS will be launched only at the intra-regional level, with the region being linked to the FSC and allowed to perform inter-regional settlements later.

As the regions providing the bulk of the payments turnover are gradually linked to the FSC, the second stage of the introduction of the RTGS system will start, with the opening of accounts for all settlement participants and the closing of their accounts with the RCSCs.

The terminals at banks and at the offices of Bank of Russia clients needed to provide the RTGS link will be installed on a voluntary basis.

With a view to reducing the FSC's workload in connection with the processing of the return payments from those regions not linked to the RTGS system and addressed to credit institutions and Bank of Russia clients which have accounts at the FSC, such payments will be processed and recorded by the RCSCs that have previously provided settlement services to the recipients, and subsequently recredited to the FSC.

The development of the RTGS network will be based on a standard hardware and software package that will be replicated and sent to the regions in accordance with a predefined schedule.

The integrity of the RTGS system will be supported by a single system of supervision ensuring the uniform monitoring of compliance with the settlement rules and procedures, data-processing functions and operating hardware and software components.

# Payment system developments in the People's Republic of China

Chen Yao Dong

## Introduction

The mission of modernising the payment system in China is to prepare a platform without which it is impossible for a socialist market economy to work smoothly and readily engage in the global economy. Both marketisation and globalisation are needed now. How to construct a national payment system to meet those two needs has become a revolutionary and strategic choice affecting the financial sector and whole economy in China.

### *Financial diversification and risk control*

Driven by the two trends, The People's Bank of China (PBC) has started to make great efforts to modernise the national payment system. Its objective is that, by the end of this century, a framework for China's National Advanced Payment System (CNAPS) will be in place, including:

- a legal framework for the financial sector and a set of mutually consistent rules;
- a plurality of institutions based on the legal framework and the rules;
- a range of payment instruments;
- a telecom-network based payment system infrastructure which can provide a variety of convenient (easy to use and swift), secure and low-cost services.

The subject of this presentation is how to construct and implement a payment system which can meet the needs of the times, that is, both for running the socialist market economy and for accessing the global market.

Since 1989, the PBC has launched three major payment system projects as well as a number of smaller projects. The first of the major projects is the EIS (Electronic Interbank System); the second is the CNAPS, begun in 1991; and the third is the "Golden Card"/"Bank Card"

project, started in 1993. The completion of these projects will bring about a fundamental change in China's payments sector, in which transactions have long been carried out mainly through manual operations and using a large amount of notes and coin.

Since China is the largest of the developing countries, with significant imbalances resulting from different rates of development between regions and industrial sectors as well as between rural and urban areas, it is tremendously difficult and complex to shift from an economy based on central control and planning to one essentially driven by the relationship between market supply and demand. The complexity and the difficulty of the task are major challenges that we are facing; to put it briefly, "a big ship is difficult to turn around". We do, however, have a good opportunity, in that, to quote another saying, "a latecomer should learn from mistakes previously made by others". This means that, in the context of the policy of opening its door to the outside world, China can use the experience and knowledge accumulated by other countries, especially the G-10 countries, as a reference, in order to learn and adopt mature and effective methodology and technology verified by practice elsewhere.

This is the case, for example, in the redesign of the national payment system in accordance with the two-tier banking structure: on the one hand, to adopt RTGS with DVP and PVP functions, in order to strengthen safeguards against systemic risk; on the other hand, to re-engineer the electronic bulk payment system to incorporate netting arrangements among all participants, in order to reduce costs and increase efficiency.

In view of the fact that China is still in the primary stage of socialism, a central policy is to maintain the strategy of "gradual advance", that is, "to cross the river by stepping stones". Any significant reform should therefore first take the form of a pilot project of limited scope; once enough experience has been acquired and the major laws have been identified and understood more clearly, the scope can be broadened, step by step. China is still a developing country and different from more developed countries. On the one hand, we have to apply general essential principles, but, on the other hand, we should also avoid "cutting all at once". We cannot deal with all regions, rural and urban areas, as well as industrial sectors without differentiation. Experience has demonstrated that this strategy, viewed overall, has already achieved rather positive and reliable results.

## Trends of change

### *Shift towards financial sector diversification and emphasis on risk control*

The major features of change in China's financial and payment systems are:

- a shift from a single bank to a diversity of financial institutions;
- a shift from focusing solely on increasing efficiency in clearing and settlement arrangements to paying more attention to preventing risk.

In the last 18 years, China's GDP has grown at an average annual rate of about 10%, with a significant increase in the income of individuals. The direct result of this change is that the opportunities open to consumers have continually increased, while consumer preferences have become more individualised and diverse. This in turn has led to a diversification of financial institutions, financing methods and financial instruments.

### *Diversity in the financial and payment system sectors*

The financial infrastructure has shifted from a single bank monopoly for all banking business to a two-tier banking structure with a plurality of institutions. A framework was developed that provides for different types of financial institution, including banks (central bank, state-owned commercial banks, policy banks, cooperative banks, and commercial banks) and non-bank financial institutions (trust and investment companies, securities companies, finance companies, insurance companies).

Financing methods have shifted from traditional bank deposit-taking and lending towards trading in a variety of financial assets, including securities, bonds, drafts and bills. Payment methods have shifted from cash to cashless funds transfers via bank accounts. Payment and settlement services have shifted from manual procedures to various forms of automated electronic processing.

### *Increased exposure to financial risks*

The emergence of a financial market, including a money market and a capital market, and of a variety of financial products and instruments creates both profit opportunities and financial risks, which are becoming a

reality for a wider section of society. In mainland China, the number of accounts held by participants involved in stock exchange transactions stood at about 31 million at the end of August 1997. The total market value of the stocks listed on the Shanghai and Shenzhen stock exchanges has reached about 1,600 billion yuan.

While, in comparison with developed countries, the scale of the financial market is still limited, people are now not only concerned about efficiency in accessing and circulating cash, but are also starting to pay attention to the risks arising from financial trading and payment services. They have become aware of the fact that a lower level of risk means more stable and reliable returns.

On the one hand, financial institutions, financing methods, financial instruments and payment and settlement services are all diversifying; on the other hand, all the financial sector reforms are intended to strengthen risk control. The impact of the change is profound.

### *Emphasis on risk control*

To improve the situation, both management and operation have to follow laws and regulations. A series of laws and regulations have been enacted, including:

- Framework for Implementing Asset/Liability Ratio Management of Financial Institutions [1994, by the PBC];
- Law of the People's Republic of China on The People's Bank of China [18th March 1995];
- Commercial Bank Law of the People's Republic of China [10th May 1995];
- Law on Negotiable Instruments of the People's Republic of China [10th May 1995];
- General Rules on Loans [28th June 1996];
- Provisional Monitoring Indicators for Asset/Liability Ratio Management of Commercial Banks;
- Provisional Regulations on Warranty and Credit Authorisation of Commercial Banks;
- Provisional Regulations on Pawning;
- Provisional Regulations on the Qualifications of the Senior Management of Financial Institutions;
- Regulations on Avoiding Unfair Competition in Deposit-Taking.

## Payment system projects in China

### *The challenge of the optimal use of information*

A major challenge is how to ensure that the right information is obtained at the right time from the right financial markets in a dynamic context, and how to put that information to optimal use. The challenge of controlling risks is, in essence, the challenge of using information. There are two keys: one is to identify the object and scope; the second is to build an infrastructure through which data and information can be captured, transmitted, processed and used more promptly and safely.

Since China's economy is expanding rapidly, it is very important to identify the credit-worthiness of financial institutions. Since state-owned enterprises bear a large part of the historical and social burden in the economic transition, it is also very important to monitor their financial position in order to make decisions about macroeconomic policy. To safeguard the interests of investors, setting reasonable rules for the disclosure of information has become an urgent task, especially after the financial problems of Mexico, Thailand and other countries. The PBC and other banks have devoted a great deal of human, capital and physical resources to the modernisation of the national payment system in China. They see it as a strategic part of the national computerisation and modernisation programme.

China's National Advanced Payment System (CNAPS) project has forced us to make a number of crucial and strategic choices. Since mid-1980, we have taken a number of steps to develop our payment system:

- in 1988, we embarked on a reform of settlement instruments, promoting the introduction and use of drafts, promissory notes, cheques and bank cards. With the formal promulgation of the Law on Negotiable Instruments, the volume of bills expanded and their financing function increased further;
- in 1989, we started establishing the Electronic Interbank System (EIS) and a private satellite transmission network to provide its infrastructure.

The objectives of the EIS project are:

- to strengthen the central bank's macroeconomic management;

- to reduce float, speed up the circulation of funds and increase the efficiency of funds transmission;
- to improve convenience and service to users;
- to achieve a reliable, secure and integral payment, clearing and settlement system to meet the needs of a growing economy;
- to expand flexibility and modularity to suit Chinese conditions.

In 1990, we started to design and implement the CNAPS pilot project, with the support of the World Bank and the Government of Japan.

The objective of the project is to build a new national automated payment system by the middle of 1999.

The project will include:

- a national processing centre for the payment system in Beijing;
- a backup centre in Wuxi, Jiangsu Province;
- 20 city-level clearing and processing centres;
- 80 county-level branches;
- a new network communication system which will connect the three levels of processing centres.

There are three application systems on the network system:

- a high-value clearing system with an RTGS function;
- a bulk electronic system with a net settlement function;
- an account management system for executing final settlement across reserve accounts with the PBC.

In 1993 we embarked on the "Gold Card" project, a major part of which is the "Bank Card" sub-project. The goal of the project is that, by the beginning of the next century, about 300 million payment cards will have been issued in about 400 cities and some of the developed coastal regions.

In 1994 the National Foreign Exchange Trading System began operations.

In 1996, the National Bond Trading System began operations.

In 1995 it was proposed both to expand the network into each county and to establish an electronic connection "between heaven and earth" i.e. to connect the satellite network used for the inter-city link with the city-level WAN, or wide area network, in order to be able to send a payment message from a branch in one city to another branch in another city. While inter-city transmission takes three seconds, intra-city

transmission often takes three days. As someone said, three seconds for heaven, and three days for earth.

In 1996 the PBC set up a joint venture with the PTT, the major state-owned commercial banks and the People's Insurance (Group) company of China named the Zhong Yuan Company or China Financial Data Network Company Limited (CHINA FINET). Its main task is to establish an optical fibre backbone network connecting about 400 large and medium-sized cities, including 30 large provincial capitals. Over 200 cities have already been connected via this backbone network. High-speed frame relay communication technology will be adopted.

In 1997, a national bank card centre to provide services for interbank transactions was established.

All these efforts will push China's payment system towards modernisation and the National Advanced Payment System will provide the right conditions for the country's marketisation and globalisation.

## **Challenges in the development of Vietnam's payment system**

Le Phuong Lan

After a long period under a centrally planned economy, Vietnam is now moving towards a market-oriented economy. In recent years, the country has made significant progress in the process of economic development. Trading transactions throughout the economy have increased, leading to a rise in the demand for payments. Although the bank payment system has been improved considerably, due to the existing technology, legal framework and other infrastructure, the payment system still falls short of the economy's demand for payment transactions. Therefore, the use of non-cash payment instruments is limited. In other words, a significant proportion of payment transactions are carried out in cash. With the current efforts to develop the payment system, we hope that we can gradually put an end to the so-called cash economy. The present paper focuses on the development of the existing payment system, the internal issues and external constraints in the development process and the solutions adopted. It will deal in turn with the development of Vietnam's payment system, the challenges faced in developing the system, and, finally, the solutions envisaged and the future orientation of the system.

### **Development of the payment system in Vietnam**

#### *An overview*

The financial sector in Vietnam consists essentially of the banking sector. The State Bank of Vietnam (SBV) was the country's monobank until 1988, when commercial and central banking activities were separated. Financial reform began at the end of the 1980s, extending banking services to include a wide variety of ownership structures. Since then, a large number of financial institutions have been established. The present banking system includes many types of bank: state bank, state-owned commercial bank, joint-stock bank, joint-venture bank, foreign bank branch, credit

cooperative, etc. The total number of branches and bank offices of all types amounts to over 4,500.

The State Bank of Vietnam is the country's central bank, which acts as the regulator and supervisor of the banking system. The SBV's role is steadily evolving as it modernises its operations in the context of a developing market economy.

The SBV has its head office in Hanoi and branches in each of the country's 61 provinces. These branches are also involved in a variety of central banking activities such as supervision and the clearing and settlement of payment transactions.

The commercial banking sector is dominated by four state-owned banks which account for around 80% of commercial bank operations in Vietnam and have the largest number of branches.

#### *The payment system*

The intrabank payment system has improved significantly in recent years. Almost all commercial banks are now equipped with modern computer networks. As a result, an intrabank bank funds transfer can be initiated and completed the same day. The presence of foreign banks with modern technology and offering high-quality service means that the domestic commercial banks have no choice but to apply the new technology to their payment systems and enhance the quality of service in order to maintain their competitiveness and market share. Procedures for intrabank payments depend on the degree of computer support available at branch level and on the size of the branch network. In general, commercial banks centralise the processing of inter-branch transfers at one regional centre, and transfer requests are made via computer using dial-up links. Branches effect their transfers via their accounts with the regional centre. Within a province, branches act for sub-branches and make transfers to each other mainly via the postal system. Inter-provincial transfers are sent via dial-up link for processing via accounts held at the head office.

The interbank payment system is now regarded as underdeveloped, despite its recent improvement. The mechanism of this system can be outlined as follows: each branch of a commercial bank has to open a settlement account with the SBV's branch in the province where it is located. The SBV's branches act as provincial clearing centres for the

processing of intra-provincial payment transactions. Intra-provincial interbank transfers are made through an exchange of paper documents between banks at two clearing sessions per day. For inter-provincial (non-local) interbank payment transactions, in addition to sending paper documents, electronic instructions must also be sent through the national communications network set up by the SBV's Centre for Informatics of the Bank (CIB). In the CIB network, transfers are processed by the provincial SBV branch, which inputs information into the CIB system. The CIB then routes the transfer to the appropriate receiving SBV branch. Settlement accounts are debited and credited accordingly upon receipt of a copy of the transfer document.

For foreign payments, 20 Vietnamese banks have joined S.W.I.F.T. and the system allows their branches to transmit and receive foreign payments via their respective head offices. At present, the number of transactions through this system is over 2,500 per day.

#### *Payment instruments*

The range of non-cash instruments is limited at present, and they are mainly paper-based. The most commonly used non-cash payment instruments are authorised payment orders, which account for nearly 70% of all non-cash payment transactions. Recent improvements in the area of cheques include a single format for all types of cheque and the transferable cheque. Payment vouchers were introduced in 1994 and are now accepted as a convenient payment instrument. International credit cards were first issued in Vietnam in 1995 and their use appears to be increasing.

#### *Payment volume*

The turnover of all payment transactions made through the banking system in 1997 will be about 1,500,000 billion Vietnamese dong (equivalent to US\$ 120 billion), with about 6 million transactions, of which 60% are carried out through the commercial banks' internal payment systems. Of the interbank payment transactions about 60% are made through the local (provincial) clearing centres.

Cash payments account for over 40% of all payment transactions. Generally, Vietnam's payment system seems to be underdeveloped.

## Challenges

### *Technology*

Many bank branches lack the appropriate equipment to serve a modern payment system. The shortage of funds is the main difficulty in modernising the payment system at many banks.

The poor infrastructure of the communications network is another stumbling block for electronic funds transfer. Even though the clearing time has been reduced from seven days to one or two days, the payment transactions from and to remote locations are sometimes delayed.

The payment instruments available and the quality of banking services do not meet the needs of customers for a low-cost, confidential, convenient and reliable payment medium which is essential to a market economy. In addition, because the use of payment instruments is sometimes complicated, many people prefer cash to non-cash instruments when conducting payment transactions.

The current payment system is unable to cope with the anticipated significant increase in the volume of monetary transactions that is characteristic of the development process. Most inter-provincial payments are carried out through a combination of intrabank and local interbank transfers, lengthening the execution time significantly.

The lack of knowledge of the SBV's staff about modern payment mechanisms is another factor hampering the development of the system. Even though the SBV has held many training courses for its staff, the results still do not meet requirements. The low level of SBV salaries compared with the commercial banks is obviously the greatest obstacle to improving the staff's qualifications, since the SBV cannot attract well-trained, experienced and skilled persons. This is the major constraint on the pace of modernisation of the payment system.

In the absence of a national clearing centre, branches of commercial banks have to open accounts with the provincial branches of the SBV. This leads to an inefficient use of funds for all commercial banks, especially given the lack of an effective mechanism for transferring funds rapidly between provinces in the event of a shortfall or surplus. As a result, the cost of the payment system is raised. It is difficult to optimise the use of all payment accounts throughout the country. Commercial banks have to maintain a large amount of money in their payment accounts at the SBV's

provincial branches in addition to their compulsory reserves with the central bank.

The choice of payment instruments is limited and does not meet modern requirements. The constraints of the current payment systems make it difficult to develop new products and to offer new services which could become an important source of fee income for the commercial banking sector.

### *Legal framework*

According to the Decree Law on the State Bank of Vietnam of 1990, the SBV is responsible for organising settlement in the banking system. In addition, Government Decree No. 91/CP of 25th November 1993 establishes a legal framework for the organisation of payments in the banking system.

The other important piece of legislation concerning the payment system is Government Decree No. 30/CP promulgating the regulation on the issuance and use of cheques dated 9th May 1996. This Decree has clarified the obligations of the various parties involved in cheque transactions. In addition, cheques can now be transferred. Many provisions of this Decree are similar to those in cheque laws in other countries.

However, the legal framework has still not been completed and has certain features that may restrict payment transactions through the banking system, namely:

- overdrafts on payment accounts (i.e. current accounts) are not permitted. A customer can only conduct a payment transaction through a bank if he holds sufficient covering funds on his payment account;
- the penalty for abuse in the processing of payments has not been completely defined by regulation, raising the risk in payment transactions through banks.

### *External constraints*

Vietnamese per capita income is still low, standing at only US\$ 300. Vietnam is in the lowest per capita income group in South-East Asia. Thus the cost of transactions through banks is too high for the average level of

income. The demand for holding deposits with banks and making payment transactions through banks is very low.

The Vietnamese people tend to prefer to use cash in payment transactions rather than non-cash instruments. Some people find difficulty in using cheques or other payment instruments when they are required to fill in cheque forms and other documents. Many people are reluctant to make payments through banks.

The level of development of the trading and services system also affects the scope for expanding payment transactions through banks. Most trading transactions between individuals are on a small scale and take place in retail markets, where non-cash instruments such as credit cards or cheques are too costly.

The differences between various types of bank, especially between foreign and domestic banks, in terms of sophistication level, payment equipment and technology lead to differing views on the same rules and regulations. This makes it hard for the regulator to draw up a uniform regulation for all types of bank without giving rise to complaints.

## **Solutions and orientation**

### *Modernisation of the bank payment system*

The modernisation of the bank payment system is the focus of attention in the strategy for developing the banking system. With the aid of a loan of US\$ 49 million from the World Bank, Vietnam's payment system is now undergoing modernisation. Our ultimate objective is to help develop a modern banking sector capable of meeting the needs of a growing economy, thereby increasing confidence in the Vietnamese banking system. The immediate objectives in the coming years are to improve payment services in the economy in order to reduce float, speed up transfers of funds and increase the efficiency of funds transmission, while offering convenience and service to users; and to strengthen the operational capabilities of participating banks in order to stimulate commercial bank initiatives to improve internal management and customer service.

The national interbank payment clearing and settlement system will satisfy the needs of both the SBV and the commercial banks. Under this system the SBV is planning to build a national clearing centre in Hanoi and to set up a clearing centre in the suburbs of Hanoi that will provide local and non-local interbank clearing and settlement services for all payment transactions throughout the country. The interbank payment system will comprise:

- a small-value subsystem for credit transfers and pre-authorised debit transfers, able to handle batch payments as well as individual payments; and
- a large-value subsystem for credit transfers, providing a real-time gross settlement facility for individual time-critical payments.

With the new system, settlement accounts will be centralised, thus facilitating better treasury management and freeing up resources that can be used for productive purposes. The centralised account will also eliminate the fledgling interbank market as banks rationalise their liquidity management.

Commercial banks' intrabank payment systems will be upgraded. The modernisation project also aims to meet the intrabank and international payment needs of the six participating banks. Each participating bank's system will be able to handle all domestic intrabank payments, both within and between provinces. The generalised Commercial Bank Payment Systems architecture is also capable of accommodating the changing needs of the commercial banks as they implement their plans to improve customer accounting.

In the area of international payments, the number of banks which are members of S.W.I.F.T. will be increased. The stand-alone S.W.I.F.T.-based international payment facility introduced at the head offices of the commercial banks will be integrated with their payment systems. The modernisation of payment technology will provide the commercial banks with a special application that will allow them to freely execute out international correspondent payment transactions through S.W.I.F.T.

As part of the modernisation project, the communications network and equipment for payment transactions will be upgraded. The time needed for the execution of a payment transaction through the banking system will be shortened significantly, especially for large-value funds transfers.

### *Improving the telecommunications network*

Improving the telecommunication infrastructure is one of the highest priorities of the SBV. Significant investments are being committed to upgrading physical circuits and installing a modern telecommunication infrastructure backbone. Vietnam is currently in the process of completing an X.25 data communications network.

### *Developing new payment instruments*

The improvement of the payment systems will enable banks to develop new payment instruments. The SBV is drawing up a regulatory framework for the issuance and use of bank cards and the settlement of bank card transactions, creating the necessary conditions for expanding the use of bank cards in Vietnam.

### *Completing the legal framework*

The SBV is playing an important role in the development of a comprehensive legal framework for payment operations. Regulations governing electronic funds transfer systems are currently being formulated. When complete, these regulations will provide a legal and regulatory framework to underpin all aspects of modern electronic payment operations.

The Decree on Cheques will be upgraded to a law. Our objective is to simplify the cheque form and fulfil the regulations on cheque use and issuance in order to make cheques more popular in payment transactions.

The ultimate objectives in building the legal and regulatory framework are to ensure that:

- procedures and regulations for system operations are clearly documented;
- specific rights attaching to existing or newly proposed non-cash payment instruments, in both paper and electronic form, or relating to the way they are handled and settled, are formalised;
- payment system participants, as providers of services and users of instruments, are clear as to their rights, responsibilities and obligations to each other and enjoy protection in the event that fraud or mistakes by other participants result in a financial loss;

- internationally accepted standards, definitions and procedures are adopted to the extent possible.

### *Staff training*

Staff training and development are among the most important factors that will influence the success of the payment system development process. The training plan is focused on three main areas:

- application training will meet the needs of technical staff and end-users (system operators, supervisors and managers) and train them in the use and operation of interbank and intrabank payment system applications;
- technical training will provide the skills required to support the installation, operation and maintenance of the computers and telecommunication equipment and services;
- management training will focus on interpreting and using the information that will be generated by the system.

### *Conclusion*

A well-functioning payment system is necessary for underpinning efficient financial sector development as well as increasing confidence in the banking sector. With the improvements in our payment system, the volume of payment transactions executed through banks is predicted to increase by 30% annually after 1998.

By strengthening the operational capacities of the banks and enabling them to provide a range of new banking products and services to their customers, the future payment system will meet the demands of a fast-growing, market-oriented economy.

# Payment systems in the Republic of Armenia

Gevorg Machanyan

## Introduction

The collapse of the Soviet Union was followed by the dismantling of the unified banking system in Armenia. Consequently, the Central Bank of Armenia had to solve a number of problems, related in particular to the existence of an enormous amount of non-payments on settlements between enterprises and organisations operating within Armenia, the lack of a legal framework regulating interbank settlements, the inadequate infrastructure of the banking system, an energy crisis and a paralysed postal delivery system.

During 1993–97 the Central Bank of Armenia took active steps to tackle these problems, to establish new settlement relationships and to improve interbank settlements. New projects have been undertaken not only to resolve the present-day issues relating to the payment and settlement system, but also to define the future system.

Let me first give a brief account of the current situation in our payment and settlement system and then describe the steps that the Central Bank of Armenia is taking to develop the system and all the associated problems.

## Payment and settlement system reform

In the Republic of Armenia there are 29 commercial banks with 173 branches; of these, 28 banks and 42 branches are located in the capital Yerevan.

At present, banking activity is regulated by the following laws:

- the Law on the Central Bank of Armenia (30th June 1996);
- the Law on Banks and Banking (30th June 1996);
- the Law on Bank Bankruptcy (29th June 1996); and
- the Law on Banking Secrecy (14th October 1996).

Payment and settlement relationships are governed by:

- the Law on Funds Transmission by Payment Order (30th June 1996) as well as a number of other laws;
- the resolutions, instructions and regulations issued by the central bank; and
- interbank agreements.

To coordinate the work of developing the payment and settlement system in Armenia, an interbank Committee on Payment System Development was established in April 1994 with the participation of representatives from the central bank and commercial banks.

The development of the domestic payment system has been carried out in the following phases, reflecting the concentration of payment activity in Yerevan and difficulties with physical delivery at the inter-regional level:

- the introduction of new payment procedures in Yerevan;
- the introduction of new payment procedures for intra-regional payments; and
- the introduction of new payment procedures for inter-regional payments.

All licensed banks hold one correspondent (settlement) account at the Central Bank of Armenia. Compulsory reserves are held in the same accounts. The number of correspondent accounts that commercial banks may hold at domestic and foreign banks is unlimited.

Settlement on the accounts at the central bank is same-day, final and irrevocable. In order to reduce risks, all settlements are on a gross basis.

In individual cases anticipated shortfalls in funds can be covered by loans from the central bank using government securities as collateral.

At present, there are no separate large-value and low-value interbank systems. Essentially, all payments are effected by two basic interbank settlement mechanisms operated by the Central Bank of Armenia – gross (electronic and paper-based) systems and a clearing system (in operation since 1994).

Since February 1995, Armenia has been operating an intra-regional payment system.

The central bank has introduced uniform codes for banks, their branches and customer account numbers based on EBS200 as well as national formats for electronic messages based on ISO and S.W.I.F.T. standards.

In March 1997, the central bank (where the main terminal is located) and eight commercial banks (with a shared connection through the main terminal) were linked to S.W.I.F.T. The work of linking up another four banks is in progress.

Also in March 1997, the central bank issued a special resolution setting a time-limit for the execution of interbank transfers in Armenia. Penalties are imposed if transfers are delayed. The procedure and the level of penalties and fines for delays and incorrect payments are defined by an interbank agreement on payment deadlines and the establishment of interbank arbitration, according to which the party at fault must pay a penalty in respect of a delayed payment equivalent to twice the refinancing rate for the whole period of delay.

As part of the development of the interbank payment system, the central bank is implementing an interbank wide area network (called CBANet) and an electronic funds transfer system (called BANKMAIL) for all banks, their branches and the Treasury. In November 1997, 20 bank head offices, 14 bank branches and 34 Treasury branches were connected to CBANet, while 15 commercial banks are making electronic payments using BANKMAIL. The extension of BANKMAIL to other commercial banks is in progress.

