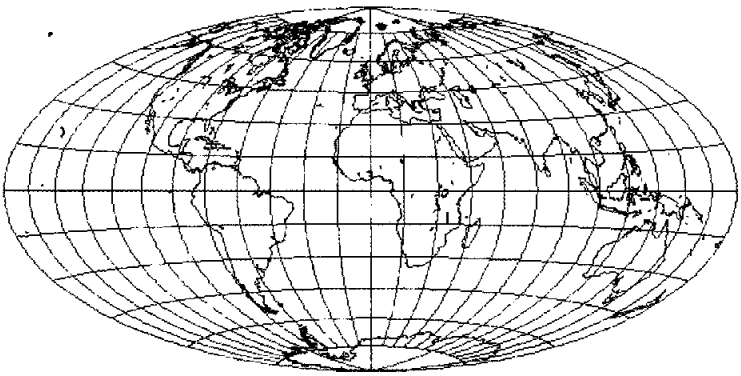
THE PAYMENT AND SETTLEMENT SYSTEMS IN THE SEACEN COUNTRIES



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THE PAYMENT AND SETTLEMENT SYSTEMS IN THE SEACEN COUNTRIES

VOLUME I

Integrative Report of Country Experiences

by

Dr. Magno L. Torreja, Jr.
Visiting Research Economist and Project Leader

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Volume 1: Integrative Report of Country Experiences
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FOREWORD

With the advent of globalisation and integration of markets, many central banks around the world are currently reviewing their payment and settlements systems with a view to enhancing the operational efficiency, reliability, speed, and timeliness of payment and settlement transactions. A well-functioning payment and settlement system promotes stability in the financial system, lowers transaction costs, aids in the efficient use of financial resources, helps the financial markets to become more liquid, and facilitates in the swift and smooth conduct of monetary policies.

In recent years, many SEACEN-member countries have already implemented or about to implement significant changes and reforms in their payment and settlement systems. The pressures behind this change were the liberalisation of financial transactions. At the same time, there had been a growing recognition of the need to minimise, if not completely eliminate, the significant risks inherent of the payment and settlement systems. Thus, modernising such systems had become inevitable for a more efficient and a less risky payment and settlement system.

Recognising the importance of safeguarding the stability and integrity of the payment and settlement systems, an in-depth study on this subject was deemed timely and useful for the SEACEN central banks in their quest for the best possible payment system.

This research project is a collaborative effort between the SEACEN member banks and the SEACEN Centre. Led by Dr. Magno. L. Torreja, Jr., Visiting Research Economist from Bangko Sentral ng Pilipinas (BSP), the Project Team comprises 10 country researchers, namely Mr. Iwan Setiawan (Bank Indonesia), Mr. Yu-Chul Kim (The Bank of Korea), Mr. Azzad Abdul Razak (Bank Negara Malaysia), Mr. Tsend-Ayush (The Bank of Mongolia), Mrs. Khin Thida Maw (Central Bank of Myanmar), Mr. Jagadishwor Prasad Adhikary (Nepal Rastra Bank), Mr. Jonathan Leow Chiun-Yi (Monetary Authority of Singapore), Mr. A. Kamalasiri (Central Bank of Sri Lanka), Mr. Kuo Hsing Chang (The Central Bank of China, Taipei) and Mrs. Toschanok Leelawankulsiri (Bank of Thailand).

The Project Report is divided into 2 volumes. The first volume, which contains regional analysis and integrative report of country experiences, was prepared by Dr. Torreja. The second volume presents the country chapters that offer more details of the payment and settlement systems in the individual countries as prepared by the respective country researcher.

The Project Report was completed with the kind assistance of several institutions and individuals. The SEACEN Centre wishes to acknowledge the valuable contributions of the payment and settlement systems department of all the member banks, for making available their staff to join the Project Team, and for their useful comments and suggestions on the first draft of the report. Special thanks are due to the Committee for the Payment and Settlement Systems (CPSS) of the BIS for their thoughtful comments offered during discussions on the findings of the Project at the *SEACEN-CPSS Seminar on Core Principles for Systemically Important Payment Systems (SIPS)* held in Bali Indonesia on 28-30 August 2001. In addition, the author of this Volume, wishes to especially thank the senior management of BSP and his supervisors and colleagues at the Treasury Department, BSP, for their support and assistance. He would also like to express his deep gratitude to management and staff of the SEACEN Centre, in particular Ms. Nurulhuda Mohd Hussain, Research Associate, for her research assistance throughout the project.

The views expressed in the report are those of the authors and do not necessarily reflect those of the member central banks, monetary authorities or the SEACEN Centre.

Dr. Subarjo Joyosumarto
Executive Director

Kuala Lumpur, Malaysia
August 2001

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INTEGRATIVE REPORT OF COUNTRY EXPERIENCES

The maintenance of safe and efficient payment and settlement system is one of the key roles played by central banks in their efforts to promote economic activities, improve control over monetary aggregates, reduce transaction costs, increase velocity in the circulation of money, control the growth of credit risks, develop the financial sector, create new products and institutions, and develop new financial markets.

The rapid growth in the information technology in recent years has brought about significant changes in the infrastructures of the payment and settlement systems in the Southeast Asian region. Among the constraints faced by central banks in the process of initiating change are acquiring necessary information or data, determining the possible options, discovering and learning what other countries are doing to improve their system's efficiency and effectiveness, and acquiring a wider source of pertinent advice or guidance.

A payment system must be tailor-made or especially designed to suit and satisfy the unique requirements of a particular country. However, it was observed that a number of common factors are known for their significant influences on the systems' success, which include speed, certainty, reliability, safety and security, convenience, and costs.

Normally, the roles played by central banks in the payment system involve the following activities: establishing a legal framework to ensure appropriate institutions, organisational structure, and monetary policy environment; facilitating payments finality; regulating private agents in the payment system; administering, as owner/operator, various payment services; and providing credit for participants in the payment system, especially in Large Value Transfer Systems (LVTSs).

The theoretical and conceptual basis of the payment and settlement system for every country rooted from the necessity of having acceptable medium of exchange for discharging obligations efficiently and securely, that is, efficient and safe movement of money between the participants in both the domestic or international transactions. The principle underlying the re-

lationship between payment system efficiency and the money supply is shown by the equality MV = PT. Holding PT (or GNP) constant, an increase in payments system efficiency raises velocity (V) allowing the money supply (M) to be reduced to support the same level of economic activity.

The concerns of the fundamental policies on payment systems are not so much focused on the risks posed by individual institutions or those confined to particular market segments, but rather the systemic type of risk, i.e, the possibility of failure on the part of participants to meet their contractual obligations which, in turn, may cause other participants to default resulting to a chain reaction causing broader scope of financial difficulties or damages. While the risk management measures focused on the following courses of action: ensuring settlement finality within netting systems by establishing appropriate membership criteria, exposure limits, collateralisation and loss-sharing arrangements, shortening time lags in settlements (generally to achieve same-day settlement), promoting real-time gross settlement systems (RTGS), economic pricing, limits on central bank intraday credit, requiring settlement in the books of the central bank by all clearing systems, and fostering international cooperation to reduce risks in cross-border payments.

The recent initiatives taken by many SEACEN-member countries were to further develop their payment systems. These initiatives were made in response to demands for a more speedy and reliable system as the volume and value of payment transactions were rapidly increasing mostly in the capital cities and immediate environs as a result of the growth in the number of financial market activities in relation to GDP.

Survey evidence on the payment instruments used for payments shows that the SEACEN-member countries are moving towards a cash-less society. However, these electronic products are still in their relatively early stage of development. Cheque remains the most widely used payment instrument in spite of the decrease in its popularity as a payment instrument while cash still plays an important role. The magnitude of the payment instruments availability depends on the legal, business and technological environments found within and across the SEACEN-member countries while the current mix of the payment instruments largely depends on the historical developments within the domestic system.

Some of the implications of payment and settlement systems on the central functions on monetary and financial stability in the SEACEN-member countries were as follows: shorter lags of information on bank's and

domestic liquidity, credit risk control, improved accuracy and precision of measurement on monetary aggregates, serves as a pre-warning device, faster transmission and implementation of monetary policies.

The recommended roles, which the SEACEN member banks should assume to ensure the safety and efficiency of the systems for payments and settlements are as follows: (a) system's innovators, developers, and implementers, (b) encourages compliance with the Core Principles, (c) management of risks, (d) fosters regional cooperation, (e) serves as an oversight body, (f) leads in the creation of rules and regulations in the nation's payment and settlement system.

THE PAYMENT AND SETTLEMENT SYSTEMS IN THE SEACEN COUNTRIES

INTEGRATIVE REPORT OF COUNTRY EXPERIENCES

Chapter I

INTRODUCTION

One of the key roles played by central banks in any part of the world is the maintenance of safe and efficient payment and settlement system. Central banks' strong interest in promoting the efficiency and safety of payment and settlement systems is part of their primary goal of achieving financial stability, reduction of transaction costs in the economy, more efficient use of financial resources, improvement of financial market liquidity and facilitation of the conduct of monetary policy.

In recent years, there had been many countries around the world including the SEACEN-member countries, which had already implemented some changes and reforms in their payment and settlement systems. To date, many others are still undergoing, or about to undergo, changes of their own systems. Crockett (1998) observed, "...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."[1]

As part of the process of implementing reforms, central banks have to overcome certain issues regarding their payment and settlement systems. Among the common problems being encountered include the following: [2]

- acquiring the necessary information and experience,
- finding out what the possible options are,

1. Crockett A., General Manager, McDonough W.J., Chairman, Committee on Payment and Settlement Settlements Systems, and President, Federal Reserve Bank of New York, "Managing Change in Payment Systems," Policy Paper No. 4, May 1998, Foreword.

2 Ibid.

- learning what other countries are doing and making the best use of available advice,
- obtaining the necessary resources and how to use them effectively,
- building a consensus on the type of reform needed,
- how the costs will be shared,
- changes in the law of the land, and
- improvements in the local communications infrastructure.

Payment system reforms are crucially important and should be regarded as a key component of ongoing efforts to create sound and efficient financial systems. By strengthening payment systems to reduce systemic risk, central banks have increased their degrees of freedom, that is, the freedom to let financial institutions fail, perhaps even those currently perceived as too big to fail, without threatening the stability of the entire financial system.[3]

The reasons given by the Committee on Payment and Settlement System (CPSS) to work on the Core Principles for Systemically Important Payment Systems[4] were as follows: [5]

- First, there was a clear demand from many countries which were embarking on significant projects to reform, develop, and modernise their payment systems; they had the opportunity to design afresh.
- Secondly, there were concerns about financial stability risk and these are part of general concerns about the ability of the international architecture to withstand different kinds of shocks.
- The third factor that led to this work was from discussion between central banks, as overseers of payment systems about their own work and those discussion central banks found very valuable. There is a great deal of discipline in trying to write down one's experiences and what is agreed amongst a group of fellow interested parties in sharing their experiences.

3 Landau D.F., Garber P., and Schoenmaker D., "The Reform of Wholesale Payment Systems," Finance & Development, World Bank Publication, June 1997, Abstract.

4. Please refer to Annexes 1, 2 and 3 for the responsibilities of the central bank in applying the Core Principle, The Core Principles of Systemically Important Payment Systems, and The Lamfalussy Standards, respectively.

5. Trundle J., Bank of England, "The Perceived Need for Core Principles: An Update on the Work of the CPSS Task Force on Core Principles," Current Topics In Payment And Settlement Systems, Papers presented at a CPSS Asian-Pacific workshop, Hong Kong SAR, MAY 1999, CPSS, BIS, Basel, Switzerland, December 1999, p.4.

Considering the importance of central banks' role in safeguarding the stability and integrity of the payment and settlement systems, an in-depth study on this subject is deemed timely and useful for the SEACEN central banks.

1. The Problem Statement

During the past 10 years, the world's financial systems have witnessed the unprecedented growth in payment flows. These flows, according to Landau, et. al. (1997), "...are facilitated by an interlocking network of wholesale payment systems that is at the core of the world's major financial systems. A disturbance in one of these payment systems—an operational mishap, the failure of one institution to pay another, a liquidity problem in one of the money markets—could have serious consequences for global trade and finance. Payment systems are vulnerable because of the ubiquitous presence of unsecured and sometimes uncontrolled credit in settlement systems. Because financial institutions make payments during a settlement period in anticipation of incoming payments, the failure of a major institution to settle its obligations could have a domino effect: banks that were counting on that institution's payments might be unable to meet their own obligations. "[6]

This research project, with the goal of ensuring that SEACEN central banks adhere to the best possible system for payments and settlements in the region, focused its concern in finding answers to the following questions:

(a) What are the risks associated with payment and settlement systems?
(b) What is the structure of the existing payment and settlement systems in the SEACEN-member countries?
(c) What are the implications of the payment and settlement systems on the central bank functions on monetary and financial stability?
(d) What are the recent policy initiatives on the payment and settlement systems in the SEACEN-member countries?