The central bank has started work on setting up a securities accounting and book-entry settlement system using the delivery-versus-payment principle. This work will be completed in 1998.

In the area of retail payments, the central bank plans to set up a National Interbank Card System in the Republic of Armenia and implement new payment instruments using the CBANet.

### **Problem areas**

In the process of developing the payment and settlement system the central bank encountered a number of problems that hampered progress, namely:

- poor cooperation between commercial banks;
- a lack of commercial bank staff sufficiently qualified in the area of payment systems;
- inadequate equipment and a lack of reliable communication links at the commercial banks;

- the absence of a tradition of providing banking services and inadequate bank structures;
- a population unaccustomed to using banking services;
- commercial banks' lack of experience in the area of security and protection of information;
- the large volume of cash in M1 (52%). Individuals and business entities generally make payments by cash, without using the banking sector; and
- the limited number of payment instruments (89% of non-cash payments are made by payment order).

### **Conclusions**

One of the basic objectives of the Central Bank of Armenia is the creation and development of a modern payment and settlement system. The Bank is therefore playing an active role. During the reform process we have learnt some important lessons concerning the functions that the Bank must perform. These include:

- the redefinition and regulation of payment and settlement relationships;
- the establishment and improvement of payment and settlement systems;
- the supervision of their operations;
- the provision of payment and settlement system services and, on the basis of experience, other functions such as training of commercial bank specialists and the consolidation of banks' resources in order to implement interbank projects (S.W.I.F.T., National Interbank Card System, interbank arbitrage).

Experience has shown that sometimes the central bank has to take initiatives, as was the case with the implementation of S.W.I.F.T., CBANet and BANKMAIL. Otherwise, as with plastic cards, the banking sector may not achieve satisfactory results and may consequently turn to the central bank to take the lead.

During the planning and introduction of innovations in the banking sector the central bank needs the advice of the commercial banks, but sometimes it has to issue strict instructions within the limits of its rights to oblige the banks to follow its payment system policy (as was the case

with uniform customer account numbers, the setting of a time-limit for the execution of interbank transfers, etc.).

We have greatly benefited from learning from international experience, the cooperation and coordination of our work with international organisations (IMF, BIS, TACIS, USAID), and the technical assistance received from them and, especially, from central banks.

# The experience with payment system reform in Bulgaria

Alexander Zinzarski

## Introduction

Starting in 1990, more than 25 countries in Central and Eastern Europe and the former Soviet Union faced fundamental structural changes not only in the financial markets, but in their overall political, social and economic structures. In fact, many systems of national importance had to be built from scratch rather than reformed: creating a system from scratch may indeed be termed an extreme example of reform.

The above statements were particularly valid for the banking systems in those dramatically reforming countries. As is well known, the socialist type of centrally planned economy provided for a single-tiered or mono-banking system. In such cases the central bank was usually the only commercial bank as well, and the payments running across the country were in fact intrabank payments between different branches of the same bank. Settlement did not exist.

Building a two-tiered banking system and an appropriate and sophisticated interbank payment and settlement system was indeed an extreme example of reforming the existing environment – very close to the case of building from scratch.

Facing such a situation, in which the normal continuation of processes is missing and a long series of radical steps needs to take place, we recognised that, first of all, as a general policy issue we had to make a choice between at least three possible ways of carrying out this major reform: the easy way; the fast way; and the right way. This policy task was, furthermore, complicated by the fact that these three ways may be defined or appear in practice in different manners.

A common example of the easy way would be to try and “buy” a payment system. This way of thinking sounds reasonable to many specialists and managers, who believe, or rather hope, that this process can be undertaken on a cash-and-carry basis by large, or very large,

commercial entities from the developed countries. Many tenders have been carried out during the last few years based on this kind of logic. The easy way usually either fails or produces poor results and takes much longer than predicted.

An example of the fast way could be: we will do it by ourselves, but why reinvent the wheel when we can copy one-for-one an already developed, sophisticated payment system. This approach does not take into account local circumstances, especially in a transition period, and it usually also fails and is not fast at all. Adopting something one-for-one, but in a completely different environment, takes more effort and is, in the end, more time-consuming than doing something from scratch.

There is always, of course, a right way. The problem has to be defined. We recognised that a simple definition, like for instance the counter-concept of the easy and the fast ways, is useful and works to a certain extent, but is not enough. So, in addition to the latter, we decided from a policy point of view to define the right way as an adaptation of three basic principles. It should be pointed out that these principles were derived from the country-specific environment in Bulgaria, and not from any internationally valid theory or standards.

Principle 1 is in fact the answer to the following question: what is the payment system? Is it the set of legislation, regulations, standards, critical decisions, bilateral and multilateral conventions and message system? Or it is rather the set of computers, software and telecommunications? We came down in favour of the first answer to this question. Establishing this already defines the areas of greatest efforts, attention, commitment of the institutions, etc.

Principle 2 relates to the choice of a competitive, administrative or cooperative model. As a major policy issue, seven years ago we decided in favour of the cooperative model. Its basic characteristics are well known. A big surprise for us was that it was easier to establish and start running the cooperative model than to maintain it continuously. This is a very important policy issue and at the same time represents a real danger of compromising the reform.

The third principle is that any domestic interbank payment and settlement system must be efficient from both the investment and the expense point of view. This must apply to the overall as well as the detailed design of the system. The design must be based on a series of analyses, which should include the full set of appropriate dimensions and

their values such as the number and types of banks, the number and infrastructure of branch offices, the payment instruments and frequency of their use and the available telecommunications infrastructure.

The Bulgarian interbank payment and settlement system BISERA (Banking Integrated System for Electronic Transfers) was developed during 1991–92. It has been in operation since October 1992. Two major upgrades were implemented in June 1995 and May 1996, defined as BISERA 2 and BISERA 3. The development of the BISERA system was based on the three major principles, on which a consensus was reached by the central bank of Bulgaria – BNB (Bulgarian National Bank) – and the community of Bulgarian commercial banks. The following is a brief description of the way the Bulgarian interbank payment and settlement system was reformed and developed during the last seven years.

### **Implementation of Principle 1**

A domestic interbank payment and settlement system is founded chiefly on the relevant legislation, regulations, standards, critical decisions, bilateral and multilateral conventions and message system, and to a much lesser extent on computer hardware and software.

#### ***Legislation***

The legislation governing BISERA is based mostly on the Law on the BNB, the Law on Banks and Credit Activity and the Bulgarian Commercial Law. Of importance in this context is the almost full independence of the central bank from the Government and even from Parliament (the BNB reports to Parliament but independently formulates and implements monetary policy). It has the right by law to define efficient payment mechanisms in the banking system. The BNB has full powers of supervision of the banks, and has sole legal authority to issue all types of bank regulations and standards, including for the payment and settlement system.

#### ***Regulations of the payment and settlement system***

The regulations governing the BISERA payment and settlement system are based mostly on the “Ordinance of Payments” issued by BNB. It

covers the basic definitions of the payment instruments, settlement principles, finality and irrevocability of payments, the set of basic rights and obligations and other general rules in the payment process, including definitions of the bank accounts through which payments are performed.

### **Standards**

The BUS (Banking Unified Standard) standards are based on the Ordinance of Payments and define and describe all concrete steps in the payment process. They form an integral part of the Ordinance of Payments and can be modified and/or extended by the issue of new standards by the BNB at any time.

### **Critical decisions**

As a general approach to the design of the basic principles and rules of BISERA we adopted the well-known method of defining questions and trying to find the best possible answers for the particular banking and economic environment in Bulgaria. For this purpose, during 1990 a special formal unit, approved by the BNB and called the PMU (Project Management Unit), was established and drew up a BISERA questionnaire with about 100 questions and answers, considering a number of key areas including legal regulations, banking regulations, regulations for the execution of payments, regulations on settlement and conventions, security, information and technological regulations, requirements for the telecommunications technology, risk management and the tariff system.

Out of the long list of issues to be addressed, a special set of so-called critical decisions were isolated and dealt with at senior management level, including the PMU and the BNB management. Some of the major questions we resolved are discussed below.

*Should the interbank clearing procedures be separated into a high-value/low-volume mechanism and a low-value/high-volume one?*

It was decided not to build two separate systems. One of the possible reasons why developed countries have separate systems is that 5% of the number of payments often represents 95% of the value of interbank funds transfers (the so-called 5 to 95 rule). This reflects the importance in these countries of financial market transactions involving securities, money

market instruments and foreign exchange. Also, the number of retail transactions in interbank arrangements in these countries is very high, reflecting the rapid move from cash to non-cash payment methods by bank customers. However, the risk of systemic disturbances in (net) settlement arrangements for low-value transfers (e.g. unwinds) is probably limited in developed countries since banks there are typically liquid. Finally, it may be economic to have separate systems in developed countries even if it means greater investment and operating costs and introducing separate risk control mechanisms.

The situation in Bulgaria, and possibly in most other transition countries in Eastern Europe and the former Soviet Union, is different. In Bulgaria, for instance, 80% of the volume of interbank funds transfers represents 20% of the total value of transfers, so that difficulties with high-volume clearings can have more significant effects on the settlement of interbank fund transfers. Also, the liquidity position of banks is low and can cause funding problems even for relatively small interbank settlement obligations. Financial market activity, for instance securities market trading, will take some time to develop in countries in transition. Finally, the total number of interbank payment transactions is low (in Bulgaria 60,000 to 100,000 per day) compared with developed countries. There are no clear reasons to expect that volumes will rise to levels seen in developed market economies. Investing in separate interbank payment systems for the present and foreseeable volumes would therefore be uneconomic.

The lack of experience with risk management in Bulgaria – as elsewhere in Eastern Europe and the former Soviet Union – is obvious. This is a key concern of central banks in countries in transition given the high level of domestic inflation and the need for a restrictive monetary policy stance, the chronic illiquidity of banks and the bouts of financial speculation and the resulting difficulties with bad loans. This calls for simple and efficient procedures to deal with payment system risk which are easier to implement in an integrated system.

*Should a net or a gross settlement procedure be applied?*

It was decided to opt for a gross settlement system to be operated with (overnight) batch processing (with settlement in the morning of the next day). We analysed the advantages and disadvantages of net and gross

settlement in terms of liquidity requirements, systemic risk and settlement finality. The following considerations influenced our decision:

- introducing well-defined bilateral credit limits in a net settlement system would be almost impossible since this would require a high degree of automation and sophisticated information technology including real-time information flows between the banks as well as experience in monitoring intraday positions;
- introducing overall multilateral limits for participants in a net settlement system would be equally difficult;
- it could not be expected that banks would be able to quickly integrate their payment business with their treasury and internal risk management;
- it was doubtful whether banks could be persuaded to enter into loss-sharing agreements (for instance on the lines of those of CHIPS);
- the BNB was not willing to accept the risk related to net settlement procedures (e.g. standby liquidity facilities to “lubricate” the system);
- it was not recommendable to allow information on non-final transactions (i.e. those not settled during the day) to be transmitted to the receiving banks so that the ultimate recipient of the funds could be credited;
- given the chronic illiquidity of banks reliance on unwind provisions to deal with settlement failures would be useless;
- it would be possible and helpful to reduce the disadvantage of gross settlement procedures in terms of higher liquidity needs by designing a proper queuing mechanism even if the system was not working in real time but through file transfers one or more times during the day;
- it would be possible and helpful to split large-value transfers into two or more parts without requiring too much sophistication on the part of the banks;
- withdrawal of transactions before settlement would be possible only in real time or with multiple transfers during the day;
- it was possible to provide for on line monitoring of banks’ current account with the central bank even with multiple file transfers during the day;
- it would be quite possible to define and apply different priorities for payment transactions apart from the first-in-first-out (FIFO) principle in a batch processing environment.

Thus, for our environment, and presumably as in many Eastern European and former Soviet Union countries, we came to the conclusion that while there were almost no possibilities to reduce the disadvantages of a net settlement scheme in the near future, it was quite possible to limit the disadvantages of gross settlement mechanisms to an acceptable degree from the beginning.

*Should all payment instruments be cleared and settled through the same mechanism?*

We decided yes. It would mean that the system (BISERA) should be devised with a proper message system that would allow the clearing and settlement of different payment instruments.

*Should the system allow the transmission of interbank instructions only from one central point (e.g. head office or main data-processing centre) for each bank or should bank branches be allowed to connect?*

We opted for the second solution. It was recognised that this would require an appropriate accounting mechanism to keep track of the position of each branch of each participating bank as well as of the overall position of each bank. A properly constructed message system would allow the processing of interbank as well as intrabank transfers.

*How long should be the lag between the debiting of the payer’s account and the crediting of the payee’s account?*

It was agreed that the debiting of the payer’s account and the crediting of the payee’s account should be for the same value date. Payment instructions would be collected on the day prior to the settlement date and processed during the following night (batch). Information on the settled transactions would be available to the receiving bank on the morning of the settlement day with mandatory crediting of the payee’s account by 08:00 the next day.

This required specific regulations defining the settlement cycle, the proper definition of the finality of payments and its consequences, a strict schedule for BISERA clearing operations and final settlement in the accounts of the BNB, and the inclusion of penalty provisions in the conventions governing the system.

*What should be the operating environment?*

It was agreed to construct from the beginning a fully electronic system. The exchange of data media would be used for backup purposes only. A specialised X.25 network was built for the whole banking system, called BANKNET.

*Who should operate the BISERA system?*

It was agreed to set up a joint stock company – called Bankservice – owned by all the participating banks and the BNB.

*Should there be single or multiple verifications of payment messages?*

Payment messages would be checked both at the entry point (bank branch) and at the settlement centre. An extended set of verifications would be used (about 120 checks at both levels).

*Should priorities be given to payment instructions?*

The FIFO rule would be applied for all payments. A court ruling relating to transactions between the BNB and a commercial bank necessitated a strict application of this rule (though it applied to interbank transfers for banks' own proprietary transactions). The FIFO time stamp would be created at the sending bank's branch at the moment of debiting the payer's account.

### **Conventions**

The various conventions governing the system can be distinguished between multilateral (for instance with respect to settlement) and bilateral (e.g. the application of penalties); mandatory (for instance those relating to interbank aspects) and voluntary (e.g. intrabank aspects); and contractual (for instance those involving the banks and Bankservice) and regulatory (e.g. the relationship between the BNB and the banks). All the conventions are reflected in the BUS standards, the BISERA user manual and the contracts between the banks and Bankservice.

### **Message system**

The message system is one of the most important parts of any interbank

payment and settlement system. At the start of live implementation of the BISERA system in 1992 we had a very simple and non-sophisticated message system consisting of about ten different messages only. Furthermore, the messages were fixed-length and did not allow any flexibility or improvement (for instance with respect to input, processing and output information). We faced a great need to improve the message system. The basic question was whether to develop a comprehensive message system (based on S.W.I.F.T. standards, for instance) or to adopt a temporary solution (fast and cheap) and to survive with it until a kind of global European standardised payment and message system was put in place in the future. Our choice was for the temporary solution. This was successfully developed and implemented in 1995.

The message system is based on file transfer technology and has a well-defined organisation and structure. It consists basically of three different levels: fields, messages and segments.

There are twenty different types of field including those for bank codes (choice of six different types of bank code); dates (choice of thirteen different types of date, such as date of document registration, date of accounting, date of creation, deadline date of letter of credit, date of settlement); and account numbers (choice of six different types of account number distinguishing, for instance, bank account numbers for payers and for payees).

In principle messages are split into categories, groups and types. This message system is very flexible. New messages or modifications of the present messages can be created and implemented at any time.

### **Implementation of Principle 2**

A sophisticated domestic payment and settlement system should not (and most probably cannot) be developed, implemented and operated purely by administrative and regulatory procedure and with 100% central bank ownership. It will be much more successful if created via cooperation (including ownership) between the central bank and the community of commercial banks in the country.

Following well-established and successful models from the developed countries (Switzerland's Telekurs and many others), at the beginning of 1989 we took the decision to create a common joint stock company

owned by the central bank and commercial banks and dedicated to the development and operation of the payment and settlement system, banking telecommunication infrastructure and banking automation. This is Bankservice Plc.

To ensure its success, the model we created for this joint venture followed the basic principle of separating the powers and defining the relative independence of the parties involved.

In our case the three different parties have the following independent powers in general: the commercial banks have the right to decide what and how many common interbank payment and information systems are to be developed and operated without competition between themselves, as well as the basic parameters of those systems; the BNB has the right to define and fix all rules of the interbank payment and information systems (it is also the only official issuer of all regulations and standards for those systems); and Bankservice has the right to decide on and implement the technical solutions for these systems. These rights are established in the Statute of Bankservice Plc.

### **Implementation of Principle 3**

A successful domestic interbank payment and settlement system, comprising all the elements referred to in the brief description above (legislation, regulations, standards, critical decisions, conventions, risk management tools, message system, design, application programming, hardware, system software and telecommunications environment) cannot be purchased on a cash-and-carry or 100% turnkey basis.

For the most part, especially as regards the most important regulatory aspect, it should be defined and developed in the country, keeping in mind both specific domestic arrangements and best practice from the developed countries. In this respect, consultation and transfer of know-how are needed and are very useful, but only from companies and/or people with the relevant experience.

The second, also very important, technical part should be analysed, defined, contracted, delivered and installed on a professional tender basis.

Most of the aforementioned major steps were successfully undertaken in Bulgaria during the period 1990-96 with the implementation of the

BISERA 1, BISERA 2 and BISERA 3 systems. As a result, the current BISERA 3 system has the following major characteristics:

- 100% electronic transfer of all payment and information messages through the system. BISERA does not move any paper or media; this channel is tested and available for backup purposes only. All transfers are made via the common X.25 telecommunication network BANKNET, the property of Bankservice Plc. BISERA 3 processes all types of credit and debit payment instrument defined in the Ordinance of Payments.
- There is a two-level system for verification of all payment and information messages, first at the entry points and secondly at the settlement centre, with an extended set of verification checks at both levels: about 120 different checks serve to verify all fields and the total contents of all types of payment and information message.
- Payment and information messages enter the system from branches and/or from the head offices of the banks; a sophisticated set of information about the settlement results is addressed to the supervisory and monetary policy departments of the BNB.
- Settlement is on a gross basis. Every individual payment transaction is directly booked to the current (reserve) accounts of the two banks involved with the central bank: debiting the account of the payer's (sending) bank and crediting the account of the payee's (receiving) bank. The overdraft limits for each bank defined daily by the central bank are calculated automatically.
- There is an efficient queue management system based on a FIFO stamp for each transaction initiated. At the moment every payment transaction is generated on the spot and the payer's account at the bank (bank branch) is debited. Non-settled transactions are queued as so-called waiting payments, kept in the settlement system and processed again the next day according to their FIFO priority.
- The maximum duration of the payment process for each individual transaction, including debiting of the payer's account with the payer's bank and crediting the payee's account with the payee's bank, is 24 hours for credit transfer type transactions (payment orders), and 48 hours for debit transfer type transactions (direct debits, cheques).

Consideration has been given to further adapting the BISERA system (BISERA 4). The following changes have been agreed on to date:

- Final settlement at the central bank at around 4 p.m.
- Continuous transfer and settlement of payment transactions during the day, in two stages:
  - multiple or continuous file transfer;
  - transaction processing.
- Online monitoring of the current (reserve) accounts of the banks with the central bank.
- Advanced cash management at the head offices of the banks and the central bank.
- Possibility of withdrawing transactions before the final settlement cut-off by means of well-established revocability definitions and procedures.
- Continuous operation of the system 24 hours a day, seven days a week.
- Extending and improving the message system.
- Improving the queue management system to include different priorities.

## **Managing change in the domestic payment and settlement systems of the Kingdom of Saudi Arabia**

Jammaz Abdullah Al-Suhaimi

### **Background**

It is now some 11 years since SAMA (the Saudi Arabian Monetary Agency) launched its first initiative to create a modern payments system for the Kingdom. The starting-point was the need to improve the system for clearing cheques, at that time the only important non-cash payment instrument in use, and essentially limited to wholesale transactions. Cheques were then cleared locally in the centres where SAMA had branches. The cheques were listed on hand-operated machines and settlement was carried out each day after extensive reconciliation.

In cooperation with the commercial banks, SAMA designed completely new procedures and rules for interbank clearing and settlement. New cheques were designed in collaboration with each bank, incorporating standard layouts. MICR code lines were designed to meet the Kingdom's geographical requirement. Full cheque personalisation was introduced at the outset in both Arabic and English according to the needs of the customers. Clearing computers were installed at the main SAMA branches and automated cheque processing successfully commenced in 1986.

On the retail payments side, however, Saudi Arabia was a cash-based society. Payment instruments based on deposit money had limited acceptance, so ready access to cash was a key customer requirement. In response to this, several Saudi banks had installed proprietary ATM networks in the mid-1980s, but these were of limited scope. Above all, there was no national ATM switch or established basis of reciprocity among the banks. SAMA saw the need to provide a neutral national transaction switch for the commercial banks. After initial feasibility studies and subsequent system design all ATMs in the Kingdom were linked so that all bank customers could draw cash at any ATM in the

Kingdom. The system was called the Saudi Payments Network (SPAN) and went live in April 1990.

While SPAN was being implemented we realised that it could serve as the backbone system for all retail payment card transactions in the Kingdom. Because the “banked” population was low and cheques were not widely used, Saudi Arabia had an opportunity to move from a currency-based economy to a deposit money society using electronic payment systems. Given the difficulties in displacing paper instruments experienced in other countries, we viewed this as a key advantage.

SPAN has lived up to expectations and has contributed significantly to strengthening the “banking habit”. There are now some 1,613 ATMs throughout the Kingdom in online daily operation processing over 50 million transactions per annum, with a daily value of over SR 100 million (US\$ 27 million).

In March 1993 SPAN was enhanced to support EFTPOS transactions. Approximately 15,000 retailers are equipped with point-of-sale terminals, with the 3.2 million SPAN cards serving as ATM and debit-POS cards. SPAN will continue to operate as the sole online point-of-sale network in the Kingdom. VISA and MasterCard transactions are now accepted by many SPAN terminals, with online connections to the bankcard switches overseas. We hope to eventually support all major credit and debit cards through a single device on the shop counter.

While these developments were taking place on the retail side, SAMA was pursuing two key initiatives in wholesale banking. First, all the Kingdom’s banks were linked to the S.W.I.F.T. network, a vital step for a country heavily engaged in international transactions. Secondly, we developed an electronic stock exchange for Saudi shares, the Electronic Securities Information System (ESIS).

ESIS is an electronic screen-based share trading and settlement system. Only Saudi banks are permitted to provide brokerage services to the public. SAMA operates the system and provides interbank settlement and book-entry securities transfer services to ESIS. SAMA also provides development and support of the system itself and acts as supervisor of the securities market.

Despite these developments, until the implementation of the RTGS system in May 1997 (called SARIE) interbank settlements in the Kingdom continued to be effected through the cheque clearings or account transfers at SAMA head office and branches.

The major milestones on the road to a modern payment system in Saudi Arabia were as follows:

- 1986: ACH (Automated Clearing House)
- 1989: The Kingdom’s banks joined S.W.I.F.T.
- 1990: ESIS (Electronic Securities Information System)
- 1990: SPAN (Saudi Payments Network)
- 1993: EFTPOS (electronic funds transfer at the point of sale)
- 1997: SARIE (EFT system – RTGS)

More details on the payment systems in Saudi Arabia can be found in the “Red Book” published by the BIS in February 1996.

### **The role of SAMA**

SAMA has a multiplicity of roles as the central bank and the banking and shares market supervisor. SAMA also acts as ombudsman of the financial markets and promotes cooperation among market participants.

SAMA’s role in payment systems has evolved from its broad mandate to maintain the safety and soundness of the Saudi banking and monetary systems. In the payment systems area SAMA has chosen a leadership role in establishing an integrated and comprehensive electronic payments infrastructure while continuing to support traditional payment vehicles such as cash and cheques. SAMA’s leadership role is essential in ensuring a rational and consistent national strategy for payment systems. This approach is based on the conviction that significant financial benefits would accrue to all financial market participants from a collaborative rather than a competitive approach to the development of a common payments infrastructure.

To implement its national payment systems strategy, SAMA established a Banking Technology Division which is responsible for the development and implementation of all national payment systems. It is also responsible for the day-to-day operation and enhancement of the payment, clearing and settlement systems in the Kingdom with the cooperation and participation of the local banks.

## Driving force for change

There were many reasons for SAMA to develop a modern payment system. SAMA recognised that the old payment and settlement arrangements inhibited the development of an active domestic interbank market. They also suffered from the slow and uncertain settlement by cheque and imposed a cumbersome correspondent banking role on SAMA.

SAMA commenced work on the development of an interbank EFT system in January 1995 after extensive study of interbank payment systems in G-10 countries.

SAMA had many objectives in building such a system. These included:

- greater efficiency in the banking system;
- improved risk monitoring and control by SAMA and the banks;
- facilitating the development of local financial markets through secure and efficient settlement;
- achieving international standards for certainty and finality of settlement of all interbank payments;
- developing a modern payment system which would support economic development;
- expanding the use of bank deposit money; and,
- protecting the banks' franchise in payments.

Our goal was to achieve an electronic infrastructure which is fully integrated, safe and cost-efficient, avoids unnecessary duplication where possible and is expandable to cater for future developments such as EDI, DVP and PVP.

## Approach

In order to learn from the experience of other countries we undertook a study of best international practices. The scope of this study was to identify best practice on a number of key issues including the EFT system operational approach; liquidity; risk management; pricing and incentives to use the system; and future perspectives.

We are very grateful for the support and assistance we received from many central banks and payment system providers. The information we

gained from such contacts has helped considerably in the development of our EFT system.

SAMA had already taken a number of decisions on the operating policies for the EFT system. All of these were fully vindicated by the best practices study. These included:

- consolidation of bank current accounts (previously, separate accounts were maintained by each bank at individual SAMA branches);
- the EFT system would be closely linked to SAMA's central accounting system;
- direct access to the system would be by banks only;
- fully collateralised daylight overdrafts would be provided;
- the system should operate central queuing with automatic cancellation at cut-off.

Our EFT system, called SARIE (Saudi Arabian Riyal Interbank Express) – the word SARIE in Arabic means fast – was brought into operation in May 1997. SARIE comprises a central system, located at and operated by SAMA, and gateways located at each bank linked to their main host systems. The bank gateways are linked to the central system via an X.25 network.

The key features of the system include:

- secure message transmission between the commercial banks and SAMA ensuring the authenticity and confidentiality of all data;
- an RTGS system providing for payment finality through debits and credits to banks' current accounts at SAMA in real time;
- incorporation of the net settlement positions of other clearings, i.e. cheque clearings, ESIS and SPAN as well as the net settlement positions from VISA and MasterCard;
- central queuing, with payment priorities set by the sending or paying bank;
- online payment scheduling tools available to bank treasurers together with real-time access to their own account balances and payment queues on the central system to enable them to effectively manage their accounts and queues;
- a gridlock resolution tool which enables SAMA to intervene to break payment gridlock situations in exceptional circumstances (responsibility for the provision of sufficient liquidity to meet all their settlement obligations rests with each bank along with full responsibility for managing all their outgoing payments);

- near 24-hour operation which allows for the transmission of forward value payments and direct debits (this feature provides the capability of overlapping business hours with other markets and key financial centres);
- a secure free format message facility for the exchange of messages between SAMA and bank treasurers.

SARIE handles interbank and customer payments for both high and low value:

- for same-day value and up to 14 days forward;
- as single and bulk messages;
- for both credit transfers and direct debits.

Same-day value payments are settled on a real-time basis, while forward value payments and direct debits are settled on their maturity date.

## Issues

The issues with which we had to deal in the course of the development and implementation of SARIE can be broadly divided into three categories: policy, business and technical.

We needed to deal with the following **policy** issues:

- weighing system complexity and cost against the potential benefits;
- assessing the benefits to be derived from using the system – benefits to SAMA (risk reduction), benefits to the commercial banks (efficiency, risk management, customer service), benefits to customers (corporate, retail, utility companies);
- allocation of the initial capital cost;
- recovery of costs – per-item fee, membership fee, etc.;
- balance between cost recovery and incentives to use the system;
- costs at individual bank level;
- intraday liquidity, collateral rules regarding “eligible assets”;
- supply of “eligible assets”;
- history of risk to date;
- operating rules and regulations;
- security and confidentiality of all data.

We had to address the following **business** issues:

- roles and responsibilities, during the preparatory stage and once the system was operational;
- membership – 12 commercial banks;
- minimum and maximum value of individual payments;
- value-dating of payments – same-day value only, or same-day and forward value;
- synchronisation of payment flows;
- need for scheduling of payments;
- operating hours.

The **technical** issues which we had to address included:

- volumes – present and projected for the next five years;
- performance – peaks/averages, response time;
- linkages to other systems, i.e. cheque clearing, SPAN (ATM network), ESIS (stock exchange system), credit card settlements, bank host systems, and SAMA’s main accounting system;
- queuing;
- message formats – range and types of messages to be supported;
- system architecture;
- contingency – level of dependence on the system;
- ability to expand the system to meet future requirements.

## Cooperation

A key factor in our success to date has been the high level of cooperation we have received from many payment system providers and regulatory authorities and the commercial banks in the Kingdom. This has enabled us to quickly adapt and apply the lessons learned in developing our payments system.

We established a number of working groups which played a vital role in the development and implementation of SARIE. The members of these working groups were drawn from the commercial banks and SAMA. The following is a brief description of the various working groups.

### *Project Managers*

This group handled the overall coordination of the project between

SAMA and the banks. Overall project management was provided by SAMA.

#### *Operating Rules and Regulations*

This working group produced the rules and regulations governing all aspects of SARIE. It discussed and agreed practical business procedures for the use of the system and agreed the daily time schedules and cut-off times.

#### *Security and Audit*

This group established the SARIE Security Policy, Standards and Procedures.

#### *Testing and Certification*

All testing between the banks and SAMA was coordinated through this group. It also coordinated all activities in relation to the certification of individual bank systems.

#### *Documentation and Training*

This group coordinated the wide range of training courses comprising some 50 courses covering both technical and business subjects and totalling 160 days. It also reviewed the supporting user documentation.

As well as these specific working groups which were set up to deal with the issues relating to the development and implementation of SARIE, we also had extensive discussions with the banks' Treasurers Committee on the subject of limits and collateral as well as the overall operation of the system.

Now that the system is in operation we have established a SARIE User Group which meets on a regular basis to exchange ideas and address common issues and concerns relating to the SARIE system.

### **The policies**

#### *Limits and collateral*

Each bank may have an intraday overdraft limit on its settlement account

with SAMA. These limits are fully collateralised with Saudi Arabian government securities. The intraday overdraft limit is the maximum amount by which a bank may be in debit at any time during the day. Payments which would breach the limit are queued in the central system until sufficient funds become available in the form of either credits for incoming settled payments or an approved increase in the limit. Each bank's settlement account must be in credit at the end of the day.

It is the policy of SAMA that the level of intraday overdraft limits should be sufficient to ensure the smooth functioning of SARIE and to minimise delays in the settlement of payments while, at the same time, ensuring that the overall safety of the payment system is maintained. Banks are responsible for applying to SAMA for the intraday overdraft limit that they require. Sanctioning these limits is at the discretion of SAMA.

#### *Pricing*

The initial cost of the shared payment system was borne by SAMA and will be recovered through transaction fees. The central system is operated by SAMA.

One aim of the pricing policy is to maximise the efficiency of the banking system by promoting the use of SARIE and encouraging customers to switch from manual to automated procedures. The other objective is to recover the cost of the investment which SAMA has made in the development and implementation of the system, and the costs which SAMA incurs in the ongoing operation of the system. SAMA intends to recover its capital investment over a period of seven years and to recover operating costs as soon as possible after the year in which they are incurred.

We have not, at this stage, introduced any exceptional charges and penalties. We will review our pricing policy from time to time and, if deemed necessary, we will introduce pricing incentives and penalties aimed at encouraging and enforcing good behaviour, particularly in the area of maximising liquidity through the early transmission of payments.

#### *Benefits*

SARIE has already had a significant impact on risk reduction in our interbank payments business. Within the first three months of operation

we have seen close to 90% of the value of all payments between banks being settled over SARIE on an RTGS basis in a single, secure electronic environment.

The commercial banks in the Kingdom are now beginning to reap the rewards of improved efficiency in their payments processing. They will continue to build on these benefits over the coming years as the use of retail and corporate payments and, in particular, electronic payroll transfers and direct debits increases. The banks' customers have also benefited from the improved efficiency of the banking system, which has resulted in significant reductions in the time taken for the transmission of payments between banks.

### **Conclusion**

We believe that we have now put in place a sound payments infrastructure within the Kingdom which meets the highest international standards. We have made considerable progress in meeting our objective of having a modern payment system which significantly improves the efficiency and safety of the banking system for the benefit of all participants.

While we are pleased with our progress to date, we must not rest on our laurels but continue to look to the future. We expect that e-money (electronic purse) [DVP and EDI] and electronic commerce will be the major developments in the period immediately ahead, and we envisage launching initiatives in these areas in the near future.

We look forward to making further progress in the payments field and hope that we will continue to benefit from the kind assistance we have experienced to date from our many friends in the payments business.

## **Modernising payment systems in Indonesia**

Adolf Latuhamallo

### **Background**

Up to the late 1980s the primary means of payment in Indonesia, in common with many countries, was cash, as in fact is still the case. All other payments were made using traditional paper-based debit and credit payment instruments, tailored to suit local conditions over time.

The payment system in Indonesia consisted of a number of manual paper clearing centres across the country, which were operated by Bank Indonesia as the central bank. These centres operated six days a week and all interbank paper items were cleared locally. No national clearing service existed, and indeed none exists today.

The system worked efficiently at a local level, and because all interbank payments of all types (including transactions with the central bank) were cleared through the daily clearing, the results of that clearing represented the total position of each bank with respect to the other banks each day.

### **First steps**

By the late 1980s pressure had mounted on the manual clearing houses in the major centres, to the point where automation of the clearing process became a necessity. We automated the clearing centres in Indonesia's three largest cities, Jakarta, Surabaya and Medan, in succession, with reader-sorters and a mainframe-based clearing package offering a fully automated clearing service for paper items.

At the same time, Bank Indonesia developed a so-called "semi-automatic clearing system" (SOKL) for the smaller regions. This system uses data from diskettes produced by the inputting banks to calculate the output positions, and the positions are checked against the paper items by the banks' representatives. This system has been implemented in about 40

locations. At each location the settlement is completed locally, because settlement accounts are not centralised.

This, in turn, produced a need for a system to move cash between Bank Indonesia branches to allow banks to keep their settlement accounts at every location in credit at all times, and we built a cash transfer system (SAKTI) to accommodate this need.

By 1995 these developments were largely complete, and significant benefits were being realised from the new systems. Because the focus was on technology and technological improvement, the term “payment system” meant little or nothing to Bank Indonesia. Furthermore, our vision was determined by our Central Bank Act, which sets out Bank Indonesia’s duty to operate the clearing systems but otherwise does not address general payment system issues at all.

### **A new vision for Indonesia**

A number of visitors to Bank Indonesia during the early 1990s brought with them the concept of a national payment system. Literature started arriving from various quarters which contained references to the “payment system” and staff at Bank Indonesia sought to understand what was meant. Needless to say, there were many views on the subject once it became a topic of discussion. Some equated the term “payment system” with money market activities, others with clearing (indeed both were incorporated into the same department at the Bank). Others thought it concerned the new ATMs which were arriving on the commercial scene.

It was apparent that some form of clarification was needed, and Bank Indonesia hosted a Payment Systems Seminar with speakers from six countries which was attended by top officials of Indonesia’s major banks. With hindsight, this seminar was crucial in establishing the importance of the payment system with a large number of Bank Indonesia staff, and in generating the momentum needed to be aware that many payment system issues needed attention, and that something had to be done about them.

We formed a Payment System Working Group with representatives of all major departments of the Bank, and charged them with producing an assessment of the current payment system in Indonesia and a vision for

the future. To assist the Working Group, a firm of international payment system consultants was appointed to prepare a Blueprint and Development Plan for the future. While the documents that were produced in the course of our work are obviously important (and they include an Indonesian equivalent of the BIS “Red Book”), the Working Group also worked closely with the consultants throughout the development process in a series of a dozen or more workshops, some lasting half a day and some two or more days, to address and discuss specific payment system issues. This interaction between Bank Indonesia staff and payment system experts was vital in establishing common perceptions and payment system terminology throughout the Bank and in defining the scope of the payment system and the Bank’s role in its future development.

### **Implementation of the reform programme**

One of the outcomes of the Blueprint project was a list of 22 major projects that needed to be addressed to reform the national payment system. These projects included systems development projects covering national clearing, high-value payment processing, retail electronic payment processing and so on. With the automation of Indonesia’s payment system, increased pressure on the Bank’s own computer systems means that our accounting system, fund management systems, internal network and so on need to be strengthened. A number of institutions, such as a National Payments Council, will be set up. Finally, a consistent policy and legal framework for the payment systems had to be established.

To undertake a single project involving fundamental change is difficult enough. To embark on a reform programme comprising 22 projects is a daunting experience. Nonetheless, our Board of Managing Directors and Governor were committed to change and progress, and this commitment has been vital to our ability to finance and support the various initiatives we have undertaken. Payment systems development is expensive, and in a country of 200 million people and over 220 commercial banks, its scope is necessarily large.

## Challenges faced

In the course of the first two years of the payment system reform programme we have faced many challenges and been involved in much discussion and debate. The following issues relating to the implementation of changes in our payment system have arisen so far during the reform process.

### *Managing the reform process*

As already noted, Bank Indonesia made an early decision to set up a specialist internal Working Group to take charge of payment system development. The members of the Group were drawn from many departments, so that each would be represented during the development process. The Heads of Department of five key departments formed the Steering Committee for the Blueprint development project. The process may sound simple, but it was the first major inter-departmental initiative undertaken by the Bank, and was therefore under more than the usual scrutiny. Members had to be released from their regular work in order to attend Working Group meetings, and this required a high degree of cooperation between departments. The results justified the approach. A broad cross-section of the Bank's staff became knowledgeable about many aspects of payment systems in less than a year, and an impetus was established which is still in place today. The Bank is in the process of establishing a Payment Systems Department, and some members of the Working Group will form the nucleus of this new department.

### *Education of central bank staff*

Bank Indonesia employs about 8,000 staff in 42 locations. Each of our branches is responsible in one way or another for aspects of the payment system, through the distribution of cash, operation of the daily clearing, and maintenance of settlement accounts. The Working Group developed a communications programme to spread the "payment system message" to these staff at our annual planning meetings, through our monthly in-house magazine, and by adding payment systems modules to the curricula of staff training and management development courses.

### *Centralisation of settlement accounts*

The system of maintaining separate settlement accounts at each of the Bank's branches is rapidly becoming outdated in a world of modern networks and real-time payments. The process of identifying the issues has raised many problems, from the technical requirements of maintaining a consolidated position (a fundamental change for banks' management) to more emotive issues such as the fact that the balance sheets of Bank Indonesia branches will be much less impressive without the settlement accounts being recorded in them. Banking supervision is carried out throughout Indonesia at bank branch level, and the removal of local settlement accounts will mean that provincial branches will no longer be "mini-banks" with their own central bank settlement accounts but will, of necessity, be part of a single bank, with a single head office account. That will have an impact on the way banking supervision is undertaken.

### *Management of settlement accounts*

It was noted earlier that, in the past, the local clearing centres processed all interbank payments each day. That meant that a bank's position with respect to other banks could be obtained by simply looking at the results of the daily clearing. With a move to multiple clearing systems, such as paper clearing, money market clearing, ATM clearing, and an RTGS system in the future, the results of the daily paper clearing no longer represent the total picture. Banks must now look at their settlement accounts, and Bank Indonesia is developing systems to allow banks to manage these accounts which will show cash transactions, paper clearing transactions, and electronic transactions in the future. This may sound very obvious but it is not necessarily so to banks and even to some departments within the central bank that were accustomed to clearing all payments through the daily clearing, often using the clearing as a substitute for accounting entries rather than posting them direct to our books. The primary impact of the change has been on some of Bank Indonesia's departmental systems, and in the manner in which they link to our accounting system, rather than on the clearing system itself.

### *Systems acquisition*

The specification and acquisition of new systems is never an easy task. When a system automates a previously manual function the system

requirements and vision are relatively easily established. In our payment systems development, we are developing entirely new payment services, and the development of a shared and consistent vision has not always been easy. The straightforward language of cheque processing has been enhanced with concepts such as DVP, PVP and Lamfalussy standards. Trying to work out what our future requirements will be is not an easy undertaking, and it can be made more difficult if we are surrounded by vendors offering apparently “ideal” solutions for our perceived needs. We have responded by studying many solutions in other countries, and developing an understanding of the strengths and weaknesses of various systems, which may be entirely satisfactory in one country, but not necessarily transportable to a large and diverse country such as Indonesia. Our skills in specifying systems are therefore being developed, and we are learning much about what to do, and in some cases what not to do, by experience.

#### *Clearing cycle*

The introduction of new systems means that previously established cut-off and reporting times for clearing activities may not necessarily be appropriate. We have studied closely the effects of moving the clearing and settlement cycle, following such a move last year. We have learned that the development of a good clearing cycle is no simple task. The clearing house, the commercial banks and even the bank customers are all affected by different cut-off and processing times. Issues as diverse as Jakarta’s traffic, the availability of parking spaces and the working hours of bank treasurers have all had their part to play in our discussions. The balancing of the various interests has not been an easy task, and we have learned that there is probably no perfect clearing cycle that makes everybody happy at the same time.

#### *Legal framework*

Indonesia has a Commercial Code based on the European model, which sets out the legal basis for cheques and bills of exchange. Clearly, these provisions are inadequate for a payment system based on computers communicating by way of electronic messages. The introduction of new legislation is not a quick process, and in particular the matters that require legislation need to be considered carefully. When we look outside

Indonesia we see legislation on various aspects such as digital signatures, electronic commerce, UNCITRAL model laws, and so on. The challenge faced by our legal people has been not only to understand the technology supporting our proposed payment system, but to draft the laws in such a way that they will remain robust in a future environment of continued rapid technological change.

#### *Payment system risk management*

Given some of the earlier comments, it will not come as a surprise that payment system risk management has not yet been implemented to any great extent in Indonesia. The shifting of payment system risk from the central bank to the payment system participants has required a process of education inside and outside the Bank, and is still far from complete. Agreement in principle to the concept has been reached. It is fair to say that issues relating to the provision of basic payment infrastructure take first priority, although we are taking advantage of new regulations governing clearing houses to incorporate several requirements relating to payment system risk management. The proposed regulations will require clearing operators to provide participants with information and facilities to allow them to manage their risks, and ongoing adherence to the Lamfalussy minimum standards will be a requirement for clearing operators. This regulatory approach may be unfashionable in some circles, but we believe it is effective, and it allows us to keep our reform programme moving forward.

## The process of managing change in payment and settlement systems in Poland

Adam Tochmanski

The aim of my presentation is to share the experiences of the National Bank of Poland (NBP) in the “management of change in payment and settlement systems”. In particular, I would like to present some observations made during my five years of work in the area of settlement systems.

I would like to focus on the following issues involved in the process of change in payment and settlement systems in Poland:

- (i) questions of information and experience;
- (ii) interaction between the central bank and commercial banks;
- (iii) topics relating to the use of the central bank’s internal resources;
- (iv) consequences for central bank operations and their structure;
- (v) international cooperation.

My personal experience in the field of payment systems started at the time of the major changes in Polish payment systems which took place in April 1993, when the new uniform rules for interbank settlements were introduced.

But before starting to explain these changes, I would like to say something about the previous system. The old interbank settlement system was based on the following main principles:

- there was only one system for transferring both large and small-value payments;
- the settlement was performed not on consolidated accounts of banks in the head office of the NBP as today, but on the current accounts of banks’ branches with the NBP’s branches;
- payment orders, except for very urgent telegraphic orders, were sent between banks’ branches on paper, by mail only;
- in order to register all payment orders sent and received on the banks’ branches’ current accounts with the NBP, the relevant lists of payments were sent to the central bank separately by the sending and

receiving branch (with a minimum delay of a few days). This type of settlement generated a debit or credit float in the books of the NBP (according to whether settlement was in respect of cheques or credit transfers);

- an additional, but very important, element of the system was the control of the consistency of the lists of payments received and sent by banks’ branches at the head office of the NBP.

This system proved to be inefficient, because settlement sometimes took longer than a week and the central bank bore a considerable risk. This risk resulted from the excessive operational role of the central bank in the system, obliging the NBP to ensure settlement and giving rise to the possibility of potential abuses by dishonest entities in the settlement of cheques. In fact, dishonest practices occurred place in 1991, in what became known as the “Art-B scandal”.

The National Bank of Poland came to the conclusion that the system had to be changed. The questions were, How? In which direction to go? Who would carry out the change? It was not easy to find simple answers to all these questions but there was no doubt that change was needed.

One of the major problems at this stage was the fact that there were only a few specialists in the field of payment systems at the central bank, for example people who were familiar with the payment systems in other countries and the professional literature relating to this subject. Indeed, until 1989 the Polish central bank had not required this knowledge because it was part of an economic system which, on the one hand, still operated according to planned economy mechanisms and, on the other hand, was only just starting to emerge as a market economy. It should also be noted that at this time the NBP was still an element of the old system, and was the first to start implementing market mechanisms, restoring a proper role for money and fast evolving from a monobank to a real central bank. Small groups of experts with a background in accounting and data processing started to deal with payment system questions, so our knowledge of this subject resulted less from our own experience than from the experiences of other countries.

Intensive international cooperation between the NBP and international financial institutions, such as the International Monetary Fund (IMF) and the World Bank, began in 1989. Many foreign experts, including many central bankers, came to Poland and visited the NBP. One of the areas supported by the IMF was payment and settlement systems.

In this respect the NBP received help from the Federal Reserve Bank of Boston in particular. Thanks to its assistance, in 1990 and 1991 a real-time gross settlement system was designed, named NBP-Wire. Unfortunately, owing to weak telecommunication networks in banks, the impossibility of a quick implementation of this system, personnel changes at the central bank and urgent matters concerning retail payments that needed to be dealt with after the Art-B scandal, the implementation of the system was suspended and only some of the basics of the NBP-Wire system were used in the SORB system, which I shall describe later. It should be emphasised that the cooperation initiated by the IMF developed in many cases into bilateral cooperation between the NBP and some central banks independently of the IMF. This resulted in a few study visits by NBP employees to other central banks. This cooperation and support was very useful, answering many questions and permitting direct observation of how other systems work, thus enabling us to find the right direction for the development of the Polish payment system.

In accordance with the basic principles of the reform of the interbank settlement systems, two new payment systems were planned in 1991 and 1992, and implemented in April 1993. The first system is based on the exchange of customers' payment orders between banks via the intermediary of the National Clearing House (KIR). In this system the NBP acts only as a shareholding participant and the settlement agent of KIR. The KIR was established in 1992 as a joint stock company by 17 commercial banks, the National Bank of Poland and the Polish Banks' Association. The KIR calculates multilateral net settlement positions for participants and sends these three times daily to the Interbank Settlements Department of the NBP for interbank settlement. The KIR manages two clearing systems. The paper-based clearing system, SYBIR, came into operation in April 1993, and the electronic clearing system, ELIXIR, was launched in April 1994.

The second settlement system was set up by the NBP to handle typical interbank payments and banks' operations with the NBP. This settlement system is called SORB, which is an abbreviation of "System for Servicing Banks' Accounts".

This system is based on the following main principles:

- interbank payments are sent directly from the banks' head offices to the Interbank Settlements Department and executed on a gross basis throughout the business day, one exception being that there are two

or three settlement sessions a day (on a net basis) for payment orders sent via the KIR;

- debiting of the account of the sending bank and crediting of the account of the receiving bank take place simultaneously, unlike in the previous system where there was a delay of at least a few days between these bookkeeping operations;
- settlement is carried out provided that there are sufficient funds in the debtor's current account, otherwise orders are queued.

Since SORB's introduction in April 1993, the system has fulfilled the basic criteria for an RTGS system. However, the system is not completely efficient; for example, payment orders are sent to the NBP only in paper form, by fax or on diskette and are then entered manually into the system.

It was not an easy task for the NBP to reach agreement with the banks on these changes and to convince them of the new solutions. This was mainly because under the old system there was no risk of non-execution of settlement since any shortages of funds were always covered by the NBP, thus allowing banks to use vast amounts of float. It was a very difficult task to draw up the legal provisions, establish the telecommunications infrastructure (with the creation of a new, separate telecommunications company providing banking services, TELBANK), to set up the KIR and to implement a new system for servicing bank accounts managed by the Interbank Settlements Department. In order to create a well-organised clearing house, the central bank not only had to shoulder some of the financial costs (being one of 19 shareholders of the KIR) but also lost part of its workforce owing to the fact that some payment system specialists left the NBP for the KIR. In the course of all these preparations, which took place between 1991 and 1992 (still within the framework of the old interbank settlement system), the NBP consolidated all the current accounts of banks' branches into a single current account for each bank. These accounts were managed at the regional branch of the NBP appropriate for the head office of the bank concerned. In April 1993, the accounts of the KIR participants were moved to the Interbank Settlements Department and at the same time the new interbank settlement system was launched.

However, not all of the 90 Polish commercial banks participated in the new system from its inception. This was not possible because many banks had an inadequate technical infrastructure, particularly on the

telecommunications side. In the first stage only 17 commercial bank shareholders of the KIR exchanged payment orders through the KIR and held their current accounts at the Interbank Settlements Department of the NBP. From April 1993 till June 1994, groups of banks joined the system every two to three months, prior to which they were allowed to settle with other banks according to the old rules.

The principles of interbank settlement adopted in the SORB system were not easily accepted by all the banks. In particular, many of their treasury departments could not understand why it was not possible, as in the old system, to offset debit and credit orders on their current accounts, or why they had to find funds quickly on the interbank markets in order to meet the settlement obligations resulting from the exchange of payment orders through the KIR, when they expected inflows of sufficient funds in a short period of time. I noted that not all the employees of the treasury departments were aware that the introduction of the new system required a new approach to account management in order to maintain sufficient balances for settlement purposes during the day. As expected, the change from the old system, where clearing of credits and debits was possible, to the new system with gross settlement in real time was, at first, not easily understood or accepted. This was mainly because of the higher cost of obtaining funds and the need to hold larger balances on non-interest-bearing current account. In my opinion some commercial banks were ill-prepared for working with the new system and did not have enough skills to manage their current accounts properly.

In the judgement of the NBP the changeover to the new system had very positive results for the central bank, the banking system and all bank customers. The reform of the interbank settlement system was a significant step not only for decreasing the number of days taken to settle retail payments, but also for development of the interbank money market (it created an overnight interbank deposit market which did not exist earlier and for the NBP's open market operations and the primary and secondary short-term securities markets (Treasury bills and NBP bills). It thus led to a reorganisation of the central bank's operational role. Following the transfer of the banks' current accounts, other types of bank accounts and operations were also transferred, for example compulsory reserves and refinancing credit accounts and operations were moved from regional branches of the NBP to its head office. As a result, the role of the regional branches declined in favour of head office.

After the new system had been in operation for one year, it was clear that not all banks which had become members of the KIR and kept current accounts with the Interbank Settlements Department were able to provide sufficient funds on these accounts to meet their liabilities promptly and continuously. In 1994 and 1995, eight banks were excluded from the KIR, either because of a permanent lack of funds to cover their payments or because of the action taken by the banking supervisory authorities, which were informed by the Interbank Settlements Department about cases of significant delay in interbank settlements.

After a period of over four years of the functioning of this system, it should be emphasised that the general solutions for the new Polish interbank settlement systems, despite our insufficient knowledge and experience in the area of payment systems, were approved in 1992.

At the end I would like to present our two latest challenges in payment and settlement systems.

In a few months the National Bank of Poland is going to make a big change to our RTGS system, which is now named SORBNET. In March 1998 we plan to introduce electronic communications between banks and the Interbank Settlements Department for payment orders and for the receipt of information on current account balances and completed operations.

The second challenge is connected with Poland's desire to join the European Union in the next few years. The most important task is to bring Polish laws into line with EU recommendations and directives, also in the area of payment and settlement systems. The goal of the NBP is to implement all EU recommendations in order to ensure that Polish regulations conform to EU requirements. Of special importance is consistency with the recommendations made in reports concerning, for example, minimum common features for domestic payment systems or the TARGET system, as well as other reports and research of the European Monetary Institute. This is considered by the NBP to be essential for a common strategy of closely cooperating central banks in the European Union, and is also necessary for other central banks of countries applying for EU membership in order to adapt their payment systems to EU requirements.

I very much appreciate the reports and analysis made available by the Bank for International Settlements, in particular reports concerning issues connected with payment systems, for example RTGS systems, and

developments in payment systems in individual countries (the Red Book series). These reports have helped us to familiarise ourselves with solutions adopted elsewhere in the area of payment and settlement systems and to learn how similar problems are solved in other countries. All these reports, and the seminars and conferences like this one, enable us to find the right solutions to our problems and to develop Polish payment systems in a proper way.

## **Challenges faced by payment system modernisation in improving efficiency and reducing risk: the Peruvian experience**

María Isabel Valera Loza

### **The initial phase**

Although at the international level this issue has been receiving attention for some years, its importance has only been truly recognised in Peru since 1996, following the participation of members of our staff in two seminars held under CEMLA and BIS sponsorship in Mexico. Until that time, payment system reform had only been seen in terms of the modernisation of computer systems. Reading the G-10 “Red Book” inspired us to write our own “Red Book”, and this became our first task. The detailed description of our payment system and its operation enabled us to detect many of its weaknesses, especially in the light of the experience of more advanced payment systems. While not yet marking the start of a modernisation process, this allowed us to make improvements to security without a major outlay of resources investment, and to build up a database which would make it possible to assess the size and structure of the Peruvian payment system.