6. Landau D.F., Garber P., and Schoenmaker D., "The Reform of Wholesale Payment Systems," Finance & Development, World Bank Publication, June 1997, Abstract.

2. The Research Objectives

To ascertain the safety and efficiency of payment and settlement systems in the SEACEN region, this research project was conducted primarily to:

- review and analyse the present status of, as well as the recent developments in, domestic and cross-border payment systems in the SEACEN-member countries; and
- make recommendations on new or revised measures/roles, if any, which central banks should undertake to ensure the safety and efficiency of the payment and settlement systems.

In analysing the existing system, this study specifically aims to determine the following:

(a) The risks associated with the payment and settlement systems.
(b) The structure of the existing payment and settlement systems in the SEACEN-member countries.
(c) The implications of the payment and settlement systems on the central bank functions on monetary and financial stability.
(d) The recent policy initiatives on the payment and settlement systems in the SEACEN-member countries.

3. Significance of the Study

In recent years, there had been substantial growth and development in cross-border banking activities. Many countries had decided to use a payment and settlement system for large-value interbank fund transfers.[7] Given the close connection or strong relationship of the payment and settlement systems adopted by different countries, there is a growing need for sound management of risks in large value fund transfer systems to avoid the possible eruption of a systematic crisis in the world as a result of failure of even a single country to implement an efficient system.

7. Nine out of ten in the Group of Ten (except Canada) are now using RTGS, European Union (EU) have collectively decided that every EU member should have an RTGS system, RTGS systems are already in operation in the Czech Republic, Hong Kong, Korea and Thailand, Australia, China, New Zealand, and Saudi Arabia will introduce RTGS Systems in the near future (source: RTGS, BIS, Basle, March 1997).

Garcia (1997) observed, "...financial systems are widely integrated in the international markets, thus, because of the facilities that were provided by technological advance, it is essential to coordinate efforts to achieve an optimum development of the payment systems in the region's countries. ...Nevertheless, efficiency, thus, velocity and certainty of their functioning bear risks capable of disturbing the world economy. They may diffuse a crisis arising in one country to the rest of the world, given the interconnection of the systems and the fact that their regulation and legislation have not advanced as fast as technological innovation. It is because of the implications that disturbances in payment systems may bring to financial stability and prices, as well as with the system's operating efficiency, that CEMLA's member central banks have, as a priority task, the purpose of facing the challenges stated by the interdependence of payment systems. ...Given the uncertain consequences that a desequilibrium in the payment system could imply for the implementation of monetary policy and the repercussions the propagation of a systematic crisis may bring to financial stability, payment systems currently have special importance." [8]

Similarly, Dr. Sidaoui (2000) expressed his views on the significance of the issues confronting the payment systems. He said, "...for a long time, the operation of payment systems was not viewed as a subject of primary importance for central banks. However, there have been major changes in the nature and operation of these systems over recent years. One of them has been the rapid growth and integration of financial markets, which has caused the proliferation of the number and volume of transfers that take place through payment systems. In addition, the technological revolution in the fields of information technology and communications has had profound implications in terms of the speed and variety of transactions. While accelerated growth in payment systems reflects the dynamic performance of the contemporary economy, this evolution nonetheless involves certain risk factors." He also added that "...in Latin America the importance the payment systems have in the functioning of more complex, globally integrated economies has prompted central banks to adopt a more active and coordinated role in promoting the efficiency and sound development of those systems. It is worth emphasising the role that the G10 central bank gover-

8. Garcia S.G., Director General, CEMLA, "The Contribution of Payment Systems to Financial Stability," Committee on Payment and Settlement Systems, BIS, Basle, March 1997, p. 3.

nors, institutions like the BIS and, at a Latin American level, CEMLA have played in these joint efforts."[9]

Perlin (1995) had even recognised the significance of the issues facing the payment systems 6 years ago. He pointed out, "...until very recently, interest in payment system issues has often been of secondary importance in the financial sector development agenda. This reflected a view that the payment system is essentially a mechanical process and that nothing more than an automation of commercial banks' back-office supports function is required to achieve the goal. Today, there is a growing perception in both the World Bank and its client countries that such a limited view underestimates the role payment systems play in the process of sound financial market development. Hence, payment systems modernisation is becoming one of the priorities that needs to be addressed at an early stage to eliminate constraints for the later stage of financial sector development."[10]

In the SEACEN-member countries, Sumawannacheep (1999) in his speech on the topic entitled "Payment system: operational and policy experiences in periods of transition," observed, "...globalisation is driving financial market infrastructures from decentralised, single country and single currency contexts toward more multi-currency and multi-country payment systems in both regional and international spheres. The allotment of the multi-currency and multi-country payment systems can be seen in payment systems like TARGET, which links the RTGS systems of central bank members in the European Union, or the Eurosystem of the Euro Banking Association, which is true multi-country payment system. If we look beyond the G10 countries, many central banks have started to introduce RTGS for making wholesale payments or seeking to enhance their current systems to provide for RTGS to achieve the ultimate safe and sound payment systems as recommended by the CPSS.[11]

9. Dr. Sidaoui J., Deputy Governor, Bank of Mexico, "The Contribution of Payment Systems To Financial Stability, Committee on Payment and Settlement Systems, BIS, Basle, September 2000, p. 4.

10 Perlin G., Director, Financial Sector Development Department, Finance and Private Sector Development, World bank, "Transforming Payment Systems: Meeting the Needs of Emerging Market Economies," World Bank Discussion Paper no. 291, 1995, Foreword.

11. Sumawannacheep S., Director, Payment System Department, Bank of Thailand, "Payment system: operational and policy experiences in periods of transition," Current Topics In Payment And Settlement Systems, Papers presented at a CPSS Asian-Pacific workshop, Hong Kong SAR, MAY 1999, CPSS, BIS, Basel, Switzerland, December 1999, p.4.

The BIS on its 64th Annual Report discounted the importance of the issue as, "...payment and settlement systems are to economic activity what roads are to traffic: necessary but typically taken for granted unless they cause an accident or bottlenecks."[12]

The SEACEN-member countries have also taken seriously the relevance and importance of safe and efficient payment and settlement systems for the maintenance of stable and reliable financial systems. The SEACEN Centre, in fact, had already conducted two seminars on this matter. The first seminar in March 1997 focused on the role of central banks in payment systems while the seminar in November 1998 looked specifically at the *Real-Time Gross Settlement Systems* (RTGS).

There are many important reasons why the subject on safe and efficient payment systems is at the forefront now. Different countries had their share of unique experiences relating to payment and settlement processes and developments. Thus, this research study is significant on a number of accounts. Foremost is that many SEACEN-member countries are now embarking on major projects to reform, develop and modernise their systems. This study will give them the opportunity to share their ideas, designs, related experiences, techniques, strategies, and future plans and developments in their payment and settlement systems. Secondly, the currency crisis that hit the region's financial system in 1997 raised concerns about the ability of the present systems to withstand different kinds of shocks. This research study will therefore serve as a guide for SEACEN-member countries to have a clearer understanding of the nature of risks associated with the payment and settlement systems. Thirdly, this study will shed light on the implications of the payment and settlement systems on central functions on monetary and financial system stability. Lastly, the recommended new roles, if any, of central bank to ensure the safety and efficiency of the payment and settlement system will be presented. Apparently, it is for these reasons that this study was conceived and conducted.

4. Scope and Limitations of the Study

This research study is limited to the review and analysis of the present status of, and the recent developments in, domestic and cross-border pay-

12. Bank For International Settlements, "Payment and Settlement Systems: Trends and Risk Management," Chapter VIII, 64th Annual Report, Basle, 13th June 1994, p. 172.

ment systems in the SEACEN-member countries; and making recommendations on new or revised measures/roles, if any, which central banks should undertake to ensure the safety and efficiency of the payment and settlement systems. Specifically, the main issues covered by this study are:

(a) The nature of risks associated with the payment and settlement systems.
(b) Survey on the structure of the existing payment and settlement systems in the region.
(c) The implications of the payment and settlement systems on central banks' function of promoting monetary and financial stability.
(d) The recent policy initiatives on the payment and settlement systems in the SEACEN-member countries.

Chapter II

REVIEW OF THE RELATED LITERATURE

1. Evolution, Definitions, Instruments, Elements, Characteristics of Cross Border, Critical Success Factors, and Theoretical Basis of Payment and Settlement Systems

Basically, payment system is a set of procedures, rules, standards and instruments used for the exchange of financial value between two parties discharging an obligation. Notwithstanding the simplicity of the very purpose of the payment system, it has evolved over a period of years. A number of factors such as size, legal systems, business practices, communications, infrastructure, stages of development of instruments and institutions[13] are considered to have great influences in the payment and settlement system's evolution in every country.

1.1 Brief Overview of the Evolution of Payment and Settlement Systems

Payment and settlement systems may be viewed as the plumbing design for a financial system where nobody would care to see if everything is in good running condition. However, if one of the pipes burst or the plumbing malfunctions, we will likely find ourselves in a wet and nasty mess.[14] Considering the tremendous effect such a malfunction has on domestic systems as well as on neighbouring countries' financial systems, Hopton (1983) was surprised to discover that in the evolution of payment systems, "...governments have seldom had specific policies for the overall development of payment systems and few of them have enacted legislation specifically governing entry to and relations and responsibilities within their payment systems. ...But what is perhaps most surprising is that, despite these potentially chaotic circumstances, satisfactory payment systems have evolved in all the main industrialised countries."[15]

13. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 1-5.
14. "The US Payment System: A Plumber's Guide," p. 1.
15. Hopton D., "Payment Systems: A Case for Consensus," Bank for International Settlements, May 1983, pp. 7 –10.

A close examination of the evolution of modern payment systems suggests that the main reason why governments have not interfered more frequently is that, according to Hopton (1983), "...in most countries payment systems have evolved in close association with highly regulated banking systems or with a combination of such systems and government-controlled postal payment systems. The association between payment and banking systems appears to have been to the mutual advantage of the users of payment services and the banks. ...As a result, their regulatory efforts have been concentrated mostly on the evolving structure of banking and financial systems, on measures to safeguard the soundness and stability of these systems and on protecting the interests of small savers and investors."[16]

However, the roles played by the state-controlled postal authorities and central banks in the development of payment systems should not be discounted since most central banks have contributed significantly to the establishment of clearing facilities for interbank payments and were involved in the ultimate settlement of these payments. [17]

There are two important points that can be discerned in the preceding observations. The first one is that modern payment systems were not consciously planned. They are the result of over a century's almost uninterrupted evolution during which time the providers of payment systems and the authorities found ad hoc solutions to the problems that arose. The second point is that the present configuration of most payment systems reflects their increasingly close association with banking systems – an association which, in the past, appears to have worked reasonably well. It has been profitable for banks, appears to have met the payment needs of the community, and, in various ways, has been convenient for authorities.[18]

In the course of its evolution, the payment system had been greatly influenced by the following turn of events: [19]

- **Commercial-bank interest in payment system.** The involvement of commercial banks in payment systems in the past merely served as an adjunct to their deposit taking, lending, and other activities rather than

16. Ibid.
17. Ibid.
18. Ibid.
19. Ibid.

to provide society with convenient, secure, and efficient payment services.

- **Non-payment of interest on demand deposits.** The prohibition of the payment of interests on demand deposits was among the measures taken by most governments in the past to prevent banks from failing, and in case they fail, to cushion the adverse effects of such failures was. This made the management and use of demand deposits profitable, especially during times when interest rates were high and in an upward trend. Not surprisingly, non-price competition to attract demand deposits intensified, which resulted to a deeper involvement of banks in the payment systems.
- **The banking habit.** In the course of competing for more market share on deposits, banks in all parts of the world have succeeded significantly in increasing the banking habit. In most industrialised countries, majority of the population has an account relationship with banks and enjoys non-cash payment services made available to them by banks.
- **Emerging oligopoly.** Oligopoly situation operated by a combination of licensed and closely regulated banks and government-controlled postal authorities, seemed to have emerged in the evolution of the payment system. There appeared to have been no great outcry against, or dissatisfaction with, this oligopoly situation even if authorities have resorted to taking actions that have strengthened rather than weakened the positions occupied by these institutions. Banks were aware that their increased presence in payment systems called for some social responsibilities, which however, were never pursued seriously. The banks' pursuit of their own objectives had had usually coincided with the development of a range of payment services and adequately satisfied the society's needs. These consequences have lessened the pressure for the governments to formulate policies for the planning and development of national payment systems.