With this information on hand, we have been able to initiate a public awareness campaign on this subject, since, although it is a matter of current debate amongst bankers, policy-makers and researchers, it is not general knowledge, nor does it form part of the economics degree curriculum. Nevertheless, given the numerous system participants, the lack of a real comprehension as to why modernisation is needed makes the task very difficult to implement. The campaign was initially launched amongst central bank staff, the financial system at large and the universities.

Our second task consisted of answering the following three questions:

- (a) Why should our payment system be modified?
- (b) How should it be done and what should be the central bank’s role in the process?
- (c) When should we do it?

Answering the first question allowed us to understand what we wanted to change as well as to set our final goal. To answer the “how” question, we requested international cooperation through an IMF technical mission. Their help was invaluable, not only in their evaluation of our system and their recommendations, but also because, by contacting the main participants as well as the public bodies, they impressed upon them the urgent need for reform.

Concerning the role to be played by the central bank in the new system, we decided that its participation should definitely be active, including not only the clear issue of rules and procedures, but also the implementation and supervision of an efficient settlement process. Nevertheless, the schedule we initially proposed was affected by certain events which forced us to alter our answer to the question of “when” to “immediately”.

Globalisation seems to easily break down all frontiers. The payment system modernisation means assigning tasks not only to the central bank and the financial system, but also to the various economic agents that can assist the modernisation process, in particular those involved in the management of information systems. Although each payment system is unique and requires its own particular solutions, the international companies involved in these issues try to sell their solutions to other countries. In this case, if the central bank does not assume a leading role in the reform, in order to sell their products these companies will emphasise only the advantages to the potential buyer. Thus, late participation by the central bank means that the investments undertaken by all, or at least part, of the banking system may prove eventually to be different from those required by a proper modernisation. In this context, a reform designed by the central bank will be even more difficult to accept. This is precisely what happened in our country.

### **The low-value payment system**

One of the characteristics of the Peruvian banking sector is its high concentration. Four banks, out of a total of 26, together account for 64% of the system’s total assets. With the new banking law enacted late last year, which permitted the establishment of private clearing houses, the three largest banks set up a firm with the aim of undertaking electronic

cheque clearing and started offering its services to the rest of the system, but without finding acceptance. Simultaneously, two international firms which had been working on similar projects for other countries also offered their services to the other banks. The Banking Association tried to assume leadership in this area without much success, since the banks, being fairly ignorant of the project’s significance, did not designate high-ranking staff as their representatives on the evaluating commission. The banks eventually tired of this as they perceived no real progress. Against this background, the central bank started to act as a leader in the reform process, gaining acceptance owing to its neutral status and proven leadership capability.

It is interesting to note how the banks understood the reform: only as the establishment of electronic clearing, with the liquidity risk being assumed completely by the central bank. Moreover, the banks initially considered electronic clearing as a process which would be advantageous to them, with the speeding-up of cheque settlement providing them with a larger float, since their intention was not to enable their clients to benefit from quick availability of funds.

### **A private clearing house or one operated by the central bank?**

The central bank had to decide whether or not to allow private ownership of the electronic clearing system. Reviewing the literature and experiences of other countries, we did not find any detailed study of the two alternatives. Among the advantages, private management of cheque clearing would adopt current competitive standards and would include new products more frequently, more in accordance with the system’s progress. Moreover, the quality of the payment service and the frequent technology changes required by this service should be a constant matter of concern to the banking system, which is privately owned.

One disadvantage would be the danger that the highly concentrated banking system could lead to the development of systems which would tend to discriminate against the small banks, imposing on them technology restrictions or prices for the use of those clearing services out of their reach. Another disadvantage would be that, as a result of these differences, the creation of various private clearing houses would be

encouraged, meaning higher costs for the whole economy, especially given the limited size of our financial market.

Finally, and taking into account the necessity to reform the high-value payment system, which we consider will absorb much of our effort, it was decided that there should be a single electronic clearing house operated in a centralised manner. Regarding risks, these should be assumed by the participants, while the clearing house should implement the Lamfalussy security standards. The central bank will, according to its statutes, have the power of veto over the regulations which will be proposed to govern the clearing house and over the agreements taken up by the clearing house itself. The Interbank Payment System Reform Commission, headed by the central bank, has recently been established.

### **The high-value payment system**

Peru is a small country with a financial system which, although it has grown significantly in the last few years, is still small. After a serious crisis at the beginning of the 1990s, the Banking Law and the Central Bank Law were amended. The fear of a repetition of the fiscal and monetary mismanagement of the previous years, which led to high inflation and a recession, resulted in the new law on the central bank establishing as its sole purpose the preservation of monetary stability. Responsibility for the payment system, which is explicitly enacted in the laws governing other central banks, is not prescribed by our legislation.

The financial system reform undertaken aimed at strengthening the financial system, but the risk inherent in the payment system was not considered as a factor which could set off a crisis in the sector. Although the banking crisis happened fairly recently, it seems that some have already forgotten its consequences. Looking back, we find that the reform would have been accepted more readily at the time of the crisis. Settlement risks are more readily appreciated by all the participants in times of crisis than once the crisis has passed, since then they are less likely to occur and appear less significant.

No decision has yet been taken regarding the implementation of the settlement system as part of the reform. Our preference is for real-time gross settlement, given its lower risk. Nevertheless, a subject of concern is the high liquidity level required by such a system. Obviously, banks

would prefer to go on operating as before, that is with the entire risk assumed by the central bank. In Peru, high-value operations are processed on an individual basis, hence to this extent ours is a gross settlement system but not a real-time one, since settlement takes place at the end of the day. One could say that, only in a notional way, the central bank grants intraday credit to the system. We use the term “notional” because, although operations are processed during the day, they are settled at the end of the day when the accounting day closes, only then becoming irrevocable. Thus, if there is a need for credit from the central bank, this will be an overnight credit. Since up to now there has only been such a settlement system, no other sector of the economy, except the securities market, appears to be demanding a real-time payment settlement system.

Concerning the operation of the high-value system, one of the measures adopted for the purpose of instilling discipline in the system has been to strictly enforce the operation time schedule. As the central bank assumed the liquidity risk, the funds needed by a particular bank at the end of the day were granted by the central bank through its rediscount operations. The availability of such a facility was seen by the system as a dependable financing source. Added to this, the fact that the operations tended to concentrate towards the end of the day resulted in the operations closure process being continually deferred, inducing irresponsible behaviour on the part of bank treasurers. We experienced some extreme situations in which the accounting services of the central bank had to remain open until the next day, owing to the fact that the credit request from a particular bank did not arrive on time. This is not an automatic and immediate credit line; each time it is requested, guarantees have to be furnished to the central bank to secure its approval.

The review of the traditional rediscount operations enabled a more precise evaluation of the risks involved. In the first place, notwithstanding their denomination, these credits are not really rediscount credits, since they are granted against first-class commercial securities. As there is no secondary market for such securities, these cannot be made liquid and hence the only possibility for the central bank is to accept them as guarantees. Secondly, operational discipline became more difficult to instil, owing to the fact that monetary policy was not implemented through market mechanisms. Thus, during periods of general illiquidity, the central

bank ended up not only as lender of last resort but also as the sole lender to the system.

In these circumstances, the central bank decided to widen the range of its short-term monetary instruments, starting to conduct open market operations through the issue and placement in the market of its own deposit certificates issued in local currency, which do have a secondary market, although it is still limited. Subsequently, repos were created with the same instruments as well as currency swaps. The granting of credit backed by securities has not disappeared, but our goal is to establish a type of Lombard credit, although the volume of securities which could serve as a guarantee for this type of credit is still small.

Another problem we faced has to do with the dollarisation of our economy. Foreign currency liquidity represents 61% of total liquidity, the marginal reserve requirement for foreign currency being 45%. The reserve requirement for local currency is 7% and can be constituted by cash as well as deposits with the central bank. This means that foreign currency poses no liquidity problem for us, while local currency does entail a liquidity problem, especially in the case of banks with a large office network, since these cover their reserve requirements almost entirely with their cash funds, thus not being obliged to keep deposits at the central bank for that purpose. On the other hand, although reserve funds cannot be legally seized and therefore the average reserves held by banks are substantial (which suggests that the liquidity risk should be very small), the liquidity risk in local currency cannot be covered with foreign currency funds deposited at the central bank.

Additionally, we need to modernise our information technology, which will be selected according to our new system requirements. We also face the usual legal problems, such as having a very old cheques and securities law, which, together with many other regulations, needs to be reformed in order to give legal status to the electronic clearing and settlement of the payments and to enable the financial institutions and their clients to use the system.

## **Upgrading Korean payment systems for the information age**

Jung-Hyun Kwon

Rapid development in terms both of volume and quality of service has taken place in the Korean payment system since the mid-1980s, when the interbank financial information network was launched. New horizons for its further evolution were opened up by the construction of BOK-Wire, an interbank RTGS system that was brought into operation by The Bank of Korea in December 1994.

Although for some years development efforts were concentrated mostly on the construction of additional payment systems, more recently greater attention has been given to ways of making transfers and settlements faster and more secure.

In today's presentation, the development of Korean payment systems and the role of The Bank of Korea will first be briefly introduced. Next I will explain major policy initiatives already undertaken or in the process of introduction to upgrade the stability and efficiency of the payment systems. The explanation will focus on the background to their implementation and on problems that emerged in the process of their introduction and how these were solved, rather than on a detailed description of the systems themselves.<sup>1</sup>

### **Development of the Korean payment system and the role of the Bank of Korea**

#### *Development of the Korean payment system*

The improvement of the Korean payment system began with the construction of banks' internal online funds transfer networks in the late 1970s. But the pace of the shift to electronic data transmission in the

<sup>1</sup> Details can be found in the "Red Book" for Korea published by the BIS in March 1997.

payment system gained momentum from the late 1980s, when banks constructed the Interbank CD/ATM network (1988) and the Interbank Funds Transfer System (1989), a domestic interbank electronic settlement system designed to improve the level of customer service and give banks a competitive edge.

The launch of these interbank networks enabled bank customers to deposit and withdraw money at a bank branch anywhere in the country without having to go to their own bank. More notably, it allowed them to make online funds transfers to customers of other banks. This made the whole country a same-day settlement zone.

Also, with the constant increase in the volume of interbank settlements, it became clear that a safe and efficient system for large-value settlements was needed. Work therefore began on development of the central bank's RTGS system. After four years of development, this commenced operation in December 1994.

More recently, networks have been set up linking banks and their major corporate clients, and home banking via computer or telephone has become widespread. Electronic hook-ups between banks and non-bank financial institutions are also progressing apace.

In fact, with the introduction of various electronic payment systems ranging from CD/ATM to phone banking and the launch of BOK-Wire as a primarily large-value interbank settlement system, the overall framework of the Korean payment system is considered reasonably diverse and efficient.

Correspondingly rapid changes are transforming payment and settlement practices in Korea. But Koreans have traditionally had a strong preference for cash and the history of electronic payment instruments is relatively short compared with that in developed countries. The share of paper-based payment instruments such as cash, bills and cheques in the volume of total payments therefore remains quite high.

However, there is a growing shift towards the use of electronic payment and settlement media, particularly the CD/ATM and interbank networks.

#### *The role of The Bank of Korea*

In Korea, the large-value payment system is run by The Bank of Korea (BOK), and the bill and cheque clearing system and small-value electronic

funds transfer systems are operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), which was established jointly by the banks. The Governor of BOK serves as chairman of the General Meeting of the KFTC, its supreme policy-making body, and he is thus involved in the operation of retail payment systems by presiding over the decision-making process among member banks.

Also, in August 1995, the Act for the Promotion of Computerisation was passed with the objective of systematically promoting computerisation in various areas of national life. Under its provisions, various subcommittees for the promotion of computerisation were set up for particular sectors. Because of the need for expertise in the financial sector, the Subcommittee for the Promotion of Computerisation in Finance is run by BOK, while other subcommittees are run by government bodies. BOK, through its activities in the subcommittee, has been actively promoting financial information projects such as the introduction of electronic settlement systems, link-ups between the financial information network and non-financial networks and the selection of joint projects to be pursued by financial institutions.

#### **Major policy initiatives to upgrade the stability and the efficiency of the payment systems**

The Bank of Korea has pursued a number of policy initiatives to upgrade the stability and efficiency of the nation's payment systems. In September 1997, it incorporated risk control measures into the interbank net settlement systems to manage settlement risk efficiently. It is currently working towards the introduction of cheque truncation and is also preparing security measures to ensure the safety of electronic banking transactions.

#### **Introduction of settlement risk management for interbank net settlement systems**

##### *Background to implementation*

The launch of BOK-Wire, an RTGS system, in December 1994 has greatly reduced settlement risks in financial transactions. However, for the

interbank net settlement systems in which all the net positions of participants are settled at the designated times through BOK-Wire, no institutional arrangements were readily available to prevent a possible failure of settlement or guarantee the finality of settlement in the event of such a failure.

The mid-1990s have seen buoyant growth in the volume of funds transfers through the interbank net settlement systems, especially the CD/ATM and Interbank Funds Transfer systems. In these systems unsettled net positions occur between banks receiving and sending payment orders because the receiving banks' payments to their customers are made prior to interbank net settlement. A definite need was felt for such uncovered positions to be secured through the management of interbank settlement risk.

Korea maintained, until recently, relatively high reserve requirement ratios and banks' reserve balances far exceeded the value of interbank net settlements. There had been almost no instance of a bank failing to meet its settlement obligations or of a delay in interbank net settlement. However, the average reserve requirement ratio was reduced in three steps from 9.4% in April 1996 to 3.1% in February 1997, greatly lessening the availability of reserve balances as settlement funds. This was largely instrumental in our decision to speed up the introduction of settlement risk management.

#### *Main features of the settlement risk management system*

After studying risk management systems for net settlement in a number of advanced countries with regard to their compatibility with the Korean situation, BOK introduced a system of settlement risk management for Korean interbank net settlements.

First, it sought to minimise the possibility of settlement failure and the scale of any such failure by having each bank taking part in the interbank net settlement systems set a cap on its own intraday net debit position generated by customers' transactions through the electronic payment systems.

Secondly, it required participant banks to deposit highly marketable securities with it as collateral according to the level of settlement risk posed for the interbank net settlement systems. In the event of a settlement failure, BOK would sell the collateral or use it as security for a

loan to the defaulting bank, thereby allowing the participant to gather the funds necessary to settle its net obligation. Further, if the collateral put up by a participant in default did not cover the funds necessary to meet its obligations, the remaining banks would share the burden to provide finality for interbank net settlement. In this way, the occurrence of systemic risk arising from successive settlement failures among participants would be prevented.

#### *Problems and the problem-solving process*

Although there was a wide diversity of opinions among banks concerning the introduction of a settlement risk management system, BOK succeeded in working out an agreement in lengthy discussions involving all parties.

It was only when we looked at the case for introducing a settlement risk management system, in early 1996, that we realised that the degree of settlement risk had not been widely recognised. Thus, there was substantial opposition both to the need for such a system and to the basic approach towards its introduction, not just within the banking community but also from within the central bank itself.

However, as the reserve requirement ratios had been substantially lowered and reserve money, which is the banks' biggest source of settlement funds, had been reduced to a great extent, a consensus formed as to the necessity of preparing precautionary measures against unexpected settlement failure. Also, the establishment of Korea's Deposit Insurance Corporation in June 1996 to protect the interests of bank customers in the event of a bank's failure helped expand an awareness of the threat of bank settlement failure. These changes greatly helped us in drawing up an agreement on the guidelines for the system's introduction among banks and relevant institutions.

When it came to discussion of its practical implementation, problems arose as to who should operate the system and how to determine the total amount of collateral to be posted.

It was initially proposed that the KFTC, which is a private clearing organisation, should be the operating institution in view of the nature and characteristics of the settlement risk management system.

However, for monetary policy reasons, BOK does not provide intraday overdrafts, and thus its extension of liquidity would have to

depend on emergency loans against previously deposited collateral if the settlement funds of financial institutions were insufficient. We therefore judged it desirable for BOK to operate the overall settlement risk management system directly to ensure its effectiveness. As the net debit caps and the loss-sharing arrangements are also operationally linked to the deposited collateral, their administration is similarly assigned to BOK.

To implement the system, BOK drew up working regulations and entered into an agreement with the participating institutions in the net settlement systems. Also, it incorporated major features of these settlement risk management provisions into the rules of the KFTC, the self-governing body of member participants in the net settlement system.

Meanwhile, the issues raised with respect to banks' collateral burden included which net settlement systems it should cover and what the total value of the necessary collateral should be.

At first different opinions were expressed about whether it was necessary to include bills and cheques, because they cause no credit risk to banks as payments to customers are only made after the interbank net settlement has been finalised. However, in Korea the scale of cheque clearing is so large that a settlement failure by any one bank could cause liquidity and systemic risk problems. Thus we decided to include cheque clearing in the risk management system.

In addition, to keep banks' collateral burden as light as possible in the early stages of introduction without detracting from the effectiveness of the system, BOK set the value of the total collateral necessary at Won 1.8 trillion (approximately US\$ 19 billion). This amount is equivalent to the maximum net debit position of the largest bank, and the level was determined in the belief that, even in the event of a settlement failure by the largest bank, net settlement could be finalised by sharing out the shortfall in settlement funds among other participating banks.

The collateral requirement for each individual bank is equivalent to 10% of its net debit cap plus 30% of the daily average value of its net obligations in other net settlement systems such as cheque clearing where net debit caps are not imposed. It represents merely 6-7% of the value of government bonds and BOK Monetary Stabilisation Bonds currently held by the banks and, therefore, does not hamper their normal banking operations. Looking ahead, BOK plans gradually to increase the collateral ratio while keeping it within a range that does not unduly restrict banks' freedom in the management of their funds. The eventual aim is to induce

individual banks to manage the settlement risks arising from their operations on their own initiative.

In the case of net settlement systems in major developed countries, shortages of settlement funds in the event of a settlement failure by a bank are covered through the disposal of collateral. In Korea they are covered not only by the disposal of collateral but also by BOK's emergency loan facility, whereby banks can borrow the needed funds against their collateral held by BOK. This arrangement was reached in the belief that if just the disposal of collateral were available, other banks would be exposed to liquidity risk as it might take quite a long time for the bank in default to acquire the necessary funds, hence delaying net settlement.

### **Promotion of the introduction of cheque truncation**

#### *Background to introduction*

In Korea, as cashier's cheques and bills are widely used in general consumer and business transactions and bank branches handle the collection of charges for various public utilities and other recurring payments such as newspaper subscriptions and tuition fees, the receiving and processing of various payment documents (bills, cheques and giro documents) makes up a large part of a bank branch's everyday business.

However, the majority of the associated documentation tasks are carried out manually and the transmission of the collected slips usually requires physical delivery. This has been a factor hindering an improvement of productivity by bank branches.

Thus, there is an urgent need for a system of cheque truncation to be introduced so as to allow business to be handled solely by information flows through electronic communication channels without the need for the delivery of documents. This can be achieved by standardising the documents and mechanising the data processing.

#### *Main features of the system*

We plan to transform physical-delivery-based clearing into electronic-information-based clearing for the handling of all payment documents, including bills and cheques.

According to the plan, the first step is to complete cheque truncation by the second half of 1998 for cashier's cheques and electricity and telephone OCR documents, which have been already standardised. The remaining payment documents whose format is not yet standardised will be included as circumstances permit.

#### *Problems and the problem-solving process*

BOK took the initiative and is playing a key role in the introduction of the system. The Subcommittee for the Promotion of Computerisation in Finance, over which it presides, selected the introduction of cheque truncation as one of the key projects for financial computerisation in November 1996.

Because the introduction of cheque truncation must be carried out jointly by all banks and receivers of funds, lengthy discussions with all the parties involved were required to set out the schedule for its introduction and avoid potential conflicts of interest.

During the discussion process, some banks were very cool towards the project because of the high investment costs they would have to shoulder for the setting-up of the system. Also, the KFTC, which acts as a communication relay centre, feared a loss of its organisational status through the reduction of its operations caused by the system's introduction and sought to postpone the project.

Furthermore, tax-collecting agencies held widely differing views on the standardisation of payment documents as regards the detail and scope of the information that should be included on them, and no satisfactory consensus was reached, either among the tax-collecting agencies themselves or between tax-collecting agencies and the banks. Since the Government had selected truncation as a national computerisation project, it thereupon organised a working group on the standardisation of payment documents and became actively involved in reconciling the different opinions. This led to agreement that the information to be entered on the slips should be reduced to the bare minimum, that tax-receiving agencies unable to acquire the information they needed from the slips should construct their own database systems to obtain the information, and that the standardised format of OCR giro documents should be given wide publicity as the national standard.

By explaining the need for the system and the benefits to be gained

from its introduction, BOK persuaded the relevant institutions to play an active role in the project. It set up a working group consisting of banks, the KFTC and large-volume funds recipients, and produced a detailed implementation plan for cheque truncation after reconciling conflicting opinions so as to produce an adequate consensus.

An important problem that had arisen in the discussions on the system's introduction was that of cost-sharing among the institutions involved.

Agreement was finally reached that the banks should share the costs of constructing the information relay centre and that individual banks should bear the costs of purchasing the necessary equipment and developing the related programs.

However, each bank will be allowed to opt for reader/sorter machines, scanners or PCs as its data-processing method in order to minimise its costs. Also, the online networks of individual financial institutions and the existing financial information network will be utilised to the fullest extent possible in constructing the communication network necessary for the exchange of information.

Another problem is that it is questionable whether payment orders in electronic form are legally enforceable under the Bills and Cheques Act of Korea as it now stands, since it stipulates that cheque holders should present the physical cheques. Also, it would be difficult to make paying banks responsible, as they are at present, for the payment of forged cheques because there is no way for paying banks to inspect the physical cheques where cheque truncation is used.

To address these problems, having taken legal advice and observed foreign precedents, BOK plans to insert the following provisions into the interbank agreement. As banks both pay and issue cashier's cheques, once paying banks reconcile the electronic information received from collecting banks with the details of their own issue records and confirm that both sets of information match, payment orders are to be acknowledged as effective. In addition, as cashier's cheques will be first examined for forgeries by the collecting bank, employing sophisticated anti-counterfeiting devices, the collecting bank will be responsible for payments made on forged cheques. However, for those payment documents such as current account cheques and promissory notes that are to be included in the second stage of cheque truncation, amendment of the relevant legislation will be necessary to make such payment orders

in electronic form legally enforceable because their issuers are not banks but private individuals and an interbank agreement would not be legally binding on them.

### **Enforcement of security measures**

As factors detrimental to the security of the financial information network, such as unauthorised access and failure of computer and communication networks, have substantially increased with the expanded provision of electronic banking services in Korea, there is a growing need to set up comprehensive guidelines for security measures both to ensure the safety of electronic banking transactions and to cope with emergencies such as system failure and natural disasters.

In this context BOK undertook a comprehensive survey in June 1996 on the security status of domestic banks' financial information networks. From this it emerged that the level of security for the financial information networks in most cases fell far short of that in major advanced countries: most banks did not have security guidelines for their financial information network and also were not equipped with standby communication facilities or an electronic backup system. This was because the financial information networks had been constructed within a relatively short time-span and most banks did not pay great attention to their security level.

Accordingly, in February 1997 BOK established a set of security guidelines for financial information networks. These include guidelines for security measures and contingency plans. The guidelines for security measures include the management of information concerning financial transactions, the administration of computer network resources and specialists, and the operation of electronic systems and their installations and equipment to protect financial information networks from unauthorised access, breakdown and accidents under normal circumstances. The guidelines for contingency plans include the actions and procedures that should be contained in individual contingency plans so as to allow a swift restoration of business in an emergency.

However, because the implementation of security measures imposes heavy costs on banks and their benefits do not make themselves felt in the short term, top management had little interest in putting them in

place. Also, because of the great differences in the size of individual banks, the uniform application of the BOK guidelines to all banks was problematic.

Thus, banks are now to draw up and put into effect on a voluntary basis their own detailed implementation plans tailored to their particular conditions but based on the guidelines for security measures put forward by BOK. We hope to encourage enthusiasm for, and a willingness to invest in, security measures on the part of senior management through a biennial comparative appraisal of individual banks' progress in implementing their plans, the results of which will be reported back both to top management and to the Office of Bank Supervision.

In September this year, BOK also investigated the state of banks' readiness with respect to the "year 2000 problem" and found that some of them did not realise its seriousness. Thus, it drew up a target timetable under which all banks should complete the necessary system changes by the end of 1998 and linkage tests with other institutions by June 1999.

## Brazil's experience in modernising the payment system to increase efficiency and reduce risks

José Antonio Marciano

### Introducing the Brazilian payment system

The main payment instruments and networks in Brazil are:

- cash;
- cheques;
- credit cards;
- debit cards;
- *bloquetos de cobrança* (bar-coded remittance documents used to pay bills);
- *documentos de crédito* (DOCs, used to make interbank credit payments);
- automated teller machines;
- home banking (including through the World Wide Web); and
- smart cards (only pilot projects).

### Factors affecting the payment system

The principal factors affecting the Brazilian payment system are:

- the low proportion of consumers with cheque accounts compared with that in developed countries;
- the large size of the country and its many areas of difficult access. The country has a vast territory (8.5 million square kilometres), and some areas, such as the Amazon forest region or remote towns and villages in the countryside, have a poor telecommunications infrastructure and insufficient transportation facilities. Nonetheless, it is quite an accomplishment that no cheque takes more than six working days to be cleared (except in a very few remote areas). The country is divided into 32 regions for cheque clearing purposes. Cheques drawn and presented in some of these regions (a number of which are larger than some European countries) are cleared in 24 hours;

- all interbank settlements are made through central bank reserve accounts (because there is a regulatory restriction that prohibits banks from holding balances with each other);
- the post office service, unlike in other countries, is not widely used for financial transfers;
- cooperation between payment system participants, especially in cheque processing and transportation;
- the large number of banks, which necessitates a highly developed interbank clearing and settlement system, and a highly developed securities market; and
- a highly concentrated banking industry.

### Framework of the Brazilian payment and settlement system

The Brazilian payment system has many specialised systems for clearing and settlement. All these systems are connected to the central bank's mainframe computer (SISBACEN), which provides 24-hour access. Since financial institutions are not allowed to hold balances with each other, the central bank provides interbank settlement services for all payments. It functions as a settlement agent since the financial settlement of all transactions is made against the banks' reserve accounts at the central bank.

Our main clearing and settlement systems are:

- (a) SELIC (Special System of Custody and Liquidation of Federal Securities) – an electronic system controlled by the central bank, which registers transactions and maintains in book-entry form federal bonds and bills issued by the central bank and the Treasury. It also maintains some state and local government securities. SELIC settles on a net basis;
- (b) CETIP (Central Custody and Financial Clearing of Securities) – a private securities trading and transfer system. It also provides settlement for stock and futures exchange trading and deals in public securities issued by states and local governments. CETIP also settles on a net basis;
- (c) COMPE – a system in which cheques, DOCs and bar-coded remittance documents are cleared. Almost 98% of the total value of these documents is processed electronically;

- (d) EXCHANGE SYSTEM – an electronic system controlled by the central bank whose transactions are input by the institutions directly into SISBACEN. Each operation is individually settled;
- (e) SISBACEN (Central Bank Information System) – this system provides 24-hour access to a vast amount of information produced by the central bank and operates currency exchange transactions with selected dealers in the domestic market. The system has links to both national (SELIC, CETIP) and international (S.W.I.F.T., CHIPS) systems.

### **Restrictions and challenges imposed on the Brazilian payment system**

The major challenge facing the Brazilian payment system in recent years derives from the fact that it existed in an inflationary environment for at least 20 years. In such a situation, participants in financial markets had an incentive to keep monetary balances as low as possible. As a result, the income velocity of money rose along with inflation, forcing the payment system to catch up in terms of speed and efficiency. The successful stabilisation plan introduced in 1994 has focused attention on other issues:

- the need to modernise and improve risk control procedures as a result of market deregulation, financial innovation, fast technological advances and globalisation. The growth in the volume of international transactions and the greater interconnection between participants from different countries have increased credit and systemic risk;
- there is also room for improvement in the legal framework with a view to reducing systemic risk. Furthermore, the system rules should be clearer so that participants are able to assess exactly the risk they want to bear;
- currently, the Central Bank of Brazil is not prepared to monitor banks' intraday balances. None of the clearing and payment systems mentioned above has global caps for transactions to ensure interbank credit and liquidity risk exposure control;
- the payment system in Brazil is changing its focus from improvements in efficiency and cost reduction to an approach based on reducing credit and liquidity risk; and
- the development of a real-time gross settlement (RTGS) system is still

a challenge. A prerequisite for this is a solution to the intraday risk problem. Many aspects of this issue are under discussion, such as intraday liquidity requirements, central bank policy on the provision of intraday credit, etc.

### **Enhancing domestic payment system arrangements: accomplished and planned initiatives**

#### *Initiatives to reduce risk (mainly credit risk) in the payment system*

Rules to strengthen the Brazilian legal and regulatory framework so as to reduce risk are being studied. One possibility is to shorten the time-lag between the conclusion of a transaction and its final completion in the securities market (SELIC and CETIP). Banks are expected to be critical of such a change because it implies less flexibility for them to arbitrage in the intraday securities market.

The Foreign Exchange Clearing House is in the course of implementation. The clearing will minimise the default risk in the foreign exchange market due to the time-lag between the completion of the two legs of the transaction. The default risk may originate from time differences between countries and/or from a bankruptcy, compromising the full value involved in a transaction. Initially, this risk will be borne by the Clearing House, which will deliver foreign exchange currency to the participants in the system and will share the loss among those who traded with the defaulting bank.

#### *Initiatives to increase efficiency*

The Brazilian banks have made an outstanding adaptation from the environment of high inflation – which lasted until mid-1994, when the Real Plan was launched – to one of low inflation. During this process, the Brazilian financial sector's percentage of GDP shrank from 13% to 6% (1994 and 1996, respectively). There were mergers, liquidations and transfer of control among some financial institutions. At the beginning of the Plan, 271 banks were operating. From July 1994 to September 1997, 76 underwent adjustments resulting in the transfer of control, intervention, liquidation or absorption by other financial institutions. Of those, 43 were subject to intervention by the central bank, 30 were

liquidated, seven failed, five were placed under special central bank administration and one is still under intervention. Of the country's top ten private institutions in June 1994, three were absorbed by other banks and one was shut down. This was a very important step towards increasing efficiency and reducing risks in the payment system.

During these disruptions in the Brazilian financial system, the central bank played a decisive role by establishing a mechanism to prevent clients from losing their savings, while control over troubled banks was transferred if necessary. These arrangements kept the payment system running smoothly and did not jeopardise public trust.

The Federal Government is now tackling the problem of the state-owned banks. These banks are to be liquidated, privatised, re-capitalised or turned into regional development agencies, which are non-financial institutions. At the federal level, the largest federal bank (in terms of net worth) has been re-capitalised; others have been sold. At the state level, one large and one medium-sized bank have been privatised, two (among the top 20 banks) have been restructured with a view to being sold and two have been liquidated. Once all state banks have been closed, privatised or re-capitalised, an important source of systemic risk will have ceased to exist.

In conclusion, the soundness of the payment system and of the financial system as a whole is of great concern. Brazil has signed the Basle Capital Accord and has imposed higher capital requirements during the restructuring process. Recently, the minimum capital requirement has been raised from 10% to 11% of risk-weighted assets, 3 percentage points higher than the Basle minimum standard.

## **Malaysia's experience in modernising payment systems to increase efficiency and reduce risks**

Christopher Fernandez

Payment systems are undergoing a revolution, be it in the East or West. Paper, which has dominated for the past 50 years or so, is giving way to new media in this electronic age. The advent of the microchip, I believe, is set to transform the payments field. Given these dramatic changes, this conference is a good opportunity for us, central bankers and regulators, to share our experiences and concerns as well as to establish and strengthen personal contacts.

Before I embark on the main part of my presentation, I will provide you with some background to Malaysia's systems as an aid to understanding. I will therefore begin with an overview of the existing payment system and of new systems in the pipeline. I will then outline the objectives of reforming the systems, describe to you in some detail several constraints which we face and conclude with some of the policy directions which we are pursuing.

### **Introduction**

Most of the necessary payments infrastructure is already in place and is not unlike that in other countries. The central bank (Bank Negara Malaysia) owns and operates the high-value payment system, SPEEDS (an acronym in Bahasa Malaysia for Sistem Pemindahan Elektronik untuk Dana dan Sekuriti), which is an electronic interbank funds transfer network. The system also provides electronic book-entry settlement for dematerialised securities consisting of government paper, the central bank's securities and selected private debt instruments. SPEEDS, however, is an end-of-day net settlement system that settles across the books of the central bank.

The central bank also owns and operates automated clearing houses for the processing and clearing of cheques in the capital, Kuala Lumpur,

and in Pulau Pinang and Johor Bahru. In the remaining major towns, cheque clearing is performed manually by either the central bank branches, where these exist, or the commercial banks.

International payments are effected primarily through S.W.I.F.T., and to a lesser extent by telex.

A nationwide shared automated teller machine (ATM) network is also in place to offer bank customers the convenience of utilising any machine for their ATM transactions. Settlement of the transactions takes place the next working day through accounts maintained with the settlement banks.

In addition to the nationwide credit card authorisation network (for VISA and MasterCard), EFTPOS and EDI networks are also available. In recent years, there have been various initiatives by banking and non-banking institutions to introduce electronic money products, that is, single-purpose stored-value or prepaid cards for payment of highway tolls, use of public telephones and electricity consumption, in the last case to date on a limited regional basis.

Having enumerated what is available, I would now like to touch on what is being planned for the future. First, we intend to introduce a Real-Time Gross Settlement (RTGS) system for large-value interbank funds transfers and dematerialised securities. It is scheduled for launch in January 1999.

The recently implemented image-based automated cheque clearing system, SPICK (an acronym in Bahasa Malaysia for Sistem Penjelasan Imej Cek Kebangsaan), will be extended to Pulau Pinang and Johor Bahru in 1998, to the remaining clearing centres of Kuching and Kota Kinabalu by 1999 and to Kuala Terengganu by the year 2000.

Plans are also under way for the issuance of a multipurpose smart card (MPC) to all Malaysians. As this would probably be the first of its kind in the world, I would like to dwell a little on this planned new MPC. Bank Negara Malaysia has been chosen by the Malaysian Government as the lead agency to develop and prepare a detailed implementation plan for the issuance of the MPC, which will contain key government, payment and other private sector applications. The MPC will be a plastic card with embedded microprocessor chip that has the capability to perform a wide range of functions, including data processing, storage and file management.

Three types of card structure will be accommodated in the initial development of the MPC platform:

- (i) the Government Multipurpose Card (Government MPC), which will combine the national ID, driving licence, medical and immigration applications and optional e-cash. The national ID will be the anchor application of the Government MPC. Other government applications are to be activated at a later date;
- (ii) the Payment Multipurpose Card (Payment MPC), which will accommodate international credit, debit, ATM and e-cash applications. The combination of financial applications, however, will be at the discretion of individual financial institutions and their customers. Payment MPCs will be individually issued and branded by the issuing banks; and
- (iii) a disposable e-cash card, which will be issued by the Payment Consortium, a settlement and clearing agency approved by the central bank. The e-cash applications and infrastructure will be compatible with a disposable e-cash card.

The MPC will be tested on a pilot basis in 1998 and is targeted for full commercial release before the year 2000.

This summarises the payment systems environment in Malaysia.

### **Objectives in reforming payment systems**

Having provided an overview of the payment systems in Malaysia, I should mention briefly our objectives in seeking to enhance our systems.

Financial markets, as you know, are becoming increasingly globalised and fiercely competitive. The rapidly evolving technology and regulatory changes are constantly changing the face of payment systems. A further factor is the convenience of services and related security demands of customers. We cannot afford to lag behind or slacken if we intend to maintain our competitiveness and attractiveness as a regional financial centre.

Accordingly, as the regulatory body, we are driven by the need to improve the quality of our banking system to meet the pressures for change. This encompasses not only the elimination of risks, but also issues of security, technology, obsolescence of systems and privacy of customers. To instil greater public confidence in electronics-based payment mechanisms, it is also necessary to ensure that the legal and regulatory framework is "in sync" with payment system developments.

Hence, changes in the rules are needed to reflect developments in the market environment.

### **Challenges faced in modernising payment systems**

Let me now describe to you some of the major challenges we face in modernising our payment systems.

#### *Infrastructure*

The first issue that springs to mind is infrastructure. The traditional telephone network was not designed for data communication, much less the speeds at which modems are pushing data these days. An alternative is to upgrade to fibre optics and high bandwidth, but these are too costly to implement. Further, there is no guarantee of newer technologies emerging over time. The current public telecommunications technology also limits the efficiency of internet access and wide area networking. The dial-up analogue modem technology is too slow. As for dedicated lines, though digital and fast, they are too expensive for many small and medium-sized businesses.

#### *Legal framework*

The second issue that posed a challenge was the legal framework, which is inadequate or of uncertain applicability for the purpose of governing the existing systems and new systems to be introduced. For example, the existing “rules” for SPEEDS (the high-value payment system) are deemed to be merely procedural and lack legal force, with no penalties being imposed for contravention or abuse of the system. There is also little or no protection for aggrieved parties. Similarly, the law is found to be lacking in the area of consumer protection for retail transactions, particularly those involving ATMs and EFTPOS. Ideally, we should construct a framework which supports rapid changes in both technology and market requirements.

#### *Public acceptance*

Thirdly, there is the issue of public acceptance of new systems. Old

habits die hard and, accordingly, some segments of our society are reluctant to give up paper for electronic systems. The fact that some payment systems have a history of perceived security weakness does not help either. A further point of contention is anonymity. Supporters argue that cash is anonymous and, therefore, electronic payment systems used for cash-like transactions should also be anonymous. Regulators will then have to come to grips with the question of money laundering. There is also the preference of some citizens to deal in an all-cash environment because of the opportunity to under-report income to the tax authorities.

In Malaysia, where the majority of the population is Muslim, the payment system should also be able to support Islamic banking and financial principles. This would go a long way towards ensuring acceptance of the system by the general user community.

The issues raised here are by no means exhaustive. There are also other equally daunting challenges such as harmonisation of technical standards and protocols, linkages between the various payment and settlement systems, open access to the systems, capacity restrictions and questions of security, etc., the details of which are still to be worked out.

How, then, have we responded to some of these challenges?

### **Policy directions being pursued**

Several practical measures have been instituted. First, the Bank is considering a **legal framework** for electronic banking, particularly in the area of consumer protection for retail transfers (ATM, EFTOS, etc.) and legal certainty for large-value transfers effected through the SPEEDS system. The objective of this legal framework is to provide legal force for electronic funds transfers as well as a balance between the rights and obligations of the bank and its customers and other banks.

As it is, Section 119 of the Malaysian Banking and Financial Institutions Act 1989 (BAFIA) already stipulates that prior approval from Bank Negara Malaysia is required to operate any electronic funds transfer system, which includes the issuance of prepaid cards and stored-value cards. This section is being expanded to deal with the new developments in electronic money. The Bank has also drawn up a set of regulations governing operations using electronic money in Malaysia.

Secondly, an **RTGS** system for large-value payments will be launched in January 1999. This will reduce the risks associated with large-value payment systems and promote financial stability.

Thirdly, Telekom Malaysia Berhad earlier this year introduced its **Corporate Information Superhighway (COINS)** – an asynchronous transfer mode network catering for corporate needs. The system is a globally connected nationwide broadband communication network that will meet the need for more transmission capacity and supports multimedia applications, network computing and electronic communication. The system will be expanded in 1998 to extend its coverage of subscribers and make transmission faster. The system's nodes will be increased to 50 from 38 at present, and the transmission speed to 10 gigabytes from the current 155 megabits per second.

## **Conclusion**

To conclude, may I say that the payment challenges are many, but they are not ones from which we can shrink.

## **Strategic approach to payment system reform: the South African experience**

Philip J. Tromp

Experience has taught us that introducing change in a country's payment system is not an easy matter. The reason is simple. A national payment system has a multitude of stakeholders, key players and institutions, some of whom are fierce competitors, but who have to cooperate and collaborate in order to effect change. Furthermore, any change that may be considered will have an impact on, or be affected by, existing agreements, arrangements, procedures, systems and legislation. It is therefore not difficult to see why payment system reform is a complex endeavour, which needs the support of a diverse group of individuals and organisations.

### **Peculiarities of the South African payment system**

South Africa has a highly efficient payment system, which offers a variety of payment instruments to the public. Although various electronic payment mechanisms are available, cheques are still the most commonly used non-cash payment instrument.

Currently 51 banks and five mutual banks are licensed to operate in South Africa, of which eight are branches of foreign banks. The local banking industry, and specifically the clearing and settlement domain, is dominated by four major banks, which together account for 75% of the industry's total assets.

Various initiatives are under way in the banking industry and financial markets in order to modernise systems in accordance with international best practice and the BIS and G-30 guidelines. These initiatives include the introduction of real-time gross settlement in the payment system (March 1998), scrip immobilisation and a move towards T+3 rolling settlement in the Bond Exchange (November 1997), as well as the planned immobilisation and implementation of T+3 in the Stock Exchange.

Through these initiatives, the South African payment system and securities markets would provide the infrastructure necessary to support South Africa's role as a regional financial centre and an emerging participant in global markets.

### **Complexities of payment system reform**

The payment system involves not only the integrated and harmonious interplay of a whole range of banking institutions and operators in order to process payment instructions, but also numerous stakeholders that have an interest in, and are affected by, the payment process. The diverse nature of payment transactions brings into play numerous professions and disciplines, including bankers, dealers, economists, the legal fraternity, financial experts, auditors and technologists.

The payment system process is a complex area of business, and few people are aware of and understand the whole process and all the issues. Many regard the process as being too technical or too operational. Nonetheless, it affects the way in which banks do business and is a key component of the financial system. Although payment systems exist in order to reduce the risk in making payments and transferring value, the process can also introduce risks. Because so many institutions have to interact in order to execute a payment, there are multiple handovers – and each handover presents an opportunity for error or fraud.

Changing the national payment system thus requires a sound process, which has to be managed meticulously. Quick-fix approaches might solve immediate problems or issues, but might also drive the payment system in a direction that is not in the long-term interests of the system as a whole.

### **What is a strategic approach?**

The strategic approach requires all involved to look into the future and to sketch the desired situation, popularly known as the vision. Once all involved have agreed on the desired future, the debate on ways of achieving the defined end-state can commence. It is a case of making the future work for you – *making the future happen*. The power of a clear vision, shared by all, should not be underestimated. It is an enabling

force, which focuses the attention and efforts of people on realising the vision.

Another characteristic of the strategic approach is that it takes a holistic view of the situation. All relevant issues are included in the strategic thinking process, and the solution that is produced encompasses the required changes to every relevant aspect of the system as a whole. The approach thus means that problems must be addressed with an open mind.

Once the vision is clear, the next important facet of the approach is to enlist the support of all stakeholders. It serves no purpose to have a vision, but to restrict it to a few individuals. Real and lasting change requires all stakeholders, that is, all who could be instrumental in implementing the change, to give their full support to the envisaged end-state. Buy-in by all stakeholders will ensure that the implementation of the change will be a success. In the absence of buy-in by the stakeholders, the opposition to efforts to bring about the change may become so strong that the status quo will be maintained.

The strategic payment system reform framework covers a number of aspects, including:

- vision, that is, a description of the desired end-state;
- fundamental principles, that is, those basic non-negotiable building blocks on which the solutions will be constructed;
- critical success factors, that is, the key factors against which the success of the new payment system will be measured;
- strategies, that is, the actions that need to be taken in order to change the current situation to the situation described in the vision;
- roles and responsibilities of the key stakeholders;
- a high-level implementation plan, showing the main targets to be achieved.

The strategic framework serves as a blueprint for the development, enhancement and maintenance of the payment system.

### **Why is the strategic approach advisable for payment system reform?**

A country's payment system is a national infrastructural asset on which the economy depends. Infrastructure is, by its very nature, long-term,

since it is expensive and requires considerable effort to put in place. Although there are certainly advantages to increasing the efficiency of, and resolving problems in, current payment processes, it is the long-term soundness, robustness and effectiveness of the payment system that is the first prize.

Within national payment systems, it is essential for competitors to work together in order to complete the payment cycle. It is thus advantageous to focus the competing institutions on a higher-order goal, so that competitive issues can be played down and the focus can instead be placed on what is important to the system as a whole. This would be very difficult to achieve by means of an incremental operational approach.

Also, national payment systems are collaborative by their very nature. No single institution, or small subset of institutions, could or should dictate the process or the solution. Thus, there also is a need to cooperate with all stakeholders in defining solutions. Collaborative solutions can be achieved only by broadening the stakeholders' understanding and by building payment system expertise.

### **A collaborative approach to a strategic payment system reform project**

The South African experience has shown that it is extremely beneficial to adopt a collaborative approach to a strategic payment system reform project. In this context, collaboration is defined as *“a process of shared creation where two or more individuals, with complementary skills, interact and, in the process, develop a shared understanding of a situation that none had previously possessed, or could have attached on their own”*.

Collaboration has been found to be essential, because very few individuals possess all the relevant knowledge required to address payment system reform. The collaborative process helps to overcome the limited capabilities, knowledge and experience of individuals, and fosters learning, through the sharing of knowledge and experience.

The individuals that are selected to participate in the collaborative strategic planning process are a key prerequisite for success. In order for the process to be effective, it is necessary to ensure that the participating individuals are a diverse group, drawn from different stakeholders and with sufficient representation from the relevant disciplines. Skills in

facilitating workgroup exercises and, specifically, in building consensus are also essential.

In South Africa, the process of formulating a strategic plan for the reform of the national payment system took 18 months, from start to end. Over a period of 14 months, a team consisting of 22 representatives from the South African Reserve Bank and the banking sector participated in numerous collaborative work sessions in order jointly to define the national strategy. Thereafter, an extensive information campaign was launched so as to inform the key stakeholders of the strategy and test the proposals. This resulted in a blueprint for the payment system reform initiative in South Africa which is widely understood and supported by the banking industry.

Lessons learnt from the South African experience are described briefly below.

### **Project roles and responsibilities**

Various institutions can play a role in the development of a strategic plan for payment system reform, including the central bank, the commercial banks and consultants.

#### *The central bank*

The central bank, as a non-competitive and neutral agent, is well placed to take the lead in the development of a payment system reform strategy. As the monetary authority and the banker of the banks, the central bank also has the authority to act in the interest of the payment system as a whole.

#### *Commercial banks*

As deposit-taking institutions and financial intermediaries, banks play a key role in the national payment system. Their understanding of the business and of the impact of any change on their processes and customers is critical for the success of a payment system reform project. In cases where foreign banks are operating in a country, it is also valuable to obtain their views on the subject.

### *Consultants*

Consultants can add value in various ways. Firstly, they can support the central bank in facilitating the process, although they should never take ownership of the process. Secondly, they can provide expertise in payment systems and add fresh perspectives, of which participants in the domestic systems might not be aware.

### *Others*

Various other parties could contribute to the quality of the end-product, by providing input at various stages of the process. These include the government, telecommunication providers, donor agencies and the business community.

## **Prerequisites for a successful strategic reform project**

The successful execution of a national payment system project requires some specific fundamentals to be in place. The following have been found to be important prerequisites for a successful project of this nature.

### *A driving force*

As with any major endeavour, a driving force is required. The project needs a champion, that is, a person who has the sense of responsibility to see the project through to completion. This person should preferably be a respected individual in the banking industry and have the determination required in order to drive the project to completion. Furthermore, it is beneficial for the champion to have an appropriate power base, for example, the central bank. This will ensure that the project champion has the power to exert pressure whenever difficulty arises in the process.

### *Process management skills*

The nature of the project is such that good communication and process facilitation skills are essential. The project leader must be able to communicate well with different levels of stakeholders and has to feel comfortable with addressing both high-level concepts at an executive level and technical details with experts, when necessary. Group process

facilitation skills will enable the project leader to extract information from experts and to build consensus on concepts and strategies.

### *Application of project management disciplines*

Payment system reform initiatives are major projects, requiring proper project management disciplines. Projects must be well defined and structured, with sufficient milestones in order to measure progress and to identify problem areas.

### *Patience with the process*

Use of the collaborative approach requires not only a concerted effort by all concerned, but also patience with the process. All participants and stakeholders must feel that they have been afforded ample opportunity to contribute and must be able to see their views reflected in the end-product. The process must be allowed to run its course and cannot be rushed. Pushing the process too fast could result in half-baked solutions, which would most likely satisfy only those stakeholders that could benefit from the particular approach or solution proposed.

### *Continuous progress*

The project leader must ensure that there is continuous progress, so that all stakeholders retain their interest in the project. Therefore, the project leader must ensure that all involved are kept informed and are aware of the progress being made. Every small achievement must be highlighted, so that there is a continuous perception of real progress.

### *Continuity in participation*

Real progress requires that participants remain part of the process. If, for example, the representatives of banks change frequently, it may well become impossible to maintain the expertise and team spirit that have been built up, and arguments may well have to be revisited whenever a new team member joins. In the South African case, a team of eight to ten representatives formed the core of the project team for the full duration of the project.

### *Wide involvement*

The project must involve as many members of the financial industry as possible, in order to spread awareness and to obtain as many ideas and as much positive critique as possible. If at all possible, teams representing various disciplines, for example monetary policy, financial markets, legal experts and bank supervisors, should be involved as separate study groups, examining the proposals of the strategy formulation team as they become available.

### *Communication with all stakeholders*

The reform initiative and the progress being made must be communicated to all stakeholders, both domestically and internationally. Various methods of communication could be used, for example articles in the news media, newsletters and briefings to different interest groups.

## **Problems experienced**

A number of problems have arisen from time to time during the process, including the following.

### *Finding payment system experts*

Although the banks in South Africa have very skilled and capable staff, one of the first problems encountered was that neither the central bank nor the commercial banks had any payment system “experts”. People were knowledgeable about one or two of their banks’ payment products, but very few people had an understanding of the system as a whole. The project thus had to be structured in such a way that a common terminology and understanding could be developed before any attempt was made to develop strategy.

### *Intra-organisational politics*

We found that individuals representing the stakeholders had at times experienced problems in their relationships with other parties within their own organisations. For example, when a representative of a bank came from the retail side of the bank, the treasurers would downplay his

or her opinions as not representing the views of the bank. Such a situation places the project leader in an extremely difficult position, in that he or she has to decide whose views should prevail.

### *Ineffective communication within participating organisations*

Speaking to or involving one person from an organisation does not mean that the organisation concerned is informed of what is happening in the project. We soon realised that another means of communication was required in order to keep all stakeholders informed, and a newsletter was introduced to overcome this problem.

### *Changes in representation*

Changes in the team formulating the strategy can prove to be very disruptive. The team members, over time, gain knowledge and understanding of issues, and a new member sets the process back, since arguments have to be debated from scratch. Fortunately, we had only two changes in key players during the strategy formulation period.

### *Natural affinity for operational issues*

Pressure to resolve critical short-term problems occurs from time to time. People tend to become despondent and to pull the process back to operational issues from time to time. The project leader had to push very hard in order to keep the discussions at a strategic level.

### *Questioning the role of the central bank*

Especially in the initial stages, the banks were very suspicious of the central bank’s motive with the project. They were extremely eager to get the central bank out of the way so that they could “*get on with it*”. It required much perseverance to keep the process going in the face of continual criticism and questioning of the central bank’s role.

### *Non-negotiables*

At various points in the process, the banks dug in their heels and deemed certain issues to be non-negotiable. It took much patience and debate to overcome some of these obstacles. In the end, it was the shared vision of

what would be ideal for the South African situation that won the day, even in the most delicate situations. The end-product contains numerous fundamental changes which were at one stage or another deemed to be non-negotiable.

### **Benefits derived from using the strategic approach**

A number of benefits are becoming evident as the payment system reform project moves closer to implementation.

#### *Smooth implementation*

The process of implementing the identified changes to the payment system has been made significantly less traumatic because we can fall back on an approved strategic framework. Whether one is developing a new system or instituting a new self-regulating management structure, the fact that a blueprint has been agreed by all stakeholders obviates the need to debate issues from scratch.

#### *System design and development*

The blueprint has made it much easier to design the key technological components of the system, as the principles and long-term strategy have been spelt out clearly.

#### *Transparency*

The blueprint has introduced an era of transparency in terms of the relations not only between the central bank and the banking industry, but also between the banking industry and non-bank participants in the payment system. Business models and interface standards have been developed in line with the strategic blueprint, and there is enthusiastic participation from various quarters in defining procedures and new payment practices.

#### *Significant payment system knowledge base*

The collaborative approach has resulted in South Africa having a significant number of people in the banking industry who understand the

issues involved in payment systems. This has benefited not only the national project, but also the institutions, which have to adapt their systems and practices in line with the changing scenario.

#### *Positioning of banks and non-banks*

The blueprint gives both banks and non-banks the opportunity to position themselves in order to capitalise on the possibilities and business applications made possible by the new payment system. The interest from all sectors of the banking and business community is increasing exponentially as the progress towards implementation of the blueprint becomes evident.

### **Conclusion**

The South African experience has shown that the strategic approach to payment system reform can indeed work. It has given the South African payment industry a long-term vision of the direction in which the payment system should evolve. It has created a blueprint for the future, which serves to focus and direct the limited resources available towards achieving a long-term goal, to the benefit of the country's financial system and the economy as a whole.