Moreover, it was observed, in Europe, Japan, and the U.S., that the country's payment system evolution is largely determined by the following country attributes and conditions: [20]

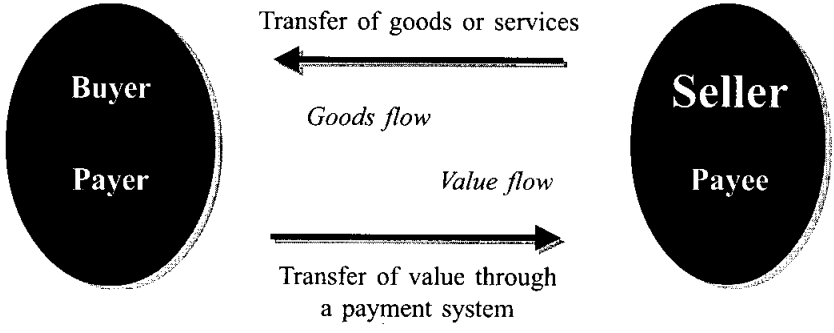
20. Humphrey D.B., Sato S., Tsurumi M., Vesala J.M., "The Evolution of Payments in Europe, Japan, and the United States," Policy Research Working Paper No. 1676, The World Bank, Financial Sector Development Department, October 1996, pp. 34-35.

- country size and population density;
- banking system concentration and interconnectedness;
- payment instrument legal structure and antitrust laws;
- crime rates and other cultural factors; and
- risk and efficiency tradeoffs for different transactions and payment instruments (relative payment costs versus user requirements and needs).

1.2 Definition of Payment and Settlement System

Payment is a transfer of value. The most common means of payment is cash. At its basic level, *payment system* is merely a design or a way agreed upon by buyers and sellers in transferring value between them in order to consummate a particular transaction. As illustrated in Figure 1, a payment system facilitates the exchange of goods or services in an economy.[21]

Figure 1. Basic Flow of Payment System
Buyers and Sellers, Payers and Payees



21. Humphrey D.B., "Payment Systems: Principles, Practice, and Improvements," World Technical Paper No. 260, 1995, p. 3.

1.2.1 What is a Payment System?

At its simplest level, a *payment system* is distinguished by the types of mediums of exchange used to transfer value in an economic exchange of goods and services. The mediums used for the exchange range from commodities, currencies, checks, and electronic transfer value. In more developed regions, the simultaneous use of currencies, checks and electronic cash are prevalent, while in the less developed parts of the world, the use of commodities—which include precious metals—and currencies are dominant.[22]

The core principles for systemically important system described *payment system* as a set of instruments, procedures and rules for the transfer of funds among participants. It is typically based on agreements made between the participants who may either be directly or indirectly involved in the system, and the system operator. The use of a technical infrastructure or any other means by which the transfer of funds shall be effected forms part of the agreement. The typical life cycle of a payment system under normal circumstances is illustrated in Figure 2 in Annex 4.[23]

1.2.2 Payment Instruments

Payment instrument is always required for each payment transaction to supply the term and conditions for the transaction, which should meet physical, legal and regulatory standards.

In today's modern market, a large number of payment instruments and services are available to address the various needs and requirements of individual customer. Among the payment services from financial service providers include provision of payment instruments and the underlying payment accounts, acquisition and collection of payments, clearing of the various payment instruments and settlement of the payment obligation. The infrastructure services from other service providers for the delivery, acquisition, clearing and settlement of retail payments are also included in these payment services.

22. Ibid.

23. Core Principles of Systemically Important Payment Systems, January 2001, p. 24.

There are two general classifications of payment instruments, namely; cash or non-cash payment instruments. Cash is generally paper-based while the non-cash instruments are either paper-based or electronic-based. Moreover, non-cash payment instruments can be sub-classified generically into cheque payments, direct funds transfers and card payments.

- **Cash** is the simplest form of a payment instrument. Cash payments usually involve face-to-face transactions of low value between individuals or between an individual and a retail firm. In cash payment, there is an immediate and final transfer of value and the currency received in the payment can be reused by the recipient immediately for further payments thus the transactions do not usually require further identification.
- **Cheque** is a written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer. It is widely used for settling debts and withdrawing money from banks.[24]
- **Direct funds transfers** include credit and debit transfers, both of which are used for remote payments. A credit transfer is a payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary. Both the payment instructions and the funds described therein move from the bank of the payer/ originator to the bank of the beneficiary, possibly via several other banks as intermediaries or via more than one credit transfer system. A debit transfer system (debit collection system) is a funds transfer system in which debit collection orders made or authorised by the payer move from the bank of the payee to the bank of the payer and result in a charge (debit) to the account of the payer; for example, check-based systems are typical debit transfer system.[25]
- **Credit card** is a card indicating that the holder has been granted a line of credit. It enables the cardholder to make purchases or draw cash up to a prearranged ceiling; the credit granted can be settled in full by the end of a specified period or can be settled in part, with the balance taken as extended credit. Interest is charged on the amount

24. Source: Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998.

25. Ibid.

of any extended credit, and the cardholder is sometimes charged an annual fee. Merchants also usually pay a fee when their customers make payments by credit card.[26]

- **Debit cards** are usually used for non-recurring electronic funds transfers at the point of sale (EFTPOS) to initiate payment to the vendor with an immediate debit to the cardholder's account. In some countries debit cards perform other services, such as ATM withdrawals or the personal cheque guarantee function with Eurocheque and Girocheque. In some countries some debit cards can be used for remote payments. As with card payments in general, debit card transactions usually require the payment to be initiated by the rightful cardholder (authentication) and authorised by the card issuer. Authentication may occur online or offline. Online cardholder authentication is done through the entry of the cardholder's personal identification number (PIN) directly into the merchant's online terminal. Authentication for offline debit card payments usually takes place by means of the cardholder's written signature or other actions. Regardless of the type of cardholder authentication (online or offline), debit card payments are most often initiated online, as part of the card issuer authorisation process. In some systems only payments above a predetermined authorisation limit or cardholder's payment limit require online authorisation by the card issuer.[27]
- **Other payment instruments.** The other forms of payment instruments available, and the most common, are money orders, wire transfers and travellers' cheque. A money order is essentially a direct credit transfer instrument involving a payment to a specified recipient. It may be used for both domestic and foreign currency remote payments. Wire transfers are electronic credit transfers sent through a proprietary communications system. Travellers' cheques are essentially paper-based instruments issued in specific denominations for general-purpose use in business and personal travel. They do not specify any particular payee, are non-transferable, can be converted into cash only by their specified owner, and are generally accepted only by other issuers, large retailers, hotels and restaurants.[28]

26. Ibid.

27. Source: "Retail Payments In Selected Countries: A Comparative Study," CPSS, BIS, Basel, Switzerland, September 1999, pp. 4-5.

28. Ibid.

1.2.3 Elements of Payment and Settlement System

The essential elements of payment and settlement systems are the following:[29]

- **an instruction** by a **payer** to his bank (or financial intermediary) to make payment in a designated medium (bank deposit) to a **payee**. The payment message has to be delivered from the payer through the banking system, eventually to the payee. This can take the form of a cheque, a telegraphic or telex transfer (TT), or electronic fund transfer, such as GIRO.
- the **clearing** of the payment messages (for example, by post, paper or electronic means) to the financial institution concerned, enabling the **payer's** instruction to pay the **payee** to be processed in the system. The processing may include message transmission, reconciliation and confirmation, as well as netting arrangements;
- the **settlement** between the financial institutions concerned, so that final value is passed from the payer to the payee and the obligation is discharged. **Gross settlement** occurs when each payment instructions is settled individually. **Net settlement** occurs when the intermediaries involved (either bilaterally or multi-laterally) agree to net their mutual debits and credit. **Final settlement** occurs when settlement is irrevocable and unconditional, and is usually taken to mean settlement with central bank money.[30]

In modern payment systems, Listfield et. al. (1994) observed, "...centralised settlement is often used for all or part of a country's payment settlements. Under a centralised settlement operation, all banks maintain a clearing account with one bank. The settlement bank processes the settlement transactions between the originator and the receiver on its books. ...Centralised settlement has operational and liquidity advantages over distributed settlement. However, if the single settlement agent is a commercial bank, centralised settlement will increase the systematic risk of bank failure over a distributed system. ...In most developed countries; the na-

29. Sheng A., "Payment Systems in Developing Countries: Lessons for a Small Economy," Occasional Papers No. 19, The South East Asian Central banks (SEACEN), Research and Training Centre, K.L. Malaysia, 1995, pp. 4-5.

30. Please refer to Figure 3 in Annex 5 for the Basic Concept of Funds Transfer Systems.

tion's central bank serves as the primary settlement agent for payment transactions. The central bank provides the operational and liquidity advantages of centralised settlement. Because the central bank cannot fail (unless the government fails), no systematic risk is inherent in central bank clearing balances. In most countries, banks and other financial institutions are required to hold balances with the central bank for monetary policy, liquidity, safety and soundness. Using these balances for settlement allows them to perform double duty, and minimises the financial resources tied up in payment processing."[31]

1.2.4 Characteristics of Cross-Border Payment and Settlement System

The design of cross-border payment and settlement systems are usually fashioned by the great diversity in the instruments, the legal and regulatory frameworks governing them, the currencies, and the communication channels involved. A cross-border settlement, as described by the BIS, is a settlement that takes place in a country that is different from the country in which one trade counterpart or both are located. Cross-border transactions can be illustrated in the following examples: when two banks located in Manila buy or sell dollars between each other through their correspondent banks in New York; or when a Filipino citizen wants to make a credit transfer to his son studying in the United States.[32]

Jonhson et. al. (1998) observed, "...many cross-border payments rely on correspondent banking arrangements. Under these arrangements, a domestic bank located in country A, in order to make payments in country B, does not seek direct access to the payment system of country B but uses the services of a domestic bank located in country B that will forward the payment to the beneficiary's domestic bank. The bank of country A can also participate more directly in the payment system of country B, through a subsidiary or one of its branch offices. These subsidiary or branches may themselves have accounts with the central bank of country B. In all these arrangements, cross-border payments are not made through an ad hoc, in-

31. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 10-11.

32. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998, pp. 12-13.

dividualised, cross-border system linking the two domestic payment systems, but through the multiple decentralised connections linking the two banking systems."[33]

1.2.5 Critical Success Factors in Payment and Settlement System

Payment system must be tailor-made or especially designed to suit and satisfy the unique requirements of a particular country. However, it was observed that a number of factors are commonly known for their significant influences on the success of these systems. The are: [34]

- **Speed**. Users must be confident that a payment, which has been initiated, will be completed to the right party for the correct amount and within a prescribed period of time.
- **Certainty**. A critical requirement in any payment system concerns certainty of payment, that is, the point at which funds are irrevocably available for use and there is settlement finality. Payments can carry immediate finality, so that the funds are irrevocably available for use without delay.
- **Reliability.** A payment system must be reliable if it is to maintain user confidence. Although no system will always operate faultlessly, all systems must have adequate contingency or fallback provisions and controls, and adequate backup capabilities in case one or more major processing stations fail.
- **Safety and Security**. The safety and security of payments are important. Particular attention must be given to fraud control and credit risk control related laws and rules to resolve disputes promptly and fairly. Special attention must likewise be given to adequate arrangements for protection against unauthorised access or tampering with payment system data, and to a mechanism that will ensure confidentiality and minimise exposures among participants.

The composition of the safety and security features of a payment system, however, are as follows: [35]

33. Ibid.

34. Negret F.M., Keppler R. "Project Design for Payment Systems," Public Policy for the Private Sector, The World Bank, FPD Note No. 37, March 1995, pp. 2-5.

35. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 1-5.

- **Fraud control**. The system must be designed with adequate control measures that will ensure prevention of unauthorised access or tampering with payment system data. This requires the ability to properly identify the payee and the payer as well as the ability to ensure the prevention of alterations or any forms of fraud.
- **Credit risk control**. Credit risks for every transaction should be understood and should remain in a manageable level, if not completely eliminated.
- **Confidentiality**. Payment system users must be confident that their payment system data will be protected from unauthorised access during or after the processing of payment transactions.
- **Record maintenance**. Each party to a payment transaction must be able to prove his role in the transaction in order to show proof of payment and to provide the necessary tax information. The integrity of transaction records must be maintained, and the time frame for record retention must balance cost and access requirements.

In addition, other factors that must be considered for successful payment include the following:

- **Convenience.** The payment system must be convenient to users, otherwise the use of cash or other instruments will become inevitable. If the system requires automation on the part of each participant or if it requires one or more bank visits each time a payment is made, a payment system may not be practical after all for developing countries.[36]
- **Costs**. The design must be the lowest cost possible to all parties or users involved without compromising the other important factors such as speed, certainty, reliability, safety and convenience.[37]
- **Low domestic inflation.** A payment system that relies on fiat money, as a store of value and medium of exchange, must enjoy price stability if an effective and efficient payment system based on the national currency is to develop. High rates of inflation render a currency virtually useless as a store of value and medium of exchange. Accordingly, and especially when a developing payment system has not yet achieved the level of technical performance that allows for highly reliable and timely processing of payment instructions, the public will seek ways to avoid the use of national currency and payment system,

36. Ibid.

37. Ibid.

especially deposit money in banks. Instead, economic actors will quickly turn to alternative and less efficient means of payments, such as currency, barter or reliance on foreign currencies.[38]

- **Monetary regime.** A country's monetary regime, which defines the terms and conditions under which deposits held in commercial banks and central banks can be used, plays a major part in determining the choice of design for the payment system. The choice between real time gross settlement and multilateral net settlement systems will be heavily influenced by factors such as bank reserve requirements, the assets that are eligible to meet reserve requirements, and whether reserve balances earn interest. In turn, the choice of payment system will directly affect the risk management procedures that need to be employed in a particular system.[39]

The challenge according to Negret (1995), "...is to strike the right balance across these factors, depending on user needs."[40]

1.3 Theoretical and Conceptual Basis of Payment and Settlement System

The theoretical and conceptual underpinnings of payment and settlement systems could be traced back on the need for a country to have an acceptable medium of exchange for discharging obligations efficiently and securely, particularly with regard to efficient and secure movement of money between the participants in a domestic or international transaction.