Approaching the project in a collaborative, instead of an individualistic, manner also has many benefits. The collaborative approach not only involves more people in the thinking process, but creates a *meeting of minds* on what it is that needs to be achieved. The approach arms more people with the arguments and the rationale for the required change. The greater the number of people who understand the need for change and the steps that need to be taken to address the long-term issues, the more likely it is that the necessary support will be forthcoming.

## **Enhancing domestic and cross-border payment system arrangements to cope with the liberalisation and globalisation of financial markets**

Joseph Yam

### **Enhancement of domestic payment systems**

A crucial component of the financial market infrastructure is an efficient and robust domestic payment system capable of handling the rapid growth in payment flows arising from the globalisation of financial markets, financial liberalisation and economic growth in general. The most compelling reason for developing a sound payment system is the increasingly important role it plays in maintaining stability in the financial system. If a major bank, for whatever reason, cannot settle its payment obligations, the knock-on effect on the ability of other banks to meet their payment obligations would have a major impact on the stability of the financial system.

Apart from containing the systemic risk arising from bank failures, an advanced interbank payment system operating on the real-time gross settlement (RTGS) principle can contribute significantly to the maintenance of financial stability in several ways. First, it will enhance the effectiveness of monetary operations by the central bank in achieving its monetary policy objectives through real-time monitoring and control of interbank liquidity and by providing a more efficient transmission mechanism for monetary operations to influence interest rates. Second, RTGS provides the essential building-block for delivery-versus-payment (DVP) and payment-versus-payment (PVP) linkages which would extend the benefits of reducing the settlement risk in domestic interbank payments to securities/equity transactions and cross-border foreign exchange transactions.

Currently, most central banks in Asia have implemented or are in the process of developing RTGS systems. For example, Hong Kong, Korea and Thailand have already implemented RTGS systems, while New Zealand, Australia and Singapore are in the process of implementing RTGS. Japan is planning to extend the current range of transactions

settled on an RTGS basis and China plans to introduce RTGS as part of the China National Automated Payments System which is scheduled for completion in 1999.

### **Cross-border linkages**

To meet the challenges of the liberalisation and globalisation of financial markets, another important task of central banks is to enhance cross-border payment and settlement arrangements to cope with the ever-rising cross-border trade and investment flows.

Both the public sector and the private sector have devoted considerable attention to this area. In October 1994 the New York Foreign Exchange Committee (NYFEC) published a report on "Reducing Foreign Exchange Settlement Risk". In its report, the NYFEC defined "best-case" settlement practices which, if adopted, will help reduce significantly settlement risks in foreign exchange transactions. However, substantial settlement risks still remain even if these practices are adopted.

In early 1996, the G-10 central bank Governors endorsed a report prepared by the Committee on Payment and Settlement Systems entitled "Settlement Risk in Foreign Exchange Transactions". The report sets out a strategy to reduce foreign exchange settlement risk based on action by individual banks to measure and control their own exposures and by banking industry groups to develop well-constructed multicurrency services, including netting schemes, that would contribute to the risk reduction. This strategy relies mainly on initiatives of the private sector. The report sets a two-year horizon for the implementation of this strategy, after which the G-10 central banks would assess the progress that has been made and consider possible further action if progress is found to be insufficient. The indications are that the strategy is spurring progress, although much more work still needs to be done.

While multilateral netting and settlement schemes offer many benefits, they also have a number of limitations. They can only be as robust as the legal framework on which they are built. In order to ensure successful settlement, restrictions on membership or access, credit/debit limits and loss-sharing arrangements will need to be instituted. Participants in most cases will need to provide collateral upfront in order to guarantee that

they can bear the cost of loss allocation. All these devices tend to confine the multilateral netting schemes to more active participants in the foreign exchange market.

Another approach to reducing or eliminating Herstatt risk is through payment-versus-payment (PVP) links. Under the PVP model, the settlement of one currency leg of a foreign exchange transaction is conditional on the settlement of the other currency leg. A PVP link can allow foreign exchange transactions to be settled on a deal-by-deal basis. Such links are simple and easy to administer and do not require an elaborate legal framework. There is also no need for membership admission criteria, credit/debit limit devices and loss allocation arrangements as in the case of multilateral foreign exchange netting schemes. This is certainly an option which warrants further consideration.

PVP is a robust form of settlement for cross-border foreign exchange transactions, as payments are settled simultaneously across the books of central banks. However, there are important issues which need to be resolved before its viability can be firmly established. One of these is liquidity management. The PVP mechanism requires the central bank to hold the local currency payment initiated by the paying bank until confirmation is received from the other central bank regarding the availability of the other currency for settlement. However, this might lead to a drain of liquidity from the system during the holding period. The amount of liquidity frozen can be very large for those payment systems in financial centres where the local currency leg of foreign exchange transactions amounts to a very large proportion of total interbank payments. The strain on liquidity is a key problem but it is not insurmountable. A number of ideas have been floated to resolve this problem.

Multilateral netting and PVP settlement are two alternative approaches to reducing Herstatt risk. They are not mutually exclusive and it is unlikely that private sector initiatives would be able to remove Herstatt risk entirely. As far as Hong Kong is concerned, the Hong Kong Monetary Authority believes that the development of PVP links will be a major step in removing Herstatt risk. It has accordingly incorporated in its RTGS system, which was implemented in December 1996, both DVP and PVP capabilities. To develop the PVP initiative further, the HKMA is presently designing the architecture and technical platform for PVP linkage between two domestic systems. The HKMA is also designing a

mechanism through which the liquidity strain caused by the holding of pending PVP payments can be reduced. Agreement has already been reached for Hong Kong's payment system to link with the RMB payment system of mainland China when the latter goes live on RTGS in around 1999. The HKMA is also discussing the development of similar PVP linkages with a number of central banks.

## **Enhancing payment systems to cope with the liberalisation and globalisation of financial markets: the UK experience**

John Trundle

The theme of this conference, managing change in payment systems, was well chosen by the BIS as it is clear that, while each country faces different specific challenges, we all face the common challenge of managing change. It may just be that I am getting old, but I have the strong impression that the pace of change has been increasing. Certainly the United Kingdom, in common with many other countries, faces very many separate projects and developments. Faced with such complexity, it seems to me that it is crucial to be clear about one's overall objectives and to have a sufficiently detailed overall strategy in order to achieve the highest specific priorities.

### **Objectives**

The principal objective for the Bank of England is to reduce risk in payment and settlement systems, especially the risk of systemic disturbances being transmitted from one participant to another. The risks with which we concern ourselves are wide-ranging and are listed in the glossaries of many BIS publications! They range from operational and legal risk through liquidity risk to the various forms of credit risk (e.g. market and principal risk). Good design and operation of payments infrastructure can reduce or eliminate many of these risks.

But it is not enough to be concerned with risk reduction or elimination. One could have the safest system in the world but it would be of no use if the system were not used. We therefore equally have to have an eye on the attractiveness of the system and we express this as a second objective, which is to promote the efficiency of the system. As a consequence of our objectives in this area the Bank of England has some involvement in both the design and, in some cases, the operation of payment and settlement systems, especially those dealing with wholesale

transactions, where the biggest values occur and where there is the greatest risk of systemic threats. In the United Kingdom this has meant that the Bank of England operates the core of the payment system, effecting the transfers between the banks which are direct members of the system, and we operate the securities settlement systems for government bonds (gilts) and for money market instruments. Both these systems deal predominantly with high-value transactions. Other systems, however, including the equity and corporate bond settlement system, CREST, and the clearing house for derivative transactions (LCH), are privately owned.

The developments in payment and settlement systems in the United Kingdom can best be understood against the background of developments in the financial system domestically and internationally. This background can indeed be characterised – as suggested in the title for this session – as one of liberalisation and globalisation.

### **Background of liberalisation and globalisation**

There have been many factors which have contributed to the liberalisation and globalisation of markets in the United Kingdom, as in other countries, but I might draw attention to two or three. First, there has been a worldwide trend towards freeing capital movements, and in the United Kingdom exchange control was abolished in 1979.

Second, the United Kingdom has a tradition of markets and trading systems which are relatively open by world standards and this was further enhanced by a series of reforms in the 1970s and 1980s which encouraged open competition in financial markets. Two key developments of both practical and symbolic importance were the introduction of “Competition and Credit Control” in 1971, which ensured that banks competed for customer business by varying interest rates without hindrance from direct controls on their lending or deposit base, and the so-called “Big Bang” in the Stock Exchange in 1986 which opened membership of the exchange to better-capitalised firms, many of which were foreign. And it is indeed the openness to foreign firms – both to participate in UK-based financial markets, and to own even the major domestic firms in those markets – that is one of the defining characteristics of the London market. The result is that it has grown as an international financial centre

and the volume and value of financial activity in London is huge. This is perhaps epitomised by the foreign exchange market, where, according to the BIS statistics for 1995, London-based trades generated settlement flows in various currencies approaching nearly \$1 trillion per day (30% of the global total).

These developments have been associated with the third factor: rapid growth in cross-border transactions. Such transactions have been encouraged both by the increasing openness of many markets worldwide and by the development of global institutions, many of which centralise the management of their trading book and the control of risk.

Against this background the Bank needed to set its strategy to achieve the objectives of reducing risk and promoting efficiency in payment and settlement systems.

### **The Bank of England's strategy**

Our strategy for payment and settlement issues has three main goals, one in each of foreign exchange, payment and securities settlement.

In foreign exchange settlement the strategy has been to implement the G-10 approach to the pressing need for banks to monitor, control and reduce the exposures which arise as a result of foreign exchange activity. This strategy involves action by individual banks, by industry groups and by central banks. In the case of individual banks, action by UK banks is being encouraged by my colleagues in the supervision department of the Bank, who have been taking a close interest in the response of individual banks to the Allsopp Report on foreign exchange settlement risk. In the case of industry initiatives, the Bank has again been involved, both as the current regulator of the ECHO multilateral netting system and through our active participation in the CPSS's FX settlement risk steering group which is overseeing the development of the continuous linked settlement approach and which has encouraged the merger between CLS, ECHO and Multinet. The third strand of the G-10 strategy towards FX settlement has been direct activity by central banks, which, so far, has largely involved publicising the issue. We have therefore taken an active role both on the conference circuit to highlight these issues, and also through individual meetings with banks involved in the FX market. We have also played an active role in the G-10 central banks' steering group

on FX settlement risk, notably through carrying out part of the surveys undertaken to monitor and assess progress.

The second component of the Bank of England's strategy towards payment and settlement systems has been in the area of payment systems themselves. Here our approach has been to introduce real-time gross settlement systems for high-value payments. RTGS was introduced into the domestic high-value sterling payment system, CHAPS, in April 1996. An RTGS system eliminates the receiver risk which arises between participants in a deferred net settlement system. But RTGS systems need careful management to ensure that they work efficiently. RTGS systems make explicit the credit which is implicit in a net end-of-day system. Participants can undertake payments only if they have cash or an overdraft facility at the moment they wish to make a payment. In common with other central banks in Europe and many other parts of the world, the Bank of England's approach has been to make credit freely available against appropriate collateral. As a result collateral management, and its cost, has been an important issue to be addressed to ensure that the RTGS system is efficient, so that it is used, and so that the risk-reducing benefits are achieved.

The Bank of England has taken a similar attitude in the development of the TARGET system for high-value euro payments. TARGET comprises the euro RTGS systems of European Union countries and extends the risk-reducing benefits of RTGS across borders. The Bank has played an active role in both the technical and business development of the TARGET system in the belief that it is desirable to have a successful euro RTGS system which will be efficient and widely used. In our view, similar issues arise in a European context to those to which I have referred in the United Kingdom about the provision of credit and the management of collateral. The issues are particularly acute within Europe, where there are a variety of national systems and a greater choice of methods of making euro payments.

The third part of our payment and settlement strategy is to improve securities settlement procedures. In particular, we wish to extend the delivery-versus-payment (DVP) system that we operate in the United Kingdom. We currently have what we call an "assured payment system", which, in the terminology of the CPSS report on DVP, is called a Model 2 system. A Model 2 system is one where the securities move gross in real time but the cash is settled net at the end of the day. In the United

Kingdom's assured payment model the delivery of securities is synchronised with a form of payment inasmuch as the large settlement banks act as guarantor for their customers. This means that most users of the system do not give up their stock without exchanging it for a high degree of assurance of payment. But the banks themselves are left as unsecured creditors to each other and effectively take on the same sort of exposures as arise in a net end-of-day payment system. Just as we decided to replace our net end-of-day payment system with an RTGS system, so we wish to replace our Model 2 DVP system with a Model 1 DVP system where both title to the security and cash (in this case, central bank cash) are exchanged in real time.

In addition to promoting this risk-reducing measure we have been having discussions with our market participants about the desirability of merging our separate securities settlement systems which cover gilt-edged securities (GCO), market instruments (CMO), and equities and corporate bonds (CREST). It may well be that efficiency would be enhanced by merger. Finally in the field of securities settlement, the question of cross-border settlement and links between securities settlement systems, particularly within the European Union, is highly topical. We will be assessing these developments against the objectives of risk reduction and promotion of efficiency that I outlined at the beginning, and we are about to embark on a formal consultation process addressing these issues.

### **Achieving the strategy**

The Bank is not able to impose solutions on the financial community in this field. We do, however, have considerable influence in a number of ways. First, we have responsibility for the oversight of the payment system. The term "oversight" is used deliberately because we have no formal statutory power to carry it out. We certainly do not have a direct supervisory role over the payment systems operators or participants. But our role is recognised in practice and will be recognised implicitly in statute. The Bank of England Bill, currently before Parliament, allows supervisors to share information with the central bank not only in its role as monetary authority but also as overseer of payment systems. That statutory recognition will underpin our authority. Second, the Bank acts

as the settlement agent for the payment systems, including, ultimately, for securities settlement systems. We have the power to grant, or not to grant, direct access to central bank accounts. This has to be exercised responsibly and in a non-discriminatory fashion, but it does give us a direct role in vetting the arrangements in payment and settlement systems where we are responsible for providing the final settlements. Finally, the Bank tries to take a leading role in the domestic debate about the development of payment and settlement services – contributing to both practical and more academic discussions. This takes the form of producing articles for publication in Bank of England publications (such as our Quarterly Bulletin and Financial Stability Review), or private sector specialist magazines, as well as contributing to conferences and having regular meetings with other interested parties.

What is clear is that the approach we take has to be cooperative. Domestically this means working with the private sector clearing organisations. The most important of these is the Association for Payment Clearing Services (APACS), which is responsible for all the main payment clearings in the United Kingdom. The most prominent of these is the CHAPS system, which is controlled by the CHAPS Company. The company is owned by the private sector banks and the Bank, but we have only a very small share. Our experience has been that the commercial banks can have different priorities from the central bank, in particular with respect to the trade-off between risk reduction and cost. Nevertheless we have also found that, if our arguments are good, the commercial banks have typically been persuaded of the merits of collective approaches to reducing risk. This has been particularly apparent in the case of RTGS systems, where we originally encountered some concern and opposition to the idea of moving from a net system to an RTGS system. A joint working party was therefore set up between the Bank and the CHAPS Company, including representatives from many of the commercial banks involved. This group conducted an extensive investigation into the consequences of moving to an RTGS system and, in particular, undertook detailed modelling of the likely impact on payments flows and the peak demands for liquidity in the course of the day. This was then compared with the ability of individual banks to provide collateral to secure adequate credit to enable them to process their payments to a timetable which suited them and their customers. After this modelling work the banks agreed to move to RTGS and are now enthusiastic about

the sterling RTGS system in the United Kingdom. That modelling work is now being adapted for use by CLS in its own business planning for its proposed foreign exchange settlement system.

In addition to talking to the main industry groups like APACS and the London Clearing House (for derivatives), we also maintain an active dialogue with individual firms and organisations including trade associations, like the British Bankers Association, and the various other banking and securities groupings. We believe that persuasion is usually an effective way of implementing the strategy even though it may take some time.

Internationally the approach is bound to be similar. There is no overarching authority to impose solutions in payment and settlement and therefore progress can be achieved only through cooperation. The main basis of such cooperation is through other central banks, both bilaterally and collectively. The Bank of England is therefore keen to take part in activities such as today's CPSS seminar as well as in more formal groupings such as those within the European Union and in the BIS or regional groupings.

## **The future**

Change will undoubtedly continue to be a major theme in payment and settlement policy in the United Kingdom.

Our domestic arrangements for the division of responsibility between official bodies is changing as a result of the Bank of England Bill, and the prospective Financial Services Reform Bill. These measures will involve the amalgamation of the Bank of England's supervision department with the supervisors responsible for securities firms and markets and for insurance and building societies. Responsibility for financial stability, by which we mean mainly systemic threats, however, will remain with the Bank of England. The example which is usually quoted to illustrate this responsibility for overall financial stability, other than in respect of individual institutions, is the oversight of payment and settlement systems. Clearly it will be important to retain close liaison with those carrying out the day-to-day supervision of individual firms and markets to protect consumers. Equally our focus on risk reduction and on the promotion of efficiency has been reinforced by these administrative changes.

In terms of payments projects themselves there is a degree of project congestion at present. Markets, clearing organisations and individual firms have been preoccupied with preparation for European economic and monetary union (EMU) and with work to deal with the Year 2000 problem. The preparations for EMU were made somewhat more complicated in the United Kingdom to the extent that we have been preparing both for the possibility of being a founder member of EMU (being "in" in the jargon) and for not being a member at the outset (being "out"). In practice many of the preparations are the same – because London's wholesale markets will actively trade and settle the euro whether or not the United Kingdom is an initial member of EMU – but the Chancellor's recent statement making clear that the United Kingdom would not join in 1999 but expressing a strong desire to join as soon as possible after the next election has aided preparations. Wholesale markets now plan on a consistent basis and the announcement has also encouraged sensible preparation on the retail side. The United Kingdom now regards itself as a "pre-in", that is, a country preparing to join EMU within the next few years.

These projects, including the Year 2000 projects, take a great deal of resources, both technical resources and – probably as important – middle and senior management time. The result is that we are not rushing ahead with other desirable projects in the field of payment and settlement systems because it would not be prudent to introduce risk-reducing measures in a risky way. Nevertheless it will be clear from what I have said that we have a number of high priorities for the next few years. The first is to move to Model 1 DVP in our securities settlement systems as soon as practicable. This is primarily a risk-reducing measure. The second is to look seriously at the advantages of consolidating the various securities settlement systems in order to promote efficiency. Third is to consider the case for links between the UK and various foreign securities settlement systems which, if done in a robust way, could contribute to the achievement of both the risk and the efficiency objectives.

We feel that we have made some progress in the United Kingdom in recent years in developing our payment and settlement infrastructure. Equally we feel that there is more to do. Managing change is, and will continue to be, a continuous process.

## **Enhancing domestic and cross-border payment system arrangements to cope with the liberalisation and globalisation of financial markets: experience in Singapore**

Low Kwok Mun

### **Introduction**

As financial markets develop, the volume and value of funds transfers between market participants have increased considerably. The globalisation of markets and increased linkages between national financial systems have also made the integrity of cross-border funds transfer systems increasingly important. As one of the major financial centres in Asia, these are important considerations in the design and implementation of payment systems in Singapore.

### **Overview of payment systems in Singapore**

Allow me to first give you a brief overview of the existing payment systems in Singapore. Singapore's payment systems can be grouped into three broad categories:

- firstly, payments between banks and the Monetary Authority of Singapore (MAS). These payments are effected directly by MAS through the debiting or crediting of the respective banks' accounts maintained with MAS;
- secondly, interbank payments which are effected electronically through the System for Handling Interbank Funds Transfers, or SHIFT. These payments are settled on a net basis at the end of the day via the banks' current accounts maintained with MAS; and
- lastly, retail payments between customers of different banks which are effected through cheques, the interbank GIRO, ATMs and EFTPOS.

Large-value Singapore dollar interbank payments are made through SHIFT, which was implemented in 1985. SHIFT is operated by the Singapore Clearing House Association, or SCHA, of which all banks are members. The SCHA has in turn appointed a private company called Banking Computer Services (BCS) to run the system. SHIFT is an end-of-day net settlement system. Under the system, the records of all banks' net receipts or payments are transmitted to MAS at the end of each day for settlement between the banks' accounts with MAS. Transaction values in SHIFT have increased by about 18% annually since its launch in 1985. It now settles about S\$ 37 billion of transactions per day.

As for retail payment systems in Singapore, their development has been largely driven by commercial considerations of banks. Given the tight labour market situation in Singapore, banks had to introduce more efficient and less labour-intensive payment systems to reduce cash and cheque handling. The Government is also a major driving force. Many government departments have been encouraging the use of cashless methods such as the interbank GIRO for the payment of public utility and other government services. Singapore's ATM network has evolved from providing basic cash-dispensing and balance enquiry functions to include such services as electronic share application and funds transfers between accounts. EFTPOS is also now widely used in major department stores and many retail outlets. The most recent development in retail payment systems was the introduction of a nationwide stored-value card or cashcard, which employs smart card technology. The cashcard will provide the framework for the introduction of an electronic road pricing system on Singapore roads sometime next year. It is hoped that the cashcard will also be used at pay phones and in car parks, the subway, buses and taxis.

### **Implementation of a real-time gross settlement system**

The growth in interbank payments handled by SHIFT has necessitated a review of Singapore's interbank payment system in order to reduce settlement and credit risks. MAS has therefore embarked on the development of a real-time gross settlement system to replace SHIFT. The RTGS project is already at an advanced stage and if all goes well it should be rolled out in the first half of 1998.

In considering the design of the RTGS system, a number of issues had to be decided on. In contrast to the SHIFT system which is operated by the private sector, the RTGS system will be operated by MAS. This appears to be the more widely adopted practice elsewhere. As banks maintain current accounts with MAS to meet their statutory reserve requirements, it is more logical for MAS to also operate the RTGS system to facilitate real-time settlement of payment instructions. The RTGS system will also provide the framework for the introduction of a delivery-versus-payment system for the settlement of transactions in Singapore government securities.

Introducing major changes to existing systems which have worked well is always difficult. We have to convince banks of the benefits of an RTGS system over the end-of-day net settlement system. Such benefits are often not obvious, especially when there has been no experience of default under the existing system. However, we have to be more forward-looking and consider the potential benefits with the possibility of linkages between RTGS systems across national boundaries for cross-border payments. Of course, the introduction of RTGS would necessitate a major change in the way banks manage their intraday liquidity positions. Staff have to be retrained to implement more rigorous liquidity management systems.

### **Cross-border payments**

So far, we have only considered ways to strengthen our domestic payment systems. There have been few, if any, attempts to develop linkages with other national payment systems. With increased cross-border financial flows, such linkages will be a major undertaking to reduce settlement risks between banks across different time zones. Singapore is now a major foreign exchange trading centre in Asia from which many international banks undertake global trading activities. Driven by their own need to reduce risks, some banks have entered into bilateral or multilateral netting arrangements with their counterparties. However, such arrangements are based on the banks' own commercial considerations. Banks are not expected to, and indeed it is not their responsibility to, ensure the overall integrity of the global payment systems. This responsibility rests with the

central banks. In this regard, major issues have to be addressed. For example:

- individual countries are at different stages of development in their domestic payment systems. How would this affect the integrity of the linkages between those systems? Should there be operational benchmarks or minimum standards for payment systems that wish to be linked?
- what would be the impact of payment system linkages on monetary policy as liquidity intended for a particular banking system could easily flow to another banking system?
- who should provide the technical connection between national payment systems and how should this be regulated to ensure its reliability?
- should central banks encourage or even mandate the use of netting arrangements by banks to reduce foreign exchange settlement risks? Do the different legal systems support such netting arrangements?

These are difficult issues and the list is by no means exhaustive. We do not have all the answers, but one thing is certain – the challenges facing central banks in managing payment systems in an increasingly globalised financial environment are formidable.

## Reforming the Australian payments system

Graeme J. Thompson

### Policy objectives for the Australian payments system

The main interests of the Reserve Bank of Australia (RBA) in the payments system have traditionally been safety and stability. This has led us to concentrate on promoting the integrity of high-value payments and securities settlement systems. Our influence has derived from our role as a participant in those systems, our authority as bank supervisor and central bankers' suasion.

Following a recent Government inquiry, the RBA will be given specific statutory powers to regulate the payments system. As well as covering safety and stability questions, these powers will extend to promoting payments system efficiency and competitiveness, which have, to date, been secondary goals.

### Domestic reform – RTGS

Our major payments project in recent years has been the implementation of a domestic real-time gross settlement (RTGS) system. This is due to be fully operational in April 1998. We will then have an RTGS system of unusually wide scope – covering general-purpose high-value payments including the Australian dollar leg of foreign exchange transactions, and providing settlement of money and bond market transactions on a genuine Model I basis. We expect it to capture around 85% of interbank payments by value.

The scope and complexity of this project have presented many challenges:

- building consensus and commitment among the various stakeholders has required extensive explanation, persuasion and negotiation, and at times the RBA has had to rely on its central bank authority to impose

a solution. The major banks originally tended to see only costs and no commercial benefits in RTGS, owing in part to the concentrated nature of the banking system and the presumption that “too big to fail” would hold. The larger banks also saw their franchise as processors of smaller banks' payments threatened. Different perceptions of the relative private and social benefits of RTGS have, in turn, led to disagreement over the sharing of costs;

- the banks, settlement system operators, owners of the existing high-value payments system and the RBA have had different views about RTGS design and areas of ownership. The banks were keen to control the delivery network and to keep customer details confidential from the central bank. The choice of S.W.I.F.T.'s Y-Copy for the industry's delivery system was a compromise acceptable to all. Debate then moved to who would own the “gateway” between the various delivery systems and the settlement accounts at the RBA. We believed we should control this gateway to ensure that participants could access their settlement accounts directly and on equal terms. For these policy reasons and a number of operational reasons, we insisted on our model but, as a quid pro quo, agreed not to seek recovery of all of the associated costs;
- the RBA has often had to play a “broking” role between the credit, treasury, settlements, payments and IT people within the large commercial banks. These areas had little experience of working cooperatively together, had quite different cultures, and frequently understood little of each other's business;
- marshalling the necessary personnel and budgetary resources has been a major task, both within the RBA and across the industry. RTGS has had to compete with other system developments, most of which were perceived to have a higher commercial priority. Fortunately, the project came sufficiently early not to have to compete with the banks' main renovation work for the Year 2000 problem. But it was not so early that its builders were unable to take full account of Year 2000 compliance in its construction.

We draw some important lessons from our experience with the project, including that one should not underestimate the task of explaining and promoting the aims of payments reform to the banking industry. While doing this, the central bank must firmly establish an agenda and a timetable for reform, and make a public commitment to

that. It should then lead the pace on implementation, and set an example to the other stakeholders by delivering its particular parts of the project on time and in conformity with agreed quality standards. We outsourced many of these tasks and needed to monitor carefully the development of critical systems by contractors.

Clearly, too much democracy in a project with so many stakeholders can slow progress and complicate system design. Even so, consultation and occasional compromise are essential to maintaining goodwill and industry commitment. For instance, we agreed to absorb a sizable portion of our development costs and to recover the remainder over five years. We also abandoned our initial intention to charge ten basis points for intraday repos, and will levy only a flat rate transaction charge.

As to management, we found it useful to divide the project into a small number of sub-projects, each with its own publicly designated manager. During the busiest period, a high-level RBA committee met fortnightly to guide our internal work and review our dealings with the industry. Overall coordination has been achieved through a steering committee comprising the major stakeholders and chaired by the RBA. This committee has been advised by an independent project consultant who has also played a constructive liaison role among the main participants.

### **Tackling foreign exchange settlement risk**

The RBA now proposes to become more active in tackling international settlement risk.

The Australian dollar and the Australian market both rank in the top ten in terms of global turnover, but Australia is not represented in many of the forums addressing this problem – the Committee on Payment and Settlement Systems, the G-20 banks, and so on. Also, the relative remoteness of the Australian time zone tends to make the problem both more acute and its solution more pressing. We will seek to ensure that the Australian dollar is included in international solutions to foreign exchange settlement risk.

Our first step has been to study FX settlement practices in the Australian market – attempting to replicate work in the G-10 and New York Foreign Exchange Committee. While this study is not complete, it is already apparent that the management of settlement risk by all banks,

both local and foreign, leaves a good deal to be desired. Many banks struggled to complete the survey and could not reconcile their responses with the turnover data they routinely provide to us. It is clear they are not managing their settlement risk in any sort of aggregated fashion. Furthermore, back office processes and arrangements with correspondents are often deficient.

We have spoken to all the survey respondents to discuss how each can best work towards achieving international best practice in managing settlement risk. And we will shortly be publishing the summary results of this study to create a broader awareness of the issues and the remedial steps which should be taken.

We will repeat our study next April to assess progress. This will coincide with the BIS triennial survey of foreign exchange turnover, and we will be asking banks to attempt to link and reconcile their turnover data with settlement positions.

Although the central banks in the East Asia and Pacific region (the EMEAP group) are working closely on payments system projects, including the publication of a Red Book on the Internet, they will probably have to look to broader international solutions to FX settlement risk. This is because, despite growing regional trade and investment flows, there are no markets quoting and trading, in any significant way, regional currency pairs. Most foreign exchange deals are against the US dollar. Consequently, bilateral links and even regional schemes seem unlikely to be the most promising way to reduce settlement exposures. Realistically, the practices associated with the trading of goods and services (i.e. priced in US dollars) and of the FX market are too ingrained for that situation to change quickly.

The BIS, the CPSS and the G-20 banks have made significant progress in reducing FX settlement risk over the past few years. Further advances are in prospect. The RBA looks forward to contributing to, and sharing in the fruits of, this work.

### **Financial system inquiry**

Australia's payments system has recently come under the microscope of a major financial system inquiry. This concluded that there was considerable room for improving competitiveness and efficiency in payments.

Subsequently, the Government has agreed that the RBA should not only be given specific statutory power to pursue the traditional objectives of stability and risk reduction, but should also have explicit responsibility for promoting payments system efficiency and competitiveness. This will include authority over the arrangements governing access – including pricing – to the various payments streams.

When the necessary legislation is in place, the RBA will have strong prescriptive powers to pursue these objectives. But our approach will be to establish a range of efficiency and access benchmarks and – where performance is deficient – to put the onus on the industry to reform its arrangements. Only where the industry is unresponsive will we be attracted to detailed regulation.

It is too early to judge how constructively the banks and other payments providers will respond to this new regime.

One of the key objectives of the reforms is to increase competitive pressure on established players by facilitating the participation of new entrants. Just how this will occur, and who the new players will be, is also not yet clear. There is, at present, no particular class of claimants for easier access – more a general view that entry should not be as restricted as in the past. (The possibility will exist for non-deposit-taking financial institutions, and even corporations engaged mainly in non-financial activities, to have settlement accounts with the central bank.) A particular challenge for the RBA will be to satisfy community aspirations for more competition without creating potential problems for settlement and confidence in settlement.

Some might argue whether it is a core role for the central bank to be responsible for efficiency and competitiveness in payments. This is not a role which we sought.

The Government has, however, decided that public policy needed to take a stronger hand in this area. And that the central bank was the most appropriate vehicle, because:

- it has a detailed understanding of how the payments system operates; and
- it is better placed than any other agency to strike a prudent balance between competition and safety. Perhaps to ensure that we do not lean too conservatively in the latter direction at the expense of the former, the Government has provided for a new second board of the RBA to sit alongside the main board. This Payments System Board,

which will be chaired by the Governor but have a majority of independent members, will oversee payments system policy and report regularly to the Parliament.

All of this will take the RBA into areas of responsibility which are somewhat unfamiliar to the central bankers. Striking the right balances between our various policy objectives, and between official regulation and industry self-regulation, promises to be an interesting task.

## A Japanese perspective on payment system reform

Eiji Mutoh

### Ongoing projects

There are a number of ongoing projects to improve payment and settlement systems in Japan.

#### *Funds transfer systems*

In the area of funds transfer systems, the Bank of Japan will discontinue designated-time net settlement (DNS) and make real-time gross settlement (RTGS) the only method of settlement for the funds transfer service of the Bank of Japan Financial Network System (the BOJ-NET funds transfer system) by the end of the year 2000.<sup>1</sup>

For funds transfer systems operated by the private sector, a variety of measures have been or will be implemented. For example, the Foreign Exchange Yen Clearing System (FEYCS),<sup>2</sup> which is a large-value clearing system for cross-border yen transactions, is going to adopt the CHIPS-type method to improve risk management measures. The Zengin System,<sup>3</sup> which clears interbank transactions for third-party payments, currently has a mechanism whereby the central bank provides liquidity to complete timely settlement on behalf of the failed bank in the event of a default. However, market participants are now studying ways to replace it with alternative risk management measures. In addition, Japanese banks, including those participating in the work to establish the continuous linked settlement (CLS) mechanism, a private sector initiative to reduce settlement risk arising from foreign exchange transactions, are

<sup>1</sup> The BOJ-NET is an online large-value transfer service provided by the Bank of Japan. It provides both funds transfer services and Japanese government securities (JGS) transfer services.

<sup>2</sup> The FEYCS is managed by the Tokyo Bankers Association and is operated by the Bank of Japan as part of the BOJ-NET, which conducts settlement for FEYCS payments.

<sup>3</sup> The Zengin System is an electronic domestic funds clearing system for third-party payments managed by the Tokyo Bankers Association.

discussing what they need to change in the Tokyo market to make the CLS function work.

#### *Securities settlement systems*

In the area of securities settlement systems, intensive efforts are being made to enhance risk reduction measures. For example, Japanese government bonds (JGBs) had long been settled on a net basis, with several days' transactions being netted out and processed together, causing long delivery lags. With the creation of the JGB repo market this net settlement scheme was modified to a T+3 rolling settlement mechanism. For non-JGS bonds, including corporate bonds, a new settlement system, the Japan Bond Settlement Network (JB Net), which will begin operating in December 1997, will convert traditional paper-based transactions into online transactions. With regard to the settlement of stocks traded in the Tokyo Stock Exchange, same-day settlement has replaced next-day settlement. In addition, the implementation of delivery-versus-payment (DVP) settlement for stocks and the corresponding funds is now being considered.

#### *Entry of non-financial institutions into payment services*

As for non-financial institutions, there are moves to reduce settlement costs by introducing multilateral netting arrangements, since these institutions will also be allowed to handle foreign currencies from April 1998, when foreign exchange transactions will be liberalised. Also, many projects relating to electronic money and electronic commerce have been initiated with the participation of these non-financial institutions.

### Background

#### *Factors promoting projects*

Ongoing globalisation and technological innovation in the financial industry can be cited as the common reason behind the increased number of projects in many countries. In addition, there are two other reasons in Japan. One is a growing awareness of settlement risks associated with the

increase in cases of failure. The second is the preparation for the approaching Japanese “Big Bang” – namely, the need to modify infrastructure and develop new business opportunities after the financial deregulation.

#### *Growing recognition of settlement risk*

For more than 50 years no financial institution had failed in Japan. Thus, it was believed that credits to financial institutions were safe and secure. This is why risks inherent in designated-time net settlement have never been a serious concern for financial institutions. Since it was introduced in 1988, the BOJ-NET funds transfer system, the interbank online system for large-value funds transfers provided by the Bank of Japan, has offered both designated-time net settlement mode and RTGS mode. In practice, more than 99% of transactions over the BOJ-NET have been settled in the former mode. It would not be too great an exaggeration to say that until very recently settlement risk was not recognised as a real risk.

In the last three years, since autumn 1994, failures of financial institutions have become a reality in Japan, and have prompted banks to drastically change their perception of settlement risk. Also, the Barings incident has demonstrated the immense risk associated with securities settlement. When the Bank of Japan decided to make RTGS the only method of settlement in the BOJ-NET and asked commercial banks for comments in 1996, there was strong support for the proposals and I believe this was a sign that banks had come to really recognise settlement risk.

#### *The Japanese “Big Bang”*

In connection with the Japanese “Big Bang”, the motivation to improve payment and settlement systems has two aspects.

The first is the recognition among market participants that, with the growing competition among international financial markets, it is becoming more important to enhance the attractiveness of the Tokyo market and thus it is indispensable to improve payment and settlement systems, which are the basic infrastructure for the market. In other words, market participants are well aware of the risk of financial institutions and other “customers” leaving the market, causing a hollowing-out of their home market. The projects I mentioned at the beginning are based on such an

awareness, which is most evident in the efforts promoted by industry groups to improve the securities settlement systems.

The second is the opportunity to achieve cost reductions and enter new lines of business with the Japanese “Big Bang”. For instance, foreign exchange transactions have in principle had to be settled by authorised foreign exchange banks in Japan; however, from next April, when foreign exchange transactions are liberalised, any non-bank entity will be able to provide foreign-currency-related services. Companies active in exporting and importing goods and services have therefore started to introduce their own netting arrangements for foreign currencies in order to reduce settlement costs. Also, some convenience stores are reportedly planning to sell foreign banknotes and coins in their storefront. More generally, the participation of non-banks in electronic money and electronic commerce projects can also be seen as being closely related to the prospective deregulation.

As the essence of the “Big Bang” lies in deregulation and international compatibility, it will expand business opportunities for individual market participants and at the same time will require them to have corresponding risk management capabilities. It was thus to be expected that new developments would emerge in the field of payment and settlement systems in response to the implementation of the Japanese “Big Bang”, and we have, I believe, already seen the dawn of these new developments.

#### **Future perspective**

##### *Basic criteria for the assessment of payment and settlement system reform: risk management and efficiency*

In evaluating the quality of payment and settlement systems several aspects may be taken into consideration. The most basic and important aspects are, I think everyone would agree, risk management and efficiency. Improvements to payment and settlement systems should therefore achieve higher levels of risk management and/or efficiency. Let me illustrate the ongoing projects in Japan which I mentioned earlier in terms of key features of payment and settlement systems.

First, from the standpoint of risk management, there is still room for wider use of DVP settlement for various securities. For example, a DVP

mechanism for non-JGS bonds such as corporate bonds and bank debentures is expected to be established soon, by linking a newly created online book-entry system with the BOJ-NET funds transfer system. From a longer-term perspective, some form of DVP mechanism for money market instruments such as CDs and CP may also be introduced when an online book-entry system for these instruments is in place. Of course, the development of a book-entry system not only helps to improve efficiency, it enhances risk management capability as well.

The CLS initiative to reduce the risk associated with foreign exchange transactions basically aims more at better risk management than greater efficiency. In order to support the CLS mechanism initiative, we are now examining the possibility of extending the operating hours of the BOJ-NET, first by a few hours, but in the future possibly up to 24 hours.

Second, from the efficiency standpoint, there are projects that are putting more emphasis on greater efficiency in payment and settlement. Most of the projects that utilise advanced technology, including electronic money and electronic commerce, are more or less aiming at increasing efficiency, paying due attention of course to safety or risk management.

#### *Role of the central bank*

In any project to improve the functioning of payment and settlement systems, it is important to balance advanced risk management against greater efficiency, since these two factors may be incompatible in some cases. One of the main roles that the central bank is expected to play is to enable a balance to be struck. This can be put as a matter of accommodating the respective roles of the central bank and the private sector in the field of payment and settlement systems, or the sharing of roles between them. The question is, then, how to put it into practice.

While there may be various answers to this question, I should like to present some conclusions drawn from our experience. First, the Bank of Japan has promoted risk management in payment and settlement systems, which has so far proved successful. However, as mentioned earlier, it is indispensable for market participants themselves to have a proper, but not excessive, awareness of settlement risk in order to achieve the effective risk management. This seems to suggest the importance of having an appropriate competition policy in the financial sector and accepting the exit of financial institutions from the market.

Second, in order to improve risk management, it is important to foster initiatives by market participants. If only the central bank pays attention to the management of risk in payment and settlement systems without private initiatives, this could give rise to problems of moral hazard. Although there are some arguments concerning the Japanese “Big Bang”, it has prompted a positive response at least in the area of payment and settlement systems.

Third, needless to say, it is private sector innovation that will be a locomotive for the improvement of payment and settlement systems. Positive efforts by the private sector are thus highly important in enhancing payment systems in the country.

To summarise, I think that, fundamentally, in the area of payment and settlement systems, the private sector should take the lead in improving efficiency, paying due attention to risk management, while the central bank should encourage those efforts, focusing chiefly on the risk management aspect. This view is consistent with our experience in recent years, with central banks cooperating, for example, to draw up the Lamfalussy standards.

The new Bank of Japan Law, which will come into effect next April, clearly states that the stability of payment and settlement systems is one of the Bank’s objectives. Article 1 of the Law stipulates: “The objective of the Bank of Japan, as the central bank of Japan, is to issue banknotes and to carry out currency and monetary control”. In addition, the Bank’s objective is to ensure the smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system.

This Article simply puts in statutory form what the Bank has pursued so far, and will not change our actions in four months’ time. Nevertheless, as a central bank staff member involved with payment and settlement systems, I think it is important that “to ensure the smooth settlement of funds among financial institutions” is specifically defined as a central bank objective. In conclusion, we are determined to make the utmost effort to constantly improve the operation of payment and settlement systems in Japan, in order to adhere to our objectives as stipulated in the new law.

## The reform of the French payment system

Yvon Lucas

The existence of a secure and efficient payment system is necessary to ensure confidence in the currency and contribute to the development of the economy. In particular, the proper functioning of the payment system is crucial for the execution, under optimal conditions, of economic agents' payments, and for the development of the money and securities markets. In France, the modernisation, organisation and supervision of payment systems has for some years been one of the major areas of interest for the central bank and the authorities.

### Characteristics of the French payment system

The characteristics of the French payment system explain, in part, the way in which the reforms have been carried out, and the priorities which have been set in this area.

The chief characteristic of the French payment system is the relatively small number of cash payments and the correspondingly large number of cashless payments.

The share of notes and coin in the money supply (M1) is 15%. This rate is lower by half than those in the United States, Japan or Germany. This situation arises out of the large "banked" proportion of the population (96%), the result both of legislative and regulatory measures by the authorities, which required the use of cashless settlement for certain transactions, and of the establishment by banks, in the 1970s, of very dense branch networks across the country.

Given the share accounted for by cashless instruments in economic agents' payment practices, their efficiency and low cost are clearly a decisive factor. This explains why one of the main objectives in reforming the payment system is to try to achieve the complete dematerialisation of cashless payment instruments. This objective has now virtually been met for all means of payment except cheques.

Another feature of the French payment system is the inadequate control of settlement risk, since the clearing systems do not yet have sufficient means to prevent the risk of default by one of their participants, and since banks with an account on the books of the Bank of France could generally, until recently, obtain an unsecured daylight overdraft.

The second major objective in reforming the payment system was therefore to make interbank settlements secure. For a number of years, considerable progress has been made in this area thanks to the progressive implementation of a risk reduction programme, inter alia as part of the preparation of the French payment system for the transition to European economic and monetary union.

### The role of the central bank

Central banks are usually called upon to play a very active role in payment system modernisation, as:

- owing to their neutrality they can play an extremely useful role in encouraging competition between banks;
- they are also responsible for the security of the payment system. In particular, they have to ensure that the means of payment placed at the public's disposal are sufficiently secure. They must also make sure that the exchange and settlement systems are protected effectively against the risks associated with interbank settlements, in order to prevent systemic risk;
- finally, central banks can act as the operators of certain exchange and settlement systems.

With regard to the Bank of France, one of its fundamental missions, according to its statutes, is to "ensure the smooth operation and the security of payment systems". Although this provision does not give the bank any regulatory power – this resides with the Banking Regulatory Committee, chaired by the Minister of Economy and Finance – it does legitimise the Bank of France's interventions in this area vis-à-vis both the authorities and the banks, and confers on it strong powers of guidance, which can extend to a right of veto when the integrity of the payment system is threatened.

The Bank of France also manages the clearing houses installed across the country for the exchange of cheques. On the other hand, since 1994

it has no longer managed the system for exchanging automated low-value transactions. The Bank of France is now focusing its operational role on the management of systems for large-value operations.

### **Cooperation between banks**

In the area of payment systems, cooperation between banks is necessary to ensure that payment orders are executed under optimal conditions in terms of speed and security and at low cost. To achieve this, banks must make efforts to define jointly the best possible organisation, participate in financing the infrastructure required and bear the operating costs. This cooperation between banks must not, of course, hinder competition between them.

In France, cooperation between banks, which we call “interbancaire”, is highly developed. This approach, which preserves and reinforces competition between banks on services and prices, encourages the universal use of payment instruments and exchange systems, the definition of common rules and the standardisation of procedures. This cooperation has given a great boost to the modernisation of the French payment system over the last 20 years. It chiefly takes place within CFONB (“Comité Français d’Organisation et de Normalisation Bancaire” – the committee for banking organisation and standards), which brings together all the commercial banks and the Bank of France.

Thanks to the efficiency of this cooperation, it has been possible to set up new systems requiring large scale collective investment. It has, for example, allowed the creation of the national system for exchanging automated payment orders for low-value transactions, the SIT (“Système Interbancaire de Télécompensation” – interbank teleclearing system). This system is based on a telecommunication network which permits the direct exchange of transactions between the banks’ computer centres. It allows the exchange at very low cost (around FF 0.03 per operation), 22 hours a day, of up to 30 million transactions daily, representing an annual volume of some 5 billion operations.

The creation of the French card-based payment system is another example of this cooperation. In 1984, the French banks decided to issue their customers with a card equipped with identical technical characteristics, the “Carte Bancaire”, to ensure that all merchant

hardware and all ATMs accepted this card (i.e. to achieve “interoperability”) and to draw up common arrangements for monitoring fraud and authorisations. Today, this interbank cooperation has borne fruit, since more than 2 billion card-based payments are carried out every year.

### **The reduction of settlement risks**

In order to reduce significantly the risks associated with interbank settlements, the Governor of the Bank of France decided, in 1990, to initiate a programme of risk reduction with two main objectives:

- making intraday irrevocability possible through the introduction of a real-time gross settlement (RTGS) system;
- protecting the other payment systems, with the measures taken being geared to the estimated risk.

When the risk reduction programme was presented to the French banks in 1990, even before the publication of the Lamfalussy Report, the awareness of the risks associated with payment systems was then not as developed as it perhaps is today. The discussions with French banks were thus not always easy. The Bank of France’s attitude has always been to try and convince the banks of the need to introduce reforms, rather than imposing a solution. These long negotiations had the merit of revealing the constraints on the user banks, which allowed us to put in place a large-value settlement system which best met the banks’ needs.

The reduction of risks relies above all on the introduction of the RTGS system, TBF (“Transferts Banque de France” – Bank of France transfers), which went into operation on 27th October 1997. Managed by the Bank of France, this system now allows French banks to obtain final settlement in central bank money of their large-value transactions within a short time period. The other settlement systems in operation in France, in the areas of retail transactions, securities and fixed-term financial instruments, ultimately settle in the TBF system, thereby achieving finality of the transactions exchanged there. All large-value transactions initiated by the Bank of France are, of course, routed via the TBF system.

One of the organisational features chosen for the execution of large-value transactions is the possibility for banks, from a common platform linked to the S.W.I.F.T. network, to issue payments to either the TBF

RTGS system or the protected net settlement system SNP (“Système Net Protégé”). The latter system, for which security arrangements in compliance with the Lamfalussy standards are currently being put in place, transfers its end-of-day balances to the TBF system in order for them to be settled with finality in central bank money.

The message routing circuit is “Y”-shaped. The credit institutions asked to be provided with detailed information on events concerning their accounts at the central bank and to be able to integrate this information automatically into their own information systems. To this end, upon receipt of an order – irrespective of how the operation is handled (executed or queued) – the TBF system immediately transmits a message to the issuer (in the form of an advice) and the recipient of the order (who receives the original payment order together with information on the status of the transaction). Any subsequent change in this status also triggers the immediate dispatch of an advice to both institutions. This information allows the participants to maintain an up-to-date information database on the status of all their transactions – executed or queued, sent and received – so that they can manage their intraday liquidity in an optimal way. The participants also have the possibility, in particular in cases of desynchronisation with the system, to monitor the status of their accounts or their queue by means of specific enquiries.

The conditions under which participants in an RTGS system can obtain intraday liquidity in central bank money represent one of the most important questions for the proper functioning of such a system. The need for liquidity results from lags between settlements to be made and settlements expected.

In addition to the necessary control of flows that the banks perform during the day, the arrangements for managing their accounts at the Bank of France enable them to consolidate a number of accounts in real time in order to monitor their overall liquidity. The TBF system also manages a queuing facility equipped with two levels of priority. Finally, optimisation is carried out periodically to ease the banks’ liquidity constraints.

The transactions handled by the TBF system (large-value funds transfers, balances from other systems, Bank of France transactions) are booked to special accounts, called settlement accounts, which in the majority of cases replace the ordinary current accounts opened for banks

with the Bank of France in Paris or at its branches. Settlement accounts have the following features:

- they are managed centrally on a single computer in order to allow banks to consolidate their assets in central bank money at any time during the day and in real time;
- they always form part of a group of accounts, which contains one or more settlement accounts. Only the consolidated balance of the group’s accounts, which must not be in debit, is taken into consideration by the Bank of France in booking orders.

The existence of compulsory reserves, together with the possibility of using the funds during the day, constitutes a first source of intraday financing. In France, given the current very low level of compulsory reserves, this source of liquidity is insufficient. Consequently, the Bank of France grants secured intraday loans to banks by means of intraday repurchase agreements. These repos can be entered into and repaid at any time during the day. This therefore allows banks to mobilise their securities only for as long as it strictly necessary, and they regain the use of the securities once the intraday repo has been repaid. In contrast to the technique of posting collateral, repos are well suited to the Paris financial market-place, where credit institutions are heavily involved in arbitrage on their securities portfolios.

This new infrastructure will enable the French payment system to change over to the euro on 1st January 1999, as the TBF system will form the French component of the TARGET settlement system of the European System of Central Banks. Thanks to this arrangement, the participants in the TBF system will be able to send a large-value transfer in euros to any EU bank participating in a national RTGS system as easily as if it were a domestic payment.

## Payment system changes in Hungary

László Török

### Historical background

The countries of Central and Eastern Europe have faced totally different kinds of challenges from countries in other regions in the last decade. These countries had not only to liberalise their economies but to transform them radically and manage the shift from the centrally planned economy model to the market economy one. From a financial point of view the centrally planned economic system assumed the single-tier banking system, where the banking sector was, practically, consolidated into two mega-banks: the central bank, which was at the same time the sole commercial bank, and the savings bank. The number of accounts kept by the central bank was limited by the rather small number of state-owned companies and cooperatives. Payments between the clients of the central bank were made exclusively in account money. The savings bank kept accounts for consumers and for private entrepreneurs. The majority of retail payments were effected in cash, while some payments between corporations and consumers took place by electronic funds transfer, which required a bilateral contract between the corporation and the savings bank for the exchange of batch files.

Hungarian economists sought ways to improve the socialist economic model from the mid-1950s within the politically tolerable limits. The economic reform process suffered several setbacks and it was not possible to reform the banking system until 1987. The banking reform meant dividing up the National Bank of Hungary by creating a true central bank and some commercial banks. The question of setting up an interbank clearing system arose soon afterwards. At the time, clearing and settlement was considered to be a merely operational matter, which had nothing to do with risk.

The need for profound change in payment systems, which has presented a great challenge even for central banks operating in long-established market economies during the last decade, was

accompanied by the task of creating the basic banking infrastructure for payments in the Central and Eastern European region, where even the commercial banking sector was non-existent ten years ago and the active generations had no previous experience in business banking. During this period the process of change accelerated in the whole economy, and the banks had to cope with the ever-growing number of accounts and payments, and also had to set up their own accounting systems. It is no wonder that in this situation the central bank has had to take a leading role and assume much of the responsibility for managing the change.

### The regulatory power of the central bank

The National Bank of Hungary (NBH) is empowered and obliged to be actively involved in creating and changing the payments infrastructure not only for high-value interbank systems but for all payments.

According to the Constitution of the Republic of Hungary (Act XX of 1949): “It is the responsibility of the National Bank of Hungary ... to regulate the circulation of money”.

Under the Act on the National Bank of Hungary (Act LX of 1991) “... the framework of the national payments and clearing system shall be elaborated by the NBH ...” and “the circulation of money shall be controlled by the NBH”. It is also stated that “... within the framework of the law, the NBH may impose rules by way of central bank decrees on financial institutions and other legal entities engaging in the activities of financial institutions, or business associations which are not legal entities and pursue such activities, and private entrepreneurs conducting financial activities, to regulate ... the circulation of money. The regulations of the central bank with regard to the circulation of money extend to legal entities, economic associations other than legal entities, and also natural persons.”

### Policy objectives

The primary goal of the National Bank of Hungary is, similar to that of other central banks, the reduction of risks, with special regard to credit, systemic and technical risks.

The NBH also pays particular attention to the efficiency and the smooth functioning of the whole payment system as well as the maintenance of public confidence in payment services.

Thus the central bank:

- manages the system with the lowest possible social cost;
- secures the continuous and undisturbed functioning of the payment system;
- enforces consumer protection;
- supervises the prudential operation of the system by means of oversight and licensing;
- regulates the redress procedures.

Finally, the NBH considers it equally important to achieve full compatibility of the Hungarian payment system with EU requirements.

### **The evolution of the payment systems and the main lessons**

The interbank clearing system started operations in 1994, eight years after the reform of the banking system. The project suffered delays because the problems which arose required appropriate solutions. The main problems were:

- first, the task of separating the operations of the central bank and the “legacy banks” was a precondition for setting up a new clearing system;
- second, some of the fundamental assumptions on which investment decisions in the clearing house company were based turned out to be false (e.g. the unavailability of public telecommunication services, the lack of centralised accounting within banks, the persistence of the COCOM rules);
- third, the original system design did not take credit, liquidity, settlement and systemic risks into account.

The system which was put in place in 1994 is a deferred settlement (gross) batch clearing system which processes payment orders overnight.