There is an opportunity cost involved if a payment system is deficient in some way. Listfield, et. al. (1994) have pointed out, "...deficiencies in a payment system can result in inefficient use of the available money stock, inequitable risk sharing between trading parties, lack of confidence in the banking system, and inadequate support for the development of other essential financial services. Moreover, because of the opportunity cost of money, lags between the sale of goods and services and the receipt of funds are costly. To minimise these lags different instruments and systems have been developed. ...Economists' interest in the efficiency of payment sys-

38. Contributed by Tuaño-Amador M.C., Director, Department of Economic Research, Bangko Sentral Sentral ng Pilipinas.

39. Ibid.

40. Negret F.M., Keppler R. "Project Design for Payment Systems," Public Policy for the Private Sector, The World Bank, FPD Note No. 37, March 1995.

tems has concentrated in two areas: the relationship of the payments system to the money supply and monetary policy and, more recently, the study of transaction costs."[41]

1.3.1 The Relationship of the Payment System to the Money Supply and Monetary Policy

In a payment transaction, flow of value from the buyer to the seller takes place within an economy. The value flow comes from the supply of money in an economy. When the volumes of daily payments comprise the bulk of the stock or supply of money available in the economy, the velocity of money or its turnover is said to be high.

Humphrey (1995) equivocated that "...the relationship between the money supply and economic activity is expressed in the well-known relationship of MV = PT or the money supply (M) times its velocity (V) is equal to the price level (P) times the number of transactions (T). PT represents some aggregate level of economic activity, such as GNP. The efficiency of the payment system is reflected in the money turnover rate, which indicates how many times the money supply has to be reused in order to meet the transaction and payment demands associated with a given level of aggregate economic activity. As a result, if the efficiency of the payment system improves, payments will take shorter time to be cleared and settled before the funds being transferred can be reused to finance another payment. Consequently, improvements in the efficiency of the payments system would permit a country to reduce its domestic money supply, assuming that economic growth and other things remain constant. The principle underlying the relationship between payment system efficiency and the money supply is shown by the equality MV = PT. Holding PT (or GNP) constant, an increase in payments system efficiency raises velocity (V) allowing the money supply (M) to be reduced to support the same level of economic activity."

41. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 6-7.

1.3.2 Transaction Costs

Listfield et. al, (1994)[42] explained that "...the simplest abstract and aggregated models used by economists assumed that economic agents operated in a frictionless world. There has been increasing interest in transaction costs analysis.[43] Transaction costs, like production costs, is a catch-all term for all costs incurred by parties to a transaction - the cost of finding each other, the costs of communicating and exchanging information, the inspection of the goods to be purchased, the drafting of contracts governing agreement between the parties (the timing of the transfer the form and media of payment). Transaction costs cover all the costs associated with the ownership transfer or, more precisely, property rights.[44]"

In addition, the authors pointed out that "...one important outcome of taking transaction costs into account is that it imposes a limit on the economy's gross trading volume. Thus if transaction costs reduce the volume of transactions and welfare, traders will try to minimise transaction costs. The latter provides the theoretical justification for the emergence of more efficient media of exchange (commodity and fiat monies rather than barter) and payment services (payment systems). These reduce the complexity, costs and risks that would otherwise emerge and become prohibitively high in a world of unregulated multi-party transactions. The more transaction costs decline, "the more highly developed will be the division of labour in financial services, the more elaborate the structure of the financial system and the higher the flow of daily transactions compared to the stocks of traded assets. It is tempting, therefore, to interpret the rapid changes in financial markets in recent years largely as a consequence of changing transaction costs."[45] As a result, electronic payment systems increase the speed and accuracy of sending and receiving payment. Thus banks can reduce transaction costs by lowering reserve balances for settlement in relation to the volume of payment processed."

42. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), Appendix 1.

43. O.E. Williamson's contributions have been important. See "Transaction-cost economics: the governance of contractual relations", The Journal of Law and Economics. 1979, 22 (2), pages 233-6, The Economic Institutions of Capitalism 199-.

44. Niehans, Jurg. 1989. Transaction Costs", Money. The New Palgrave, Eds. J. Eatwell et. al., McMillan, 1989.

45. Ibid.

2. The Importance of Payment and Settlement System, Effective Functioning of Modern Financial Markets and Role of Central Bank

The payment system is important for the smooth functioning and integration of financial markets. It can affect the speed, financial risk, reliability, and cost of domestic and international transactions. Guitián (1998) observed that, "...as a consequence, it can, among other things, act as a conduit through which financial and non-financial firms and other agents affect overall financial system stability, with a potential for domestic and cross-border spillover effects. The payment system also affects the transmission process in monetary management, the pace of financial deepening, and the efficiency of financial intermediation. Thus, monetary authorities have typically been active in promoting sound and efficient payment systems and in seeking means to reduce related systemic risks. Moreover, when changes in the payment system, the monetary policy decision-making process must take account of their implications for the design and desirable settings of monetary policy instruments, the choice of indicators, and the nature and effectiveness of the monetary policy transmission process."[46]

2.1 Efficient Payment and Settlement System and Effective Functioning of Modern Financial Markets

An efficient payment and settlement system is important to ensure the smooth operation of financial markets. Financial markets are merely the "place" where transactions occur. Payment and settlement systems are important because they permit specialisation to occur in production and help determine how efficiently transactions are made and settled. This, in turn can affect the level and rate of economic growth and the efficiency of financial markets (to the degree they exist). [47]

In recent years, sound and efficient payment and settlement systems had become of paramount importance in advanced and emerging markets for the following reasons:[48]

46. Gutián M., Director, Monetary and Exchange Affairs Department, IMF, "Payment Systems, Monetary Policy, and the Role of the Central Bank," 1998, *Preface.*
47. Humphrey D.B., "Payment Systems: Principles, Practice, and Improvements," World Technical Paper No. 260, 1995, p. 3.
48. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 1-5.

- **Promotion of economic activity**. Efficient payment system promotes economic activities, especially at the domestic and international commerce and trade. Companies cannot conveniently acquire raw materials, pay wages and promote economic growth without reliable, efficient and timely payment systems. The delays in payment (called debit or credit floats) increase intermediation costs and reduce economic welfare. Such problems are aggravated in places where there is high inflation rate. Fewer funds are available for productive use if more funds are tied up in clearing and settlement.
- **Improved control of monetary aggregates**. Large and unpredictable float levels (which add or subtract reserve money) influence short-term liquidity in the economy and introduce additional uncertainty in controlling monetary aggregates. Many countries counter the lack of available financial resources by printing more money, which leads to higher inflation rate and large swings in the money supply. An ideal payment system would minimise delays (within economic reason) in the transfer of funds. The ability of central banks to manage and enforce reserve requirements efficiently and use indirect policy instruments to conduct monetary policy (through open market operations) depends on a nationwide integrated and reliable payment system.
- **Reduced transaction costs**. Transaction costs are minimised if the payment system is efficient while a costly payment system drains resources from more productive use. In developing the national payment system, the total cost of labor and capital to operate the system must be considered and subjected to a cost-benefit test. The optimal solution for efficient payment system is not always the state of the art systems.
- **Increased velocity in the circulation of money.** The finality of payments and ease of settlements as a result of a safe and efficient payment and settlement system will increase the usage of funds for other business transactions which will result to a greater production of goods and services. Thus, a safe and efficient payment system speeds up "turnover" of money and spurs more economic activities.
- **Credit risk control**. An efficient payment system sets clearly the user rights and responsibilities which can significantly reduce banking and commercial risks.
- **Financial sector development**. The payment system is one of the basic components in a country's financial sector infrastructure which can facilitate developments of new financial instruments and products as well as institutions.

- **Security and reliability**. A safe and efficient payment system must be dependable, reliable and can protect the consumers against unauthorised access and fraud.
- **Development of new products.** An efficient payment system opens the door to an increased competition through better service and cheaper transaction costs. It enables financial institutions to develop new products (card-based consumer systems, bank remittances) hence can become important sources of fee-based income.
- **Development of financial markets**. An efficient payment system supports privatisation efforts, provides impetus to the development of the interbank and money markets, facilitates the transfer of funds, improves monetary control, develops open market operation, and rationalise liquidity and treasury management across the economy and institutions. Thus, it develops the capital market and the Government Securities market.

2.2 Payment and Settlement Systems and the Role of Central Bank

At the center of modern payment systems, Jonhson et.al. (1998) pointed out, "...central banks play an important role because it is central banks' liquid liabilities-and more particularly reserve balances-that are the instrument in which the bulk of domestic payment obligations are finally settled. This pivotal role reflects, in part, the central bank's statutory legal tender monopoly in most countries. Nevertheless, this factor is sometimes disguised by the fact that, in today's world, settlement at the central bank is simply required by law in many countries."[49]

Moreover, a Central Bank plays an important role in designing and creating a country's system for payments and settlements. Among its roles is the creation of rules and regulations, standards, and policies that will govern the nation's payment and settlement services. Although the degree of participation by the central bank in providing payment and settlement services differs from country to country and depending on the strength of its commercial banks, the central bank must play an entrepreneurial or facilitating role in all aspects of the payment systems design and development.[50]

49. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998, p. 35.

50. Please refer to Annex 6 for the brief discussions on the payment and settlement system and cost recovery.

In some countries, central bank plays an active role in providing payment services, often competes with the commercial banking industry (e.g. U.S., Germany, and Japan), and with almost no operational role (e.g. U.K.) in other countries. Listfield et. al. (1994) explained, "the central bank has a legitimate and important role in guaranteeing the safety, soundness, efficiency and fairness of the payment system. The central bank as the lender of last resort must have the information and the means to oversee and, if necessary, assist the institutions participating in the payments system. Given the central bank's roles and its special responsibility to avoid systemic risk, any large-value payment mechanism requires the central bank's particular attention."[51] In addition, an important two-way interaction exists between the payment process and the stability of the banking and financial systems. Disruption in the payment system has the potential to weaken confidence in individual financial institutions, and conversely, bank supervisory problems have the potential to trigger disruptions in the payment system. Thus, the proper construction of payment system risk policies by the central bank is vital to the long-term stability of the payment system and to confidence in financial markets. Such policies are necessary to help avoid financial crises and to ensure that if such crises arise, payment institutions and systems will provide stability. Furthermore, central banks should establish designs and operations for both public and private sector arrangements that could help prevent or reduce fraud, errors and other major types of risks in the payment system. These policies should be as clearly defined as possible, so that private institutions know the rules of the game and could focus on the enhancement of the payment system. Moreover, a well-developed statutory and regulatory framework for the payment system can reduce uncertainty and risk and provide needed clarity. [52]

Normally, the role played by central banks in the payment system includes the following: [53]

- establishing a legal framework to ensure appropriate institutions, organisational structure, and monetary policy environment;

51. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 13-17.

52. Contributed by Tuaño-Amador M.C., Director, Department of Economic Research, Bangko Sentral Sentral ng Pilipinas.

53. Baliño T.J.T., Jonhson O.E.G, Sundararajan V., "Payment System Reforms and Monetary Policy," Finance & Development, World Bank, pp. 4-5.

- facilitating payments finality;
- regulating private agents in the payment system;
- administering, as owner/operator, various payment services; and
- providing credit for participants in the payment system, especially in LVTSs.

The regulatory powers of the central bank, on the other hand, often include the following: [54]

- requiring that certain clearing organisations and interbank large-value (net) settlement systems settle accounts with the central bank and have in place appropriate risk-management measures to ensure payments finality without central bank intervention, and
- licensing and reporting requirements for engaging in certain activities in the payment system.

As a supplier of payment, the central bank's role can be limited to providing settlement services for a few major banks or getting involved in processing payment documents, running clearinghouses, and owning and operating LVTSs to facilitate a smooth flow of settlements in the payment system. Central bank, however, will not want to reduce its control over liquidity (and monetary) management as well as become the lender of first resort for market participants with these credit operations. On the other hand, it would want to foster the development of private money markets, including those for intraday funds. In addition, a central bank, in granting credit, will typically use both prices and uniform and objective rationing criteria comprising of the following:[55]

- observance of regulatory and supervisory norms,
- provision of collateral, and
- requirements for borrowers' capital.

Moreover, central bank's role, as the leading institutions in the payment system development, does not automatically qualify it to become the payment system operator. In some cases, central bank's participation might

54. Ibid.

55. Ibid.

be the source of problems rather than solutions when it ignores the users' needs or adopts heavy-handed, top-down approaches with limited or no commercial bank participation. An important component of the central bank's leading role, however, is to create an organisational structure to interact among the domestic and external actors. Thus, central bank must take the initiative and set up some form of a national payments council (NPC) to lead payment systems reform and to be a (please refer to Figure 8 in Annex 7 for a sample organisational structure and a charter outline for a hypothetical NPC):[56]

- forum (talking shop) for the central and commercial banks to discuss and agree on how to establish and oversee the functioning of the national payment system and how to coordinate central and commercial banks' policies in the payment system (the harmonious development of inter and intrabank payment systems); and
- channel and absorb external technical assistance.

The following significant issues regarding governance of a payment system must be addressed:[57]

- Who provides prudential oversight to ensure the system's safety and soundness?
- Who sets standards for credit and liquidity risk?
- Who establishes the rules to ensure equitable access and conformity of interest among the participants?
- Who establishes the standards to permit the free exchange of payment data between participants?
- Who sets the financial terms to ensure that the system recovers capital and operation costs?

3. Nature and Management of Risks in the Payment and Settlement Systems

The BIS on its 64th annual report stressed that "...the fundamental policy concern in the context of payment and settlement systems is not so much the risks run by individual institutions or confined to particular mar-

56. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 13-17.

57. Ibid.

ket segments. Rather, it is systemic risk, namely the risk that the failure of a participant to meet its contractual obligations may in turn cause other participants to default, with the chain reaction leading to broader financial difficulties. Payment and settlement systems are potentially a key institutional channel for the propagation of systemic crises. The failure of one or more institutions to settle or the fear that they might be unable to do so can trigger and spread a financial disturbance. And disruption to the payment system can have repercussions throughout the economy: all economic activity is predicated on the ability to settle transactions and confidence that counterparties will do likewise."[58]

Section 3 of the Core Principles for systemically important payment systems identified the range of risks that can arise in payment systems, the possible risks are:[59]

- **Credit risk.** The risk that a party within the system will be unable to fully meet its financial obligations within the system either when due or at any time in the future;
- **Liquidity risk.** The risk that a party within the system will have insufficient funds to meet financial obligations within the system as and when expected, although it may be able to do so at some time in the future;
- **Legal risk**. The risk that a poor legal framework or legal uncertainties will cause or exacerbate credit or liquidity risks;
- **Operational risk**. The risk that operational factors such as technical malfunctions or operational mistakes will cause or exacerbate credit or liquidity risks; and
- **Systemic risk.** The risk that the inability of one of the participants to meet its obligations, or a disruption in the system itself, could result in the inability of other system participants or of financial institutions in other parts of the financial system to meet their obligations as they become due. Such a failure could cause widespread liquidity or credit problems and, as a result, could threaten the stability of the system or financial markets.

58. Bank for International Settlements, 64th Annual Report, 1st April 1993 – 31st March 1994, Basle, 13th June 1994, p. 177.

59. Core Principles for systemically important payment systems, Section 3, CPSS, BIS, Basle, January 2001, p. 7.

3.1 Risk Management in Payment and Settlement System

Certain measures were adopted to address financial risk management in payment systems, particularly LVTSs which aim not only at reducing the risks faced by individuals but also, and more importantly, at minimising systemic risk. These measures can be divided into four types, namely; exposure limits, collateralisation, loss-sharing arrangements, and shortening of time lags in settlements. [60]

Recognising the importance of managing the risks associated in large value payment transfer, two of the Core Principles for systemically important payment systems were specifically designed to address said concerns.[61]

- **Core Principle II.** The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.
- **Core Principle III.** The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.

The concern of Core Principle II & III is the system's rules and procedures transparency and availability, that it is important for them to be clear and understandable, and the quality, emphasising the importance of appropriate management of financial (credit and liquidity) risks, respectively.[62]

Of the six Lamfalussy Standards[63] which were established for the design and operation of cross-border and multi-currency netting schemes, three (standards II – IV) were designed to address the issues on financial risk associated with payment systems. In totality, these standards set the role of

60. Please refer to Annex 8 for the detailed explanations of the four types of measures taken to address financial risk.

61. Core Principles for systemically important payment systems, CPSS, BIS, Basle, January 2001, p. 5.

62. Core Principles for systemically important payment systems, Core Principle III, CPSS, BIS, Basle, January 2001, p. 25.

63. Please refer to Annex 3 for the complete list of Lamfalussy standards.

the central bank in the payment system as follows: as regulator, it should verify that rules have been laid down and are being monitored and enforced resolutely, including especially those detailing exposure limits, collateralisation and loss-sharing arrangements, and devices to limit the time lags in settlement to as short duration as possible.

To effectively manage the financial risk associated with a payment system, it is paramount that credit risks and liquidity risks are identified and well understood by all parties involved, including the participants, the system operator and the settlement institution.[64]

Moreover, to enable the participants to understand the financial risks they may incur, the rules and procedures of a payment system should:[65]

- be clear and comprehensive,
- contain explanatory material written in plain language that will facilitate understanding by all parties of the risks they can face through participation in the system,
- show clearly the basic design of the system since this will be an important determinant of their rights and obligations,
- be up to date and accurate,
- be readily available to all interested parties,
- outline clearly the roles of participants and the system operator and the procedures that will be followed in various circumstances (for example, which parties are to be notified of specific events and the timetables for decision-making and notification),
- make clear the degree of discretion parties are able to exercise in taking decisions which can have a direct effect on the operation of the system,
- make clear the process for consultation and agreement on changes where the operator has to consult participants on proposed changes,
- make clear to the parties involved of the fact and its implications if the central bank has discretion in providing intraday or overnight credit,
- cover both normal situations and abnormal events, such as the inability of a participant to meet its obligations, and
- provide background information or supporting documentation about the degree of legal certainty associated with rules and procedures and the enforceability of rules in various situations to all involved parties.

64. Core Principles for systemically important payment systems, Core Principle II, CPSS, BIS, Basle, January 2001, p. 23.

65. Ibid.

The operator is primarily responsible for producing clear, timely and readily understandable rules and procedures. On the other hand, the participant is primarily responsible for reading and understanding the material. Nevertheless, the operator can help the participants as follows: [66]

- provides appropriate training, particularly for new participants and for new staff of existing participants, and
- identifies those who do not demonstrate a thorough understanding of the procedures by observing the performance of the participants and advise the system's overseer or the participant's supervisor.

3.1.1 Management of Credit Risks

The delay between a payment's acceptance by the system for settlement and its final settlement exposes participants to credit risks. In well-designed real-time gross settlement systems, such exposures do not arise since there is no such delay. In designing an RTGS payment system, a review should be made if said payment system allows the possibility for a receiving participant to credit its customer in anticipation of a receipt since this will cause credit risks.

The core principles for SIPS suggested measures to manage credits risks as follows:[67]

- **Limits should be placed on the maximum level of credit risk that can be created by any participant on the basis of the multilateral and bilateral (net) exposures.** Factors such as the creditworthiness of participants, liquidity availability and operational considerations usually influence the levels at which these limits are set.
- **When a system settles on a deferred net basis and credit exposure limits are related to a participant's net exposure, it is important that the netting should be legally robust.** Payments that have already been made should not be allowed to be unwound in the event of a participant failure, since credit (and liquidity) risk could be exacerbated.
- **Limits need to be accompanied by allocations of responsibility to cover losses that could result within the system from participant failure.** These allocations frequently comprise or include "survivors

66. Ibid.

67. Core Principles for systemically important payment systems, Core Principle III, CPSS, BIS, Basle, January 2001, p. 25.

pay" arrangements for the sharing of losses. Loss-sharing arrangements based on this principle would, in the event of a participant's inability to settle, require the losses to be borne by the surviving participants according to some predetermined formula. Such arrangements pose credit and liquidity risks to participants that are different from those posed by systems which rely exclusively on "defaulter pays" arrangements, where each participant is required to collateralise any exposures that it creates for other participants.

In summary, the tools for managing credit risks as suggested by the core principles are as follows: [68]

- using system designs in which credit risk between participants does not arise (e.g. in real-time gross settlement systems);
- access criteria based on creditworthiness;
- credit limits (bilateral or multilateral) to cap exposures; and
- loss-sharing arrangements and/or "defaulter pays" arrangements.

3.1.2 Management of Liquidity Risks

The problem of liquidity arises when a participant making a payment through a real-time gross settlement system does not have the necessary funds available on its account with the settlement institution when the payment is presented for settlement. Insufficient liquidity in the system (or it is not sufficiently well distributed) can result to a gridlock. Similarly gridlock could occur in a system with deferred net settlement, if position limits prevented large values of payments from being accepted by the system for settlement. Frequent occurrence of gridlock can lead to a loss of confidence in the payment system and perhaps the use of less safe alternative arrangements.

The Core Principles for SIPS suggested the possible means that can be used to reduce the risk of gridlock. These are:[69]

68. Core Principles for systemically important payment systems, Core Principle III, CPSS, BIS, Basle, January 2001, p. 30.

69. Core Principles for systemically important payment systems, Core Principle III, CPSS, BIS, Basle, January 2001, p. 26.

- **The design and operation of payment queues.** For example, a queue based simply on the principle of first in first out might cause large payments to create unnecessary delays to the system's throughput. On the other hand, a more sophisticated algorithm can reduce the requirement for liquidity and so achieve similar benefits to hybrid systems, as well as reducing delays in the flow of payments through the system.
- **The availability of liquidity in the form of the settlement asset.** Such liquidity can be obtained by borrowing from the central bank. The central bank will need to consider how it should control the risks it faces through the provision of such liquidity. In the first place, the provision should always be explicit. Most central banks also require risk control measures such as full collateralisation of any borrowings and/or limits on their amount. In providing intraday liquidity, a central bank needs to have a policy (for example, on pricing or other terms) to deal with the event that such facilities are not repaid at the end of the system's operating hours.
- **The roles and responsibilities of the system operator and participants for monitoring and facilitating a smooth flow of payments through the system.** It should be specified clearly in the rules and procedures. Guidelines on throughput are a commonly used tool, under which participants are encouraged or required to take actions or meet targets. For example, participants could be required to ensure that, on average, a certain proportion of their outgoing payments are processed by one or more intraday deadlines. Such guidelines need to be monitored closely, both by the participant concerned and by the system operator. In some cases, mechanisms allowing risk control limits to be varied intraday can be used to synchronise payment flows and thereby to economise on liquidity demands. Their risk implications must be analysed in the context of specific systems. All parties should also have a clear understanding of the status and treatment of payments that remain in any queue at the close of the system's operating day.
- **Explicit or implicit commitment of central bank to provide such liquidity in abnormal situations.** In such cases, the central bank needs to consider how it can control the exposures it might incur in a range of possible situations. The system operator (if the central bank does not itself operate the system) and possibly the relevant bank supervisor might also have a role in providing incentives to participants, which minimise this risk.

To sum up, the tools for managing liquidity risks as suggested by the core principles are as follows: [70]

- management of payment queues;
- provision of intraday liquidity (which means credit risk issues for the lender, e.g. the central bank);
- throughput guidelines;
- position (receiver or sender) limits; and
- tools described under Core Principle for systems with deferred net settlement.

3.1.3 Management of Risks Involved in Cross Border Transactions

3.1.3.1 The "Nöel" Report

Among the important reports for addressing risks involved in cross-border transactions are the "Nöel" and "Angell" reports. Johson et. al.[71] explained that, "...the "Nöel" report examined possible options for central bank payment and settlement services that might improve efficiency and reduce risks in the settlement of cross-border and multicurrency interbank transactions. Without making specific recommendations, the working group identified a set of options, including modifying or making available certain domestic-currency payment and settlement services; extending the operating hours of home-currency LVTS; establishing cross-border operational links between these payment systems; and developing multicurrency payment and settlement services."

3.1.3.2. The Allsopp Report

In June 1994, a working group set up by the CPSS prepared the Allsopp report[72] with the main objective of defining strategy for the reduction of systemic risk in foreign exchange transactions by:

70. Core Principles for systemically important payment systems, Core Principle III, CPSS, BIS, Basle, January 2001, p. 30.

71. Jonhson O.E.G., Abrams R.K., Destresse J.M., Łybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998, pp. 14-16.

72. BIS, CPSS of the central banks of the Group of Ten countries, "Settlement Risk in Foreign Exchange Transactions," Basle, March.

- examining the adequacy of current market practices for the managing of foreign exchange settlement risks,
- presenting a menu of choices for the reduction of those risks, and
- selecting a strategy from this menu.

In summary, the authors pointed out that "...in the short term the report advised that individual banks improve their current practices for measuring and managing their settlement exposures; that industry groups develop risk-reducing multicurrency services; and that central banks encourage action by, and cooperate with, individual banks and industry groups to bring about timely, market wide progress. If central bank action should prove insufficient over a two-year period, further measures could be taken, such as international supervisory action, or new public sector multicurrency settlement services such as those described in the "Nöel" report."

3.1.4 Summary on the Risk Management Measures on Payment and Settlement Systems

To sum up, the risk management measures on payment and settlement systems have focused on the following issues: [73]

- ensuring settlement finality within netting systems by establishing appropriate membership criteria, exposure limits, collateralisation and loss-sharing arrangements, and by shortening time lags in settlements (generally to achieve same-day settlement);
- promoting, as feasible, real-time gross settlement (RTGS) systems;
- economic pricing, collateralisation, and limits on central bank intraday credit;
- requiring settlement in the books of the central bank by all clearing systems; and
- fostering international cooperation to reduce risks in cross-border payments.

73. Gutián M., Director, Monetary and Exchange Affairs Department, IMF, *Preface*, "Payment Systems, Monetary Policy, and the Role of the Central Bank," 1998.

Chapter III

CROSS-COUNTRY COMPARISONS

1. Profile of SEACEN-Member Countries

1.1 Indonesia

Official Name:	***Bank Indonesia***
Official Seal:	
Official Address:	Bank Indonesia, Jl. M.H. Thamrin No. 2, Jakarta 10110, *INDONESIA*
Date of Membership:	3rd February 1982
Name of the Governor:	Dr. Syahril Sabirin
Total Population:	203.2 millions person (mid year estimate, 2000)
Total Labour Force:	95.65 millions (2000)
Total Land Area:	1.919 million sq km
Currency:	Rupiah
Average Exchange Rate:	Rp8,400:US$1 (2000)
Narrow Money Supply (M1):	Rp162,186 billions (end period, 2000)
Broad Money Supply (M2):	Rp747,028 billions (end period, 2000)
Nominal GDP:	Rp1,290,684 billions (2000)

1.2 Korea

Official Name:	***The Bank of Korea***
Official Seal:	
Official Address:	The Bank of Korea, 110, 3-Ga Namdaemun-Ro, Jung-Gu, Seoul 100-794, KOREA

Date of Membership:	25th January 1990
Name of the Governor:	Prof. Seung Park
Total Population:	47,275 thousand persons (2000)
Total Labour Force:	21,950 thousand persons (2000)
Total Land Area:	99,373 sq km
Currency:	Won
Average Exchange Rate:	W1,130.6:US$1 (2000)
Narrow Money Supply (M1):	46,997.0 billion won (end period, 2000)
Broad Money Supply (M2):	413,048.8 billion won (end period, 2000)
Nominal GDP:	517,096.6 billion won (2000)

1.3 Malaysia

Official Name:	***Bank Negara Malaysia***
Official Seal:	
Official Address:	Bank Negara Malaysia, Jalan Dato' Onn, 50480 Kuala Lumpur, MALAYSIA
Date of Membership:	3rd February 1982
Name of the Governor:	Tan Sri Dato' Dr. Zeti Akhtar Aziz
Total Population:	23,266 thousand persons (2000)
Total Labour Force:	9,573 thousand persons (2000)
Total Land Area:	329,758 sq km
Currency:	Ringgit Malaysia
Average Exchange Rate:	RM3.80:US$1 (2000)
Narrow Money Supply (M1):	RM78,216.4 million (end period, 2000)
Broad Money Supply (M2):	RM 354,702.1 million (end period, 2000)
Nominal GDP:	RM340,706 million (2000)

1.4 Mongolia

Official Name:	**The Bank of Mongolia**
Official Seal:	
Official Address:	The Bank of Mongolia, Commerce str-6, Ulaanbaatar-11, MONGOLIA
Date of Membership:	20th May 1999
Name of the Governor:	Mr. O. Chuluunbat
Total Population:	2.43 million persons (1999)
Total Labour Force:	1,227.9 thousand persons (1999)
Total Land Area:	1.565 million sq km
Currency:	Tugriks
Average Exchange Rate:	Tg1076.67:US$1 (2000)
Narrow Money Supply (M1):	Tg130,775 million (end period, 2000)
Broad Money Supply (M2):	Tg258,843 million (end period, 2000)
Nominal GDP:	Tg873,679 million (1999)

1.5 Myanmar

Official Name:	***Central Bank of Myanmar***
Official Seal:	
Official Address:	Central Bank of Myanmar, 26(A) Settmu Road Yankin Township,Yangon, MYANMAR
Date of Membership:	3rd February 1982
Name of the Governor:	U Kyaw Kyaw Maung
Total Population:	45.06 million persons (1999)
Total Labour Force:	22.52 million persons (1997)
Total Land Area:	676,577 sq km
Currency:	Kyat

Average Exchange Rate:	Ky6.52:US$1 (2000)
Narrow Money Supply (M1):	Ky499,663 million (end period, 2000)
Broad Money Supply (M2):	Ky835,316 million (end period, 2000)
Nominal GDP:	Ky2,408,359 million (2000)

1.6 Nepal

Official Name:	**Nepal Rastra Bank**
Official Seal:	
Official Address:	Nepal Rastra Bank, Central Office, Baluwatar, Kathmandu, NEPAL
Date of Membership:	3rd February 1982
Name of the Governor:	Dr.Tilak Rawal
Total Population:	22.37 million persons (1999)
Total Labour Force:	
Total Land Area:	147,181 sq km
Currency:	Nepalese Rupee
Average Exchange Rate:	Rp71.09:US$1 (2000)
Narrow Money Supply (M1):	Rp55,107 million (end period, 1999)
Broad Money Supply (M2):	Rp164,628 million (end period, 1999)
Nominal GDP:	Rp376,433 million (2000)

1.7 Philippines

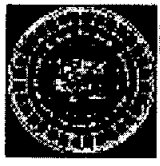
Official Name:	**Bangko Sentral Ng Pilipinas**
Official Seal:	
Official Address:	Bangko Sentral ng Philippines, A. Mabini Street, Manila, The PHILIPPINES
Date of Membership:	3rd February 1982

Name of the Governor:	Mr. Rafael B. Buenaventura.
Total Population:	78.42 million persons (2000)
Total Labour Force:	30,911 thousand persons (2000)
Total Land Area:	300,176 sq km
Currency:	Peso
Average Exchange Rate:	P44.19:US$1 (2000)
Narrow Money Supply (M1):	P386,981 million (end period, 2000)
Broad Money Supply (M2):	P1,423,191 million (end period, 2000)
Nominal GDP:	P3,302,589 million (2000)

1.8 Singapore

Official Name:	**Monetary Authority of Singapore**
Official Seal:	MAS
Official Address:	Monetary Authority of Singapore, MAS Building, 10 Shenton Way, SINGAPORE 079117
Date of Membership:	3rd February 1982
Name of the Managing Director:	Mr. Koh Yong Guan
Total Population:	3.89 million persons (1999)
Total Labour Force:	1,976 thousand persons (1999)
Total Land Area:	647.5 sq km
Currency:	Singapore Dollar
Average Exchange Rate:	S$ 1.72:US$1 (2000)
Narrow Money Supply (M1):	S$33,261.9 million (end period, 2000)
Broad Money Supply (M2):	S$170,897.8 million (end period, 2000)
Nominal GDP:	S$159,041.8 million (2000)

1.9 Sri Lanka

Official Name:	**Central Bank of Sri Lanka**
Official Seal:	
Official Address:	Central Bank of Sri Lanka, Janadhipathi Mawatha, Colombo 1, SRI LANKA
Date of Membership:	3rd February 1982
Name of the Governor:	Mr. A.S. Jayawardena
Total Population:	19,360 thousand persons (2000)
Total Labour Force:	6,674 thousand persons (1999)
Total Land Area:	65,610 sq km
Currency:	Rupee
Average Exchange Rate:	Rs 77.01:US$1 (2000)
Narrow Money Supply (M1):	Rs118,477 million (end period, 2000)
Broad Money Supply (M2):	Rs404,669 million (end period, 2000)
Nominal GDP:	Rs1,255,536 million (2000)

1.10 Taiwan

Official Name:	**The Central Bank of China**
Official Seal:	
Official Address:	The Central Bank of China, 2, Roosevelt Road, Section 1, Taipei 10757, Taiwan, REPUBLIC OF CHINA
Date of Membership:	25th January 1992
Name of the Governor:	Mr. Fai-Nan Perng
Total Population:	22.3 million persons (2000)
Total Labour Force:	9,668 thousand persons (1999)
Total Land Area:	36,006 sq km

Currency:	New Taiwan Dollar
Average Exchange Rate:	NT$31.24:US$1 (2000)
Narrow Money Supply (M1):	NT$17,481 billion (end period, 2000)
Broad Money Supply (M2):	NT$186,382 billion (end period, 2000)
Nominal GDP:	NT$9,685.9 billion (2000)

1.11 Thailand

Official Name:	**Bank of Thailand**
Official Seal:	
Official Address:	Bank of Thailand, 273 Samsen Road, Bangkhunprom, Bangkok 10200, THAILAND
Date of Membership:	3rd February 1982
Name of the Governor:	M.R. Pridiyathorn Devakula
Total Population:	62.4 million persons (2000)
Total Labour Force:	33.2 million persons (2000)
Total Land Area:	514,000 sq km
Currency:	Baht
Average Exchange Rate:	B40.2:US$1 (2000)
Narrow Money Supply (M1):	B525,690.9 million (end period, 2000)
Broad Money Supply (M2):	B5,032,684.1 million (end period, 2000)
Nominal GDP:	B4,890.8 billion (2000)

2. Research Design

This study, being descriptive in nature, describes and interprets the payment and settlement systems currently being implemented in the SEACEN-member countries. It involves the process of gathering, analysing, classifying, tabulating, and interpreting data about the conditions, practices, beliefs, effects, processes, and trends prevailing in the system for handling payments and settlements.

3. Data Gathering

The process of gathering data involved the designation of a country researcher for each of the SEACEN-member countries. The designated country- researchers were required to submit country papers containing information on the payment and settlement systems in their respective countries. As part of their major inputs to the country papers, they were asked to provide information on the following data as herein summarised:

Table	Data	Purpose
Table 1	Major development in the country's payment and settlement systems.	To provide information on the historical developments of the country's payment and settlement systems.
Table 2	Population *(year-end)*, GDP, GDP per Capita, Exchange Rate against USD, *(year-end and average)*	To present selected country's indicator which will be used to analyse the degree of usage and importance of the different settlement media.
Table 3	Notes and coin, Transferable deposits, Narrow money supply (M1), Broad money supply (M2/M3)	To provide information on the settlement media used by non-banks, which will be used to analyse the proportion of currency in circulation and demand deposits to narrow money supply. The findings of the analysis will indicate the degree of popularity and acceptance of the payment instruments.
Table 4	Reserve balances held at central bank *(required and free reserves)*, Transferable deposits, Institution borrowing from central bank	To provide information on the required and free reserves. This information will be used to analyse the relationship between free reserves and velocity of money in circulation.
Table 5	Number of central bank, Commercial bank *(public, private, foreign)*, Development and Investment banks *(public, private, foreign)*, Special Finance Houses, Money Exchangers, Post Office	To provide information on the institutional detail for readers who are not familiar with the country's banking system and financial institutions. The data will also be used to determine the density of total labour force per bank.
Table 6	Cash dispensers, ATMs, EFTPOS *(nos. of networks & machines, volume & value of transactions)*	To provide information on the relative importance of cash payment method (relative to non-cash methods). It will also be sued to determine the density of total labour force

Table	Data	Purpose
		per ATM and EFTPOS terminals as well as the degree of progress.
Table 7	Number of cards w/ cash function, cards w/ a debit/ credit function, cards with a cheque guarantee function, retailer cards	To provide information on the number of payment cards in circulation (year-end) and the degree of progress.
Table 8	Volume of transaction by the different Payment & Settlement Systems in the country.	To provide information on the payment instructions handled by selected payment systems: volume of transactions.
Table 9	Value of transaction by the different Payment & Settlement Systems in the country.	To provide information on the payment instructions handled by selected payment systems: value of transaction.
Table 10	Volume of transactions using cheque, credit/debit cards, paperless credit transfers, postal money orders, postal cheque	To provide information on the indicator of use of various cashless payment instruments: volume of transactions.
Table 11	Value of transactions using cheques, credit/debit cards, paperless credit transfers, postal money orders, postal cheques	To provide information on the indicator of use of various cashless payment instruments: value of transactions.
Table 12	Volume of transactions in the securities settlement system	To provide information on the transfer instructions handled by securities settlement system: volume of transactions
Table 13	Volume of transactions in the securities settlement system	To provide information on the transfer instructions handled by securities settlement system: volume of transactions
Table 14	Cash, Vol. & Value of Cheque transactions, Vol. & Value of Card Transactions, Vol. & Value of Direct Transfers	To provide information on the extent of the penetration of payment instruments

4. Payment Instruments

The data used for cross-country analysis on payment instruments were likewise primarily culled from the various data provided by the country researchers on the required information laid out in the preceding Tables. The following are the summary of selected payment instruments and their percentage share in the total of payments for the period 1995 to 1999. [74]

Summary of Selected Payment Instruments Table 1 (SS Table 1)
Penetration of Payment Instruments Per Labour Force for the Period 1995 to 1999

	Cash		Credit Card		Debit Card		Direct Credit Transfers		Direct Debit Transfers		Cheques	
	1995	1999	1995	1999	1995	1999	1995	1999	1995	1999	1995	1999
Indonesia [1]	0.41%	1.37%	0.08%	0.20%	0.01%	0.06%	n.a.	n.a.	n.a.	n.a.	99.50%	98.37%
Korea [2]	0.22%	0.17%	0.59%	0.52%	n.a.	n.a.	6.08%	15.11%	0.13%	0.24%	92.99%	83.96%
Malaysia [3]	1.62%	2.30%	0.59%	1.10%	0.0013%	0.0019%	n.a.	n.a.	n.a.	n.a.	97.79%	96.60%
Mongolia [4]	4.91%	12.80%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	95.09%	87.20%
Nepal	19.62%	18.24%	0.02%	0.11%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	80.36%	81.65%
Philippines [5]	17.98%	18.98%	1.31%	1.46%	1.71%	1.91%	1.46%	12.84%	0.27%	0.32%	77.28%	64.50%
Singapore	1.77%	2.43%	1.01%	1.53%	0.76%	1.11%	6.15%	8.72%	1.84%	2.58%	88.47%	83.63%
Sri Lanka	2.36%	1.73%	0.04%	0.16%	n.a.	n.a.	8.28%	30.81%	n.a.	n.a.	89.33%	67.31%
Taiwan	0.24%	0.21%	0.09%	0.21%	n.a.	n.a.	76.03%	85.00%	n.a.	n.a.	23.63%	14.58%
Thailand	0.46%	0.79%	0.18%	0.20%	n.a.	n.a.	1.72%	8.99%	n.a.	n.a.	97.64%	90.02%

[1] Figures for credit card 1996, Debit Card 1996
[2] Figures for debit card 1996
[3] Figures for debit card 1998, Cheques 1996
[4] Figures for cheques 1996
[5] Figures for credit and debit card 1996, direct credit 1996, direct debit 1997, cheques 1996

74. This study uses the per labour force figures to make the cross-country analysis comparable and meaningful. This study presumes that it is the working class population who extensively uses both the cash and non-cash payment instruments for payments.

Summary of Selected Payment Instruments Table 2 (SS Table 2)
Increase/Decrease of Percentage Share of Payment Instrument Per Labour Force from 1995 to 1999

	Cash	Credit Card	Debit Card	Direct Credit Transfers	Direct Debit Transfers	Cheques
Indonesia	231%	141%	1066%	n.a.	n.a.	-1.09%
Korea	-23%	-12%	73%	149%	88%	-10%
Malaysia	42.05%	86.58%	47.83%	n.a.	n.a.	-1.22%
Mongolia	160.71%	n.a.	n.a.	n.a.	n.a.	-8.30%
Nepal	-7.02%	475.15%	n.a.	n.a.	n.a.	1.60%
Philippines	5.60%	11.58%	11.68%	778.28%	18.40%	-16.54%
Singapore	37.54%	51.42%	46.32%	41.76%	39.90%	-5.47%
Sri Lanka	-26.68%	316.14%	n.a.	272.09%	n.a.	-24.65%
Taiwan	-11.55%	129.60%	65.00%	11.79%	n.a.	-38.32%
Thailand	70.95%	11.79%	n.a.	422.89%	n.a.	-7.80%

4.1 General Observations

The result of the survey on the use of currency for payments indicates that currency still plays an important role in the retail payment instrument for face-to-face payments in most of the SEACEN-member countries (SS Tables 1 & 2, Charts 1 & 2). However, cash payments account for a much smaller share of the total value of selected payment because the average transaction in cash payment is generally low in value (SS Table 2). The currency in circulation per labour force grew by 44% and 15% in Mongolia and the Philippines as well as by 14 % both in Nepal and Thailand. This indicates that the working class people in these countries have more cash in their wallets now than in 1995. The average working Mongolians, who theoretically used to carry about $68.18 in his wallets in 1995, now has $98.13 on hand in spite of being one of the countries that were affected the most by the recent currency crisis (SS Table 3).[75] In the Phil-

75. MNT shed 129% in value against the USD from 1995 to 1999.

ippines, the same increase had been experienced by most Filipinos who, as recorded in 1999, had been carrying cash on hand of about $174.22 from $151.95 in 1995. Among the populace of the SEACEN-member countries, the Indonesians suffered the biggest loss of 22% in its cash on hand, followed by Koreans, which suffered a loss of 19%, then by Malaysians-16%, Sri Lankans–8%, Taiwanese-6%, and Singaporeans-3%. However, the popularity of cash for payments has increased tremendously in Indonesia and Mongolia as evidenced by the 231% and 161% respective increases in their percentage share of cash per labour force on selected payment instruments in SS Tables 1 and 2, and Chart 4. Other countries with similar experiences were Thailand (71%), Malaysia (42%), Singapore (38%), and the Philippines (6%).

Cheque continues to be the most widely used instrument in most SEACEN-member countries in spite of the availability of electronic payment means in the market. It happens not only in those countries with less developed payment systems as well as in those countries that have made significant progress in the same field. Except for Taiwan, all the SEACEN-member countries rely most heavily on cheques for retail payments, both on a per labour force basis and as a percentage of total non-cash payments (SS Tables 2 & 3). The percentage share of the use of cheques for payments ranges from 65% to 98% in these countries while only15% for Taiwan (SS Table 2). Cheque payments per labour force, however, have decreased tremendously (SS Tables 2 & 3, Charts 12 & 13) in most of the SEACEN-member countries, except for Nepal which may had been affected by a condition that can be attributed to the dampening effect of the currency crisis in 1997. Among the member countries, Taiwan and Sri Lanka posted the highest and the second highest declines by 38% and 25%, respectively, followed by the Philippines (17%), Korea (10%), Thailand (8%), Mongolia (8%), Singapore (5%), Indonesia (1%), and Malaysia (1%).

As a percentage of their shares in the payment system, Singapore, Philippines and Malaysia capped the greatest percentages of credit card payments per labour force of 1.53%, 1.46%, and 1.10% respectively (SS Table 1). The use of cards for payments is also extensive in Korea (0.52%), Sri Lanka (0.23%), Taiwan (0.21%), Indonesia (0.20%), and Thailand (0.20%). Overall, the credit card as a payment instrument has become more popular in most of the SEACEN-member countries, except for Korea, for the period 1995 to 1999 (SS Table 2, Chart 17). Among the member countries, Nepal and Sri Lanka posted the highest and the second highest growth by 475% and 316%, respectively, in their percentage shares in the total

credit card payments. Other countries that experienced increases were Indonesia-141%, Taiwan-130%, Malaysia-87%, and Singapore-51%. The Philippines and Thailand shared a similar growth by 12%. The value of debit card payments as a percentage share of non-cash payments (SS Table 1) is also significant in the Philippines (1.91%), Singapore (1.11%) and Indonesia (0.06%). While in the rest of the SEACEN-member countries, debit cards payments posted a marginal share for non-cash payments. The development of debit cards has been more recent in most of the SEACEN-member, which may explain the behaviour of debit cards usage. Credit and Debit cards are relatively at their early stages in countries like Nepal and Sri Lanka, which could explain the wide increases in the number of cards in circulation in these countries.

In the direct transfer of funds, Taiwan registered the highest number of users of direct credit transfers representing 85% of the total payments made in the selected payment instruments followed by Sri Lanka, Korea, and the Philippines which accounted for a share of 31%, 15%, and 13%, respectively, in the total payments (SS Table 1). Thailand and Singapore both registered 9% share. Moreover, Philippines and Sri Lanka registered the highest and the second highest growth of 854% and 369%, respectively (Chart 21), in the value of their direct credits per labour force in absolute terms (SS Table 3). Thailand came next by 247% then Korea, Taiwan, and Singapore by 160%, 19%, and 0.5%, respectively. The usage of direct credit transfers as a percentage share for non-cash payments were minimal for the rest of the SEACEN-member countries. Moreover, only 3 out 10 SEACEN-members have data on the volume and value of direct debit transactions. All three countries showed increases in the volume of direct debit transactions while only two out of the three countries posted growth in the usage of direct debits as a percentage share for non-cash payments (SS Tables 2 & 4). The biggest increase in the value of direct debits per labour force has occurred in Korea and the Philippines, which registered respective increases of 96% and 29%, while Singapore shed 1% (Chart 22). Moreover, the popularity of direct debits has tremendously surged by 88% in Korea and by 40% in Singapore, while increasing only by 18% in the Philippines as indicated in SS Table 2. Direct debits, however, still represent a small portion of total payments in these countries.

The velocity in the circulation of money in the selected SEACEN-member countries were computed to determine if there is a significant change in the behavior on the "turnover" of money from 1995 to 1999. The figures were first subjected to Augmented Dickey-Fuller (ADF) unit root test

to determine the stationarity of the variables. Visual inspection was made on the line graph for each country for the entire period to pinpoint the particular time when any significant change has occurred. The variables were again subjected to ADF unit root test from 1995 up to the period when the significant change or "break" was noted then compared to the critical values to determine the stationarity of the variables. Finally, the ADF test statistic for the entire period was compared to the ADF test statistic in the subsequent test to determine if there is any significant difference between the two periods. The ADF statistic of quarterly "turnover" of money from 1995 to 1999 in all of the SEACEN-member countries, except Sri Lanka, showed a non-stationary behaviour at 1% and 5% critical values. At the subsequent test, the ADF statistic for Korea displayed a stationary behaviour at 5% critical value while a non-stationary behaviour was noted for Sri Lanka at 1% and 5% critical values. This indicates that there was a significant change in the behaviour on the velocity in the circulation of money in these countries.

Summary of Selected Payment Instruments Table 3 (SS Table 3)
Penetration of Selected payment Instruments Per Labour Force 1999

	Cash	Credit Card	Debit Card	Direct Credit Transfers	Direct Debit Transfers	Cheques
Indonesia	97.21	13.99	4.32	n.a.	n.a.	6,961.22
Korea	756.78	2,318.95	3.81	67,658.13	1,083.06	376,056.28
Malaysia	710.51	340.02	0.58	n.a.	n.a.	29,874.07
Mongolia	98.13	n.a.	n.a.	n.a.	n.a.	668.44
Nepal	41.38	0.25	n.a.	n.a.	n.a.	185.21
Philippines	174.22	13.40	17.52	117.81	2.90	591.94
Singapore	4,236.34	2,667.95	1,937.83	15,211.70	4,495.78	145,867.94
Sri Lanka	124.53	11.29	n.a.	2,219.51	n.a.	4,849.05
Taiwan	1,958.95	1,916.75	0.29	775,418.49	n.a.	132,983.38
Thailand	472.45	122.26	n.a.	5,376.05	n.a.	53,829.71

Summary of Selected Payment Instruments Table 3 (SS Table 3)
Penetration of Selected payment Instruments Per Labour Force 1995

	Cash	Credit Card	Debit Card	Direct Credit Transfers	Direct Debit Transfers	Cheques
Indonesia [1]	124.82	24.75	1.58	n.a.	n.a.	29,989.55
Korea [2]	936.69	2,529.53	2.11	3,059.80	551.43	399,063.29
Malaysia [3]	844.33	307.62	0.66	n.a.	n.a.	51,049.73
Mongolia [4]	68.18	n.a.	n.a.	n.a.	n.a.	1,320.49
Nepal	36.19	0.03	n.a.	n.a.	n.a.	148.21
Philippines [5]	151.95	11.06	14.45	12.35	2.26	653.24
Singapore	4,345.40	2,485.80	1,868.49	15,139.02	4,533.67	217,699.60
Sri Lanka	134.85	2.15	n.a.	473.63	n.a.	5,109.73
Taiwan	2,077.63	783.17	0.16	650,703.15	n.a.	202,262.74
Thailand	416.22	164.70	n.a.	1,548.43	n.a.	87,933.49

[1] Figures for credit card 1996, Debit Card 1996
[2] Figures for debit card 1996
[3] Figures for direct credit 1998, Direct debit 1997, Cheques 1996
[4] Figures for cheques 1996
[5] Figures for credit and debit card 1996, direct credit 1996, direct debit 1997, cheques 1996

In summary, the SEACEN-member countries are moving towards a cash-less society as evidenced by the significant growth in the usage of non-cash payment instruments. However, these electronic products are still at a relatively early stage in their development. Cheque remains the most widely used payment instrument in nine out of ten member countries in spite of the decrease in its popularity as a payment instrument. While cash still plays an important role as a payment instrument in many SEACEN-member countries. There was a significant change in the behaviour on the velocity in the circulation of money in Korea and Sri Lanka.

4.2 Currency as a Payment Instrument

Seven out of ten SEACEN-member countries exhibited increases in the amount of US Dollars in circulation (local currency converted to US Dollar) in their respective places for the period 1995 to 1999 (SS Table 4,

Chart 1). Mongolia and the Philippines posted the highest and the second highest growth of 49% and 30%, respectively, followed by Nepal-27%, Thailand-16%, Singapore-10%, and Malaysia-6%. On the other hand, Korea experienced the biggest decline of 16% while Indonesia and Taiwan recorded decreases of 12% and 1%, respectively. Moreover, Mongolia and the Philippines experienced respective growths of 44% and 15% in the currency in circulation per labour force while both Nepal and Thailand enjoyed a growth of 14% (Chart 2). Statistics indicates that the working class people in these four countries have more cash in their pockets now than in 1995. The average working Mongolians, who theoretically used to carry about $68.18 in their pockets in 1995, now have $98.13[76] on hand despite the fact that Mongolia was one of the countries that were adversely affected by the recent currency crisis (SS Table 3). In the Philippines, the same increase had been experienced by most Filipinos who, as recorded in 1999, had been carrying cash on hand of about $174.22 from $151.95 in 1995. On the other hand, the Indonesians suffered the biggest loss of 22% in its cash on hand, followed by Koreans, which suffered a loss of 19%, then by Malaysians-16%, Sri Lankans–8%, Taiwanese-6%, and Singaporeans-3%. All SEACEN-members suffered declines in the value of their currencies against the US dollars as a result of the currency crisis in 1997 with Indonesia topping the list with a recorded decline of 247% (Chart 3). However, the usage of cash for payments has become more popular in Indonesia and Mongolia as evidenced by the 231% and 161% increases in their percentage shares in total cash per labour force on selected payment instruments in SS Table 2 and Chart 4. Other countries with similar experiences were Thailand (71%), Malaysia (42%), Singapore (38%), and the Philippines (6%). The existence and further growth in the number of ATMs and ATMs networks in these countries may have contributed to greater convenience in obtaining cash and lower costs of supplying cash at traditional banking locations (Chart 5). Moreover, the density of total labour force per bank (Charts 8 & 9) and ATM (Chart 6 & 7) in 1999 have decreased tremendously from 1995 levels in these countries which may have further contributed to the use of cash for payments. Cash is usually dispensed over bank counters and ATMs. This indicates a deeper penetration of banking services on the populace of the SEACEN-member countries. Other developments that may have contributed to this phenomenon are the improvements in technology, changes in network agreements and new pricing arrangements. It also may be attributed to the absence of credit risk, the ano-

76. MNT shed 129% in value against the USD from 1995 to 1999.

nymity associated with many of these transactions, and the finality in transactions as well as the legislation imposing an obligation to accept legal tender as payment. Other factors that may have contributed to the preceding observations are as follows:

- requirements by banks offering credit and debit card facilities for the applicants to maintain savings or current accounts with the required minimum balance
- majority of the population in places where the SEACEN-member banks operate are low to average income earners and living in the rural areas with no available infrastructures for non-cash payment instruments,
- many banks were liquidated during the recent currency crisis which has caused a decline of public confidence in the banking industry, and
- many retail storeowners do not accept personal checks as payment instruments.

On the hand, countries that exhibited decreases in the use of cash for payments were Korea and Sri Lanka which both registered a decrease of 99%, followed by Taiwan with 2% and Nepal with 7% (Chart 4). These countries experienced growth extensively in other forms of payment instruments.

4.3 Cheque Usage

Cheque remains the primary means of payment in most SEACEN-member countries, with the exception of Taiwan, despite the availability of electronic payment means in the market. The percentage share of cheque payments on selected payment instruments ranges from 65% to 98% in these countries while only 15% in Taiwan (SS Table 1). The increase in the number of banks (Chart 8) which led to the decrease in the density of the labour force per bank (Chart 9) as experienced by most SEACEN-member countries may have contributed to the extensive usage of cheque for payments. Similarly, the increase in the "bankable" population (Chart 10), which may have triggered the increase in demand deposits in some of the member countries (Chart 11), may also explain the growth in the usage of cheque for payments. Moreover, most SEACEN-member countries have embarked on modernisation in their local clearing operations from manual to electronic processing as well as from net settlement to RTGS in recent years. These moves, which made the issuance and usage of cheque for payments more convenient and safe, have led to the rapid growth in the

volume and value of cheque transactions.[77] Consumers' preference for cheque may be explained also by the following factors:[78]

- The current account is the product most widely used by banking institutions to attract customers due to its low financial cost.
- The operating architecture of branches has been designed to sell all products and services at the counters and is available according to a predetermined number of branches per inhabitant.
- Stimuli to issuers promoting the use of the cheque over other payment instruments are as follows:
  - Floating utilisation at no charge.
  - Product diversification, as is the case of guaranteed cheque, remunerated current accounts and cheque elaboration services, which increases acceptance by beneficiaries
  - Initial costs of electronic payment media versus the volume of transactions to be handled.
  - The pricing strategy applicable to electronic payment media is generally more expensive.
- Initial technology costs related to the development of a new product and fear of replacement of proven technology. It's difficult to build confidence, this being one of the stronger barriers.
- Factors related to electronic payment media: operational risks, system collapse, fraud and the legal framework, among others.

However, the value of cheque payments per labour force in real terms has decreased tremendously (SS Tables 1 to 3, Charts 12 & 13) in most of the SEACEN-member countries, except for Nepal, which maybe due to the devaluation of the local currencies against the U.S. Taiwan and Sri Lanka posted the highest and the second highest declines by 38% and 27%, respectively, followed by the Philippines (17%), Korea (10%), Thailand (8%), Mongolia (8%), Singapore (5%), Indonesia (1%), and Malaysia (1%).

4.4 The Growth in Card Payments

Most of the SEACEN-member countries with the exception of Thailand experienced growth in the number of credit cards in circulation for

77. In original currency.

78. Apolinar, B., "Development or substitution of the cheque and the clearing houses – the Venezuela perspective," CPSS/BIS Mexico Workshop 2000, p. 38.

the period 1995 to 1999 (SS Table 4, Charts 14 & 15). Among these countries, Nepal and Sri-Lanka posted the highest and the second highest growth of 690% and 347%, respectively, followed by Taiwan with 270%, then by Philippines with 107%, Singapore-39%, Indonesia-9%, and Korea-7%. The number of credit cards in circulation in Thailand slipped by 17% from 1,895 thousands in 1995 to 1,574 thousands in 1999. The dampening effect of the 1997 currency crisis may have contributed to this behaviour. Understandably, most of the SEACEN-member countries have also experienced increases in the value of credit card transactions per labour force in absolute terms since 1995 (SS Table 3, Chart 16). Nepal and Sri Lanka showed the greatest increases of 86% and 81%, respectively, followed by Taiwan with 59%, then by Philippines-17%, Malaysia-10% and Singapore-7%. On the other hand, Indonesia, Thailand, and Korea have experienced respective declines of 77%, 35%, and 9%, in the value of their credit card transactions per labour force in absolute terms. These countries are among the top 4 countries that posted wide devaluation of the local currencies against the US dollars as a result of the currency crisis in 1997. Overall, the popularity of credit cards as payment instruments has tremendously increased in most of the SEACEN-member countries, except for Korea, for the period 1995 to 1999 (SS Tables 1 & 2, Chart 17). Nepal and Sri Lanka topped the list with registered increases of 475% and 316%, respectively, in their percentage share of credit card payments in the selected payment instruments. Other countries that exhibited growth in the use of credit cards were Indonesia, Taiwan, Malaysia, and Singapore, which posted their respective growth rates of 141%, 130%, 87%, and 51%. Philippines and Thailand shared similar growth rate of 12%. Credit cards are relatively at their early stage in countries like Nepal and Sri Lanka, which may explain the wide increase in the number of circulation in these countries.

With regard to the number of debit cards in circulation, Sri Lanka and Korea registered the highest growth rates of 242% and 220 % in 1999 from their 1995 levels (SS Table 4, Charts 18 &19). Other countries that experienced growth were Taiwan (141%), Indonesia (125%), Philippines (107), and Singapore (21%). The data on the value of debit cards transactions are not available for most of the SEACEN-member countries. These may be attributed to the fact that debit cards were only recently introduced in many SEACEN-member countries. Only six of the ten member countries have data on the value of debit cards transactions while three have data on the volume of transactions. These countries reflected growth in the value per labour force, except Malaysia which posted a 12% decline, in absolute terms (SS Table 3, Chart 20) with Indonesia leading the band with 173%

increase followed by Korea with 80%, then Taiwan by 76%, Philippines-21%, and Singapore-4%. Moreover, the countries, which showed increases in the volume of debit card transactions, were Korea and Singapore, which recorded growth rates of 187% and 63%, respectively (SS Table 4). In addition, the acceptance of debit cards as payment instrument has widened extensively in these six countries (SS Tables 1 & 2). Indonesia leads the group with 1066% increase, followed by Korea with 73%, then by Taiwan with 65%, Malaysia-48%, Singapore-46%, and the Philippines-12%.

The growth of card payments in many SEACEN-member countries also reflects the development of network payment technology. The new network arrangements, which enabled providers to share the initial costs of payment card infrastructures, provided them with a platform for developing new procedures and instruments. For example, some EFTPOS card systems had evolved from ATM card systems.

It was observed that one of the most critical supply factors in the trend towards card payments has been the development of interoperability standards among different card networks. It encourages the participation in card networks by vendors and service providers, which attracts even more users to the card issuers in the network. With credit card systems, most of the credit cards in the SEACEN-member countries can be used abroad through affiliation with VISA International and Master Card International.

The systems of some countries to change user charges into more liberal non-price standards may have also contributed to the demand for card payments. Turnover fees charged to merchants in card payments have declined in most countries for some types of cards. Moreover, a number of features, such as credit limits, annual fees, interest rates and loyalty programmes, were used to stimulate demand for credit cards. Extensive advertising may also have affected the shift to card payments in some countries.

4.5 The Growth in Direct Transfers

The volume of direct fund transfers has increased significantly in most of the SEACEN-member countries. Among the SEACEN-member countries, Thailand and Sri Lanka registered the highest and the second highest increases of 37912% and 607%, respectively, in the volume of direct credit transfers (SS Table 4), followed by Taiwan with 91 %, then by Philippines with 81%, Korea-67%, and Singapore-17%. Six out 10 member countries

have shown increases in the value of direct credit transfers per labour force since 1995 (Chart 21). The value of direct credit transfers for the Philippines rose by a hefty 854% while in Sri Lanka, Thailand, Korea, Taiwan, and Singapore, direct credit transfers rose by 369%, 247%, 160%, 19%, and 5%, respectively. The data on the volume and value of transactions for direct credit transfers are not available for the rest of the member countries. The use of direct credits in the SEACEN-member countries, as a percentage share in the selected payment instruments, has increased tremendously as reflected in SS Tables 1 & 2. Since 1995, the use of direct credits in the Philippines and Thailand grew by 778% and 423%. Other countries that posted growth were Sri Lanka, Korea, Singapore, and Taiwan, which registered growth rates of 272%, 149%, 42%, and 12% respectively. In recent years, most of the SEACEN-member countries have embarked on modernisation in their payment and settlement systems, especially in the LVTS (e.g. BATHNET in Thailand, MIPS in the Philippines, and IFT and BOK-Wire in Korea), which may explain the wide growth in the volume and value of direct credit transactions.

Constrained by the unavailability of the data for the direct debits, the relative share of this payment instrument in the volume of transactions for non-cash payments has risen in 3 member countries for the period 1995 to 1999 (SS Table 4). Only two of the three member countries, however, posted growth in the value of direct debit transfers per labour force (Chart 22). The biggest increase has occurred in Korea and the Philippines with respective percentage increases of 96% and 29%, while Singapore shed off 1%, respectively of their total direct debit transfers. Moreover, the popularity of direct debits, as a percentage share in the selected payment instruments, has widened extensively by 88% in Korea and 40% in Singapore, while only 18% in the Philippines as indicated in SS Tables 1 and 2. However, direct debits remain a small portion of payments in these countries.

4.6 Velocity in the Circulation of Money

The theoretical basis for the establishment of payment systems, as explained in Chapter II, summarised the principles underlying the correlation between money supply and the efficiency of a payment system using the equation MV = PT. Holding PT (or GNP) constant, an increase in the level of efficiency of a payment system raises the velocity (V) level allowing the money supply (M) to be reduced in order to support the same level of eco-

nomic activity.[79] The velocity in the circulation of money in the selected SEACEN-member countries were computed using the following formula as derived from the original equation MV = PT:

$$V = PT/M$$

where: PT = nominal GDP (quarterly figures converted into USD using the average exchange rate)
M = M1 (quarterly figures converted into USD using the average exchange rate).

The summary of the quarterly velocity in the circulation of money for the period 1995 to 1999 is shown in SS Table 5 while the yearly averages