Furthermore, the National Bank of Hungary successfully implemented two projects in 1995 and 1996–97. The first introduced uniform account numbering and standard paper forms, and the second the interbank

clearing system for direct debits and direct credit transfers. The introduction of the RTGS system is now at the top of the agenda.

### **The main lessons learnt by the central bank**

- It is extremely important to design new systems carefully and realistically. For example, the simple overnight batch clearing system can better serve the interests and real needs of participants than the technologically more advanced plan that has now been abandoned.
- Without some form of pressure from the central bank commercial banks are reluctant to change payment arrangements. This does not mean that the central bank should do the whole job. On the contrary, it has to maintain continuous dialogue and cooperation with commercial banks. Otherwise the difficulty lies in finding the point where the central bank must take action.
- In the course of payment system reform the central bank must be firm and determined in setting the agenda and ensure compliance with deadlines. The central bank must find the way to push forward those banks which lag behind.
- Sometimes different interests of some large banks may imperil the success of projects. In Hungary’s case, for example, large banks tried to start exchanging payment instructions bilaterally just before the introduction of operations at the clearing house. The central bank responded by ruling that all interbank payment instructions should be forwarded to the clearing house. The central bank must understand the motives of the individual banks and let them exert their influence only to an extent which cannot be harmful.
- Cooperation with commercial banks is often difficult because the senior management is often uninterested in payment system issues and the banks tend to delegate their IT experts for discussions related to interbank payments.

### **Setting goals and drawing up a practicable plan to reach them**

The challenges the NBH has to face are very similar to those for other central banks. The management of change in payment systems can only be

successful if the central bank has a payment systems strategy. This should be based on the analysis of the current situation and on the mission of the central bank. The most important element of this strategy is an action plan which sets out the tasks for the coming years.

The strategic action plan should be communicated to the government, the commercial banks and other major players in the payments business. Such information is very useful for banks and some corporations to support their investment decisions. Publication of the action plan is nonetheless risky, because the players have to be assured that the central bank's measures are predictable.

The central bank must cooperate with the banks. Such cooperation can take the form of project organisation or a committee. The projects and committees should have well-defined tasks and should be wound up once the work is completed.

## Some reflections on the process of managing change in payment systems

A. Vasudevan

This theme is not a mere technical matter: it has many implications for the regulatory framework and monetary policy. Its importance is critically felt in all the developing countries where financial sector reforms and market integration efforts are being undertaken.

Decisions on effecting changes in payment systems in developing countries have to be contextual, given the background of (a) the relatively high preference of the public for the use of cash for the settlement of transactions, and (b), following from (a), the limited use of cheques, even in major towns and metropolitan cities. Moreover, the following initial conditions also need to be taken into account:

- the type of cheques in use: for instance the limited issuance of MICR cheques and the fact that large-value cheques and small-value cheques are very often mixed together;
- manually operated clearing house systems and the fact that accounting systems are also generally manually driven;
- cheque clearing and settlement systems which are generally located in central banks with commercial banks rarely undertaking these payment services except at places where the central banks do not have offices;
- securities settlement systems that are generally ledger-based, with central bank staff recording entries manually.

These conditions may not apply in all respects in all developing countries. In some of them, there are different degrees of automation or IT use in the area of payment services. The settlement process may not, therefore, be fully electronic, and it may be expected that the processes associated with payments and settlements would be partly manual and partly electronically driven.

Floppy-disk-based inputting of entries also exists in certain areas, for example in the processing of large-value cheques. In the case of securities settlements, however, there are fewer cases of delivery-versus-payment (DVP) systems in use in developing countries.

The limited acceptability of cheques for the settlement of transactions may be partly due to the insufficient legal protection often faced by sellers of goods or services. The acceptance of cheques from towns/cities other than one's own would require a willingness on the part of the seller to wait for days for full settlement. Where manual operations are common, even intra-city cheque clearances may take two days to final settlement. The delays in settlement may be perceived as costly and may contribute to the unenthusiastic response to the idea of accepting cheques in payment.

However, as economies grow and diversify, the need for a greater variety of payment methods will be widely felt, with the use of cheques gaining in importance. It is widely recognised that the use of MICR cheques would facilitate the operation of modern cheque clearing systems. Most central banks favour MICR-based cheque clearing systems, even though these systems are costly in a number of ways. First of all, the fee charged for clearing services in many developing countries may be minimal, partly because of the need to promote the use of cheques and partly because, traditionally, such services have tended to be subsidised. Secondly, the operation of MICR-based cheque clearing systems requires a team of dedicated, well-trained staff, which may not be easy to put together. Thirdly, cheque clearance and settlement systems need to be integrated through automation for the efficient conduct of clearing house operations, but in many cases such downstream linkages of cheque clearing with accounting and settlement systems would require clear-cut, legally enforceable operating instructions and staff cooperation. Where operating instructions are in the form of mere guidelines, and where unionism is strong, such linkages are likely to be weak. Nonetheless, central banks in many developing countries have become acutely aware of the need to provide efficient payment services initially through automated cheque clearing systems and settlement mechanisms, in particular given the need for financial sector reforms.

Reforms entail the introduction of a sound regulatory framework and efficient monitoring and surveillance mechanisms. Central banks would necessarily have to take the lead in introducing modern payment services, either by themselves or through other institutions such as commercial banks or through private service providers. Rarely do we see private service providers being allowed to enter this area of activity in developing countries. Cheque clearance facilities can be provided by

commercial banks where central banks do not have their own offices. It is necessary to harmonise the operations of central and commercial banks in this field.

While cheque clearing and settlement are major elements in the modernisation of payment services, central banks will need to provide for the development and use of such payment options as electronic clearing (both debits and credits), credit, debit and smart cards, and also electronic funds transfers. These new activities help develop financial markets.

The availability of payment options depends to a large extent on the availability of communication technologies. Dedicated telecommunication lines are not available terrestrially in many developing countries. Many countries would therefore have to consider promoting a VSAT network, with access open only to banks and other financial institutions. The security of data and message transfers is vital, so that the closed user group (CUG) may have to be promoted while VSAT network systems are being set up. Central banks may have to take the lead in establishing a VSAT network.

Central banks would also have to set up securities settlement arrangements, preferably on a DVP basis. Once the VSAT linkages are in place, it would be relatively easy to effect such settlements and funds transfers.

When economies begin to open up and their foreign exchange markets become integrated with the domestic financial markets for government securities, money, capital and debt instruments, and also with the rest of the world, there will be an urgent need for efficient and modern payment and settlement systems to be put in place. "Real-time gross settlement", with adequate security features and precautions against systemic and other risks, will have to be implemented. While such a development will depend on the pace at which financial sector reforms are carried out, the central banks in developing countries are conscious of the need to move in this direction. This will require highly motivated and trained staff at the central and commercial banks, and continuous education and training programmes will be necessary. More importantly, central banks will need to have a good IT environment, with sound in-house applications for data collection, data warehousing and data retrieval as well as for providing services to customers efficiently at reasonable cost.

One needs to look at the blowing winds of change in payment systems from the point of view of their effects on, firstly, domestic monetary policy and exchange rate policy and, secondly, the functioning of the international monetary system. Often the central banks in developing countries consider that the first does not pose much of a problem, although this is not always the case, especially where data on payments and asset turnover are weak. With regard to the latter, cooperation not only in terms of educational campaigns, seminars and training workshops, but also in terms of designing electronic and legal systems for the settlement of cross-border transactions may become necessary. This is an issue of which many developing countries are not fully aware, in particular as regards the developments that are taking place in advanced economies. Mechanisms may have to be developed to ensure that technologies are used to promote the integration of markets not only within national boundaries but also beyond national borders.

## **Setting priorities in the management of change in the Mexican payment system**

Gilberto Calvillo Vives

### **General considerations**

The management of change in the payments arena depends on several initial conditions, among which the most relevant are the legal framework, the technology used by the payment agents, the existence of public or private bodies that promote the change, the size and complexity of the financial system, and the privileges of different players in the prevailing system.

Since such initial conditions vary considerably from one country to another, the priorities and procedures adopted by any country to change its payment system cannot be generalised. However, there are two goals and two concerns common to all countries in handling a payments system reform. On the one hand, risk reduction and improved efficiency are goals to be pursued. An ideal payments system would be one where payments occur in a timely manner and without risk. Any reform of a payments system strives towards such an ideal. On the other hand, the time and the resources available to fulfil the task are constraints on the development of the proposed changes. These two variables usually prevent the reforms from being as deep and as quick as desired and therefore counsel a gradual approach to the defined goal. This may seem an inefficient process; however, valuable feedbacks are gathered from the first steps of the reform and some new concepts can be introduced in the latter ones. In summary, once a reform of a payments system is undertaken, it transforms itself into a continuous process that drives the system towards more efficient and less risky stages, at the pace that resources and the current situation allow. The main mission of the reformer is to understand such a process in order to monitor and guide it.

In general terms, the first priority is to understand the fundamentals of payments systems theory: the body of concepts developed by the practitioners and researchers in this field. In Mexico we have devoted a

considerable amount of resources to this aim, but we believe we still have a long way to go.

### **The two goals: risk reduction and efficiency**

If a country wants to change its payments system it is because it wants to improve its efficiency or wants to reduce some kind of risk. In this context, efficiency means final, cheaper and speedier payments, friendlier systems, better services, etc. Risk includes credit, systemic, counterparty, custody, liquidity and fraud risks.

The second priority in a payments system reform is to assess the situation in the current system in terms of its efficiency and the risks that each participant is taking. This would provide a good starting-point for designing the reform.

Once the efficiency and level of risk have been evaluated, it is useful to make a judgement about how different kinds of risk and efficiency aspects would vary under different system designs. One may find instances where it is possible to reduce risk in general while making the system more efficient. However, the analysis of particular situations usually reveals complicated sets of interrelationships between different kinds of risk and aspects of efficiency that also relate to the operating costs of the system. A major task for the designers of the reform of a payments system is to decide which level of each kind of risk is acceptable and which aspects of efficiency have to be enhanced.

Although the long-run objective is to achieve some ideal payment system, each change improves only a little over the current solution. This outcome has proven to be so, if one wishes to keep markets and other facilities operating smoothly.

As a general consideration, when there is doubt about which scenario should be adopted, it is advisable to be on the conservative side. Thus, when there is a conflict between risk and efficiency, the less risky solution must prevail even if it is less efficient. Our favourite example in this regard is the settlement date of cheque clearing houses. Before the reform, the book entry of the settlement was made with value date the day the cheques were presented to the clearing house. That, of course, was a very efficient system; however it had at least two risks: a credit risk for the central bank which guaranteed the settlement and had no time to

react when something anomalous happened and the fraud risk that banks were taking by accepting cheques as final. On the basis of these and other considerations, it was decided to move the settlement date to the day following the presentation of cheques.

### **Situation of the Mexican payments system before the reform**

Since reduced risk considerations must prevail over greater efficiency, it was clear in the design of the reform of the Mexican payments system that reforming the large-value payment circuit was much more important than modifying the retail circuit. Large-value payments were executed through book-entry transactions on the accounts of banks, in particular on their accounts at the central bank, or through cheques that were taken as final even before the clearing and settlement processes were finished. Banks had access to unlimited, free and unsecured daylight credit from the Banco de México through overdrafts on their current accounts at the central bank. Settlement of the cheque clearing houses was (and still is) done at the central bank.

This situation rendered systemic risk small since the Banco de México always guaranteed settlement. The cost was an enormous credit risk assumed by the central bank. Moreover, the existence of multimillion cheques represented a large fraud risk that indeed sometimes materialised. The guarantee of the central bank to settle the cheque clearing houses increased the moral hazard of misconduct in that area.

The payment and delivery legs of securities transactions were divorced. Thus, counterparty risk existed in all segments of the securities market. Usually the weaker party had to pay or deliver first. If its counterparty had failed it would have lost the whole amount of the transaction.

On the efficiency side, one can point out that there was no mechanism for performing same-day payments between two parties that happened to be at different banks and/or in different geographical locations. Cheques were used to partially fill that gap, leaving the payees with the risk of receiving a payment that would not be final until several hours later.

Notwithstanding that its autonomous status (1994) gave the Banco de México the exclusive power to grant its credit, the central bank was committed to providing credit to settle the payments system.

## **Objectives of the reform of the Mexican payments system**

Once the risks were evaluated, the Banco de México decided to carry out a reform of the payments system that would:

- place limits on the central bank credit facilities used to settle payments systems;
- reduce credit risk for the central bank by reallocating it among the other participants in the payments system;
- reduce counterparty risk in the securities market;
- reduce fraud risk;
- try to keep systemic risks as low as possible;
- try to change participants' moral hazard perceptions; and
- improve the efficiency of the payments system.

In order to achieve such goals it was decided to reform the large-value payment circuit to include an electronic large-value payment system, to introduce delivery versus payment in the securities settlement process, and to exclude the use of cheques. At this stage, the Banco de México issued a formal statement about the reform and advised the financial system of the need for commitment amongst participants in the reform.

## **Projects for the reform of the Mexican payments system**

The reform embraced five projects representing the priorities of the central bank. The following is a list of those projects and the date on which they were accomplished:

- reschedule automatic debits and credits to the banks' cash accounts at the Banco de México to reduce overdrafts (1994);
- limit daylight overdrafts for commercial banks on their cash accounts at the central bank; ask for collateral and charge for unsecured overdrafts (1994);
- develop a same-day large-value electronic payment system capable of reducing the use of cheques (March 1995);
- change the process used to settle the results of the peso-denominated cheque clearing houses in order to inhibit the use of large-value cheques (January 1996); and
- establish delivery versus payment in the securities settlement systems (bank securities, October 1994; government securities, July 1996; shares, April 1997).

The first of these five projects related, inter alia, to automatic debits to the current accounts of banks that collected payments on behalf of government agencies. The mechanism in place before the reform debited bank accounts and credited the account of the agency at the opening of the system, creating an overdraft on the accounts of the banks to be covered sometime during the day. With the rescheduling, automatic credits, such as amortisation of Treasury bills, are executed first and debits afterwards. This simple modification reduced daylight overdrafts considerably.

Although these projects have been the core of the reform to make the retail part of the payments system more efficient and less risky, others were also undertaken:

- management by the banks of the main cheque clearing houses (February 1997);
- promotion of the Mexican ACH (Pago Interbancario, since 1994); and
- the abolition of Treasury cheques on the Banco de México (March 1997).

While in the large-value circuit the Banco de México was engaged in creating and/or modifying the systems, in the retail projects it set the guidelines to be followed by third parties. The order of the projects was dictated by some logical sequencing. For example, it was impossible to change the settlement day for the clearing houses without having the electronic large-value transfer system in place. When a decision had to be made on the order of some task, a subjective assessment of the impact/time ratio was used.

## **Involvement of financial intermediaries in the reform of the Mexican payments system**

A crucial element in ensuring success in a payments system reform is to involve the main actors in its development. After having defined the objectives of the reform, intensive work had to be done with cheque clearing houses, banks, broker-dealers and the securities depository institution.

The reform of the Mexican payments system was initiated against the background of an absolute lack of knowledge and interest on the part of the financial community and the general public. This attitude was

understandable since they wondered why the central bank wanted to change something that seemed to be working without problems.

A major effort was made by the central bank to explain to the financial intermediaries the different risks in our payments system. All steps of the reform were analysed together, although the Banco de México took a number of decisions alone. Deadlines were determined by the central bank, but they were moved whenever it was necessary.

The Banco de México's policy is that financial intermediaries should administer most payment systems and clearing houses. However, a project like an LVTS or a cheque clearing house requires a big initial effort to foster cooperation among participants as well as an understanding of the risks involved. Therefore the central bank has taken the initiative in creating and developing several systems with the idea of handing them over to the private sector once they mature. Such was the case with CECOBAN, a trust that operates the ACH switch and the main cheque clearing houses, which was delivered to the banks last February, and it will also be the case for SPEUA, the LVTS operated by the Banco de México.

### **The two concerns: time span and resources**

The main consideration taken into account in the design of the reform was that major changes had to be performed rapidly in order to reduce the credit risk borne by the central bank. Therefore, a solution was designed that may still be far from optimal but is a considerable improvement over the initial situation. The reform was started without a special increment in the budget of the central bank. As new systems develop and new issues arise, it is becoming clear that a new phase of the reform has to be put in place with more ambitious projects and new priorities.

## **Payment system change and financial stability**

William White

During this conference we have looked at the process of managing change in payment systems. Much has been said about the difficulties that have arisen and the time that the process is taking. But I am pleased to say that it has become clear from the papers presented that an enormous amount has already been achieved. Indeed, one of the remarkable features of payment system change is that so many countries have been able to do a great deal in what is a relatively short space of time.

In these concluding remarks, I would like to put this impressive record of change into a wider context by showing how important it is to the task of achieving financial stability. Payment system change is not being carried out for its own sake. Payment systems play a crucial role in financial markets and thus the way they function can have an important bearing on how stable those markets are. This has always been true, and no doubt it always will be. But what I want to do in the next few minutes is suggest why achieving financial stability is becoming harder, and thus why adopting the right strategy to manage change is becoming more important. Or, in other words, to say something about why it is necessary that we continue to work so hard to improve our payment system infrastructures.

### **Why financial stability is important ....**

Let me start by briefly reviewing why financial stability is so important. Achieving stability in financial markets is part of the wider goal of achieving macroeconomic stability. What happens if financial stability is missing – what do you do if there is a financial crisis? Broadly speaking, you have two options. One is to provide financial support for the markets. But do this and you risk undermining macroeconomic policy: looser monetary policy can cause inflation and a greater risk of asset price bubbles. Moreover, the provision of safety nets can cause moral hazard problems that make future instability more likely. The other option is to

let the crisis run its course. But this is likely to lead to institutional failures, giving rise both to heavy costs for national treasuries and to a danger of systemic collapse with wider economic consequences. Neither option is attractive, so it is far better to try to prevent the financial instability emerging in the first place.

And the causality is not just from financial to monetary stability. It also works the other way round – that is to say, monetary instability can lead to financial fragility. This interdependence only makes the problem worse by creating the danger that financial instability may cause a spiral of increasingly severe problems.

#### **..... and why it is becoming harder to achieve**

This interdependence between financial and monetary stability has always existed and so financial stability has always been important. But achieving financial stability is arguably harder now than it ever has been: it requires more effort, and thus its importance has become more obvious.

The proximate causes of this are well understood. First, financial markets are becoming more international. Moreover, the fact that information, both substantiated and unsubstantiated, now flows almost costlessly and instantaneously around the world significantly increases the likelihood that shocks of whatever sort will be propagated elsewhere. Exaggerated market concerns about counterparty risk, or technical shortcomings in the payments infrastructure, could pose further threats to international financial stability if they lead to a sudden loss of liquidity in important markets or an inability to settle transactions. Achieving financial stability is thus increasingly less possible at the national level without international cooperation.

Second, the pace of change is increasing. The assessment of existing shortcomings in the system and possible solutions is made more difficult by the extraordinary pace of change in modern markets. Driven in part by dramatic advances in technology, the target at which policy-makers must aim is constantly moving. At the same time the volume of transactions, as well as their complexity and opacity, has increased sharply as the cost of carrying out transactions has been drastically reduced.

The world is therefore a busier, more complex and more interdependent place. Underlying these proximate causes are perhaps

two more fundamental causes. An obvious one is change in technology – both in processing power and in communications. But another fundamental cause is deregulation – the decision to put more emphasis on market mechanisms, whether in the move away from planned economies or in the liberalisation of existing market economies. In the financial sector (as elsewhere), there is less emphasis now on direct control and more on allowing the market to clear, to find its own equilibrium. This increased emphasis on market mechanisms is desirable because of the gains in economic efficiency it can bring. But we can also say that it is to some extent inevitable, since the changes in technology have been making regulations increasingly easy to avoid and thus direct control over markets increasingly hard to maintain.

#### **The need to make market infrastructures safe and efficient**

The result is markets that are more volatile – and where there is more chance that extreme movements in one market will spill over into others. From a regulator's point of view, this volatility can be unnerving. Bereft of our traditional instruments, regulating the market can be a little like travelling on a roller-coaster. How do we cope? I suggest we need to keep our heads and concentrate on ensuring that the infrastructure is sound. After all, travelling on a roller-coaster can even be enjoyable if you do not have to worry about the strength of the pillars supporting it. Perhaps the same will be true of the financial system. In the financial system there are three main pillars: the financial institutions, the markets they trade in and, of most interest to this conference, the mechanisms to settle the trades in those markets, including payment systems. Our task as regulators is to ensure that these three pillars are strong enough to cope with their growing, more onerous task. Perhaps then we can begin to enjoy the ride.

So strengthening payment systems is a key part of the task of achieving financial stability. Is this the only reason why payment systems are changing? During this conference, and indeed more generally when talking about payment system change, we sometimes make a distinction between change that is designed to achieve greater efficiency in the systems and change that is designed to make the systems more robust against risk. But seen in the light of the trend towards allowing markets to clear, efficiency and risk are actually not so distinct. Payment systems have to be both

efficient and risk-robust in order to play the strong supporting role required of them. They need to be efficient so that the costs of settlement (both financial costs and others) do not interfere with the effective clearing of markets. But equally they need to be robust against risk, both so that they are not themselves the cause of financial crises and so that they do not transmit and exacerbate crises started elsewhere.

### **What sort of strategy is needed to achieve financial stability?**

So how do we go about strengthening the payment systems infrastructure to make it more stable? Indeed, how do we tackle financial stability more generally? In the light of what I said earlier, I suggest we need a strategy that recognises that the pace of change is extraordinary, ongoing and irreversible. The strategy also needs to take into account the fact that transactions are becoming increasingly complex and interdependent and involve an ever-widening and changing range of participants. The reality is that the system which policy-makers aim to stabilise is both fuzzy and fast-moving.

This reality has three strategic implications. First, the strategy must be comprehensive across sectors to cope with interdependencies. Second, the strategy must be international. And third, the strategy must increasingly rely on market-led processes, albeit ones that complement, rather than replace, traditional regulatory activity.

Looking specifically at the implications for payment system change, such a strategy means, first, that we should not tackle payment systems in isolation. To be fully effective, the changes to payment systems must be part of a broader plan of reform that includes not just other settlement mechanisms but also the other two pillars of the financial system, namely financial institutions and financial markets.

Second, the strategy has to recognise that we can no longer safely see payment and settlement system reform as a purely domestic matter. You only have to look at Euroclear, Cedel, TARGET, S.W.I.F.T., ECHO, Multinet, the planned CLS Bank, VISA and MasterCard to see truly international systems that are growing in importance and whose smooth and efficient operation has implications for an ever-increasing number of countries. And even systems that seem still to be purely domestic – those we use to make payments in our own currencies – are in

reality increasingly interconnected. This is partly through overlapping memberships: many banks with extensive international operations are now direct participants in the payment systems of a number of different countries. But the interconnection also arises because an important source of traffic in many “domestic” systems is the settlement of the domestic element of cross-border transactions; and as we continue to reduce the risks that arise when settling these international trades, we will find that our actions inevitably have the effect of making settlement in different countries more inextricably interdependent.

The third main implication of the strategy for achieving financial stability concerns the form of regulation. Regulators are finding it difficult to keep up with a complex and rapidly changing financial system. Increasingly, therefore, they have felt it useful – perhaps necessary – to get the market itself involved in the regulatory process. So there is more emphasis now on consultation with the market to determine the appropriate form of regulatory activity. And there is also more emphasis on self-regulation and on market transparency to complement traditional regulatory activity.

When it comes to payment systems in particular, the regulatory situation varies from country to country. Some central banks do not operate payment systems themselves and also do not have explicit regulatory powers over private sector payment systems. In these circumstances, central banks have little choice but to work with the market. In other cases, the central bank owns and operates the payment systems, and so it may be tempted to impose a solution on the market. But as the presentations during this conference have shown, even where it is possible to impose a solution, it is rarely the most effective approach. Consultation with the market can be slow, difficult and sometimes frustrating, but experience suggests that it pays dividends.

Of course, the central bank will usually have certain overriding interests (such as avoiding systemic risk) that are likely to be a lower priority for the market itself. So the central bank will typically have to set the objectives of the reform. And ultimately the central bank may have to override the wishes of the market in some areas. But if the experience of the private sector is drawn on wherever possible, the objectives of reform are likely to be met more effectively. This is partly because the market can exert a positive influence on the *design* of the reforms. A good example of this approach put into action is the strategy adopted by G-10

central banks to tackle the issue of foreign exchange settlement risk: the market has been set the objective of developing appropriate multicurrency services, but how it reaches that objective is largely up to it to determine. And market involvement can do more than help to shape the form of the solution. *Implementation* of the reform is also likely to be much easier if it is on the basis of an agreed solution rather than one that is imposed.

### **The Basle approach**

The Basle approach that Andrew Crockett talked about in his introductory remarks yesterday is a good example of this comprehensive, international and market-aware strategy being used to increase financial stability. As Andrew explained, the Basle approach is based firmly on the principle of national control, recognising the reality that sovereignty in the modern world still resides at the level of the nation state. But by working together, central banks can not only increase their understanding of problems and their possible solutions but, where appropriate, also agree on a common approach that each can then implement nationally.

Of course, the approach has its shortcomings. Sometimes it does not work as fast as we would like; sometimes it takes a crisis before we are galvanised into action. But this is understandable, even if not entirely desirable. Before action can be taken, much work needs to be done to develop a common understanding of the problems and possible solutions. And it is clear from the presentations during this conference that it is often easier to persuade people to tackle problems once they have crystallised than when they are merely theoretical.

Another concern, and one that is becoming increasingly pertinent, is geographical representation. At the moment the Basle approach is primarily a G-10 process. This helps in the sense that the G-10 is a relatively small group of countries which by now have a long tradition of working together; the group has shared experience, concepts and values. But if the credibility of the decision-making process rests on the involvement of national experts from jurisdictions most affected by the decisions taken, then input from a wider range of countries will be increasingly important. The challenge will be to achieve this without destroying the club atmosphere that makes the Basle approach work.

### **Conclusion**

In conclusion, I hope that through this conference you have been able to learn something from the experience of others that will help you to manage your own process of change more effectively. If you have, then one of the objectives of the conference will certainly have been achieved.

But there is also another objective – and that relates to the challenge I just mentioned of geographical representation. This conference is a small but significant part of the BIS's programme of "global outreach". By this I mean our plan to involve an increasing number of countries in the work of the BIS so that the BIS becomes a truly global institution, drawing on the experience and knowledge of countries from all continents to spread the message about financial stability ever more widely. The CPSS has already been active in this area, both through the seminars it has organised for a number of regional central bank groupings and through the special meetings it has held here at the BIS with payment system policy-makers from a number of non-G-10 countries. As Andrew indicated in his opening remarks, we hope that from this conference we can discover further ways for the BIS and the CPSS to develop their relationship with central banks around the world. If we can, then that will be an important step forward towards achieving our other objective.

Thank you all for your participation here in this conference and, on behalf of the BIS and the CPSS, we look forward to working with you in the future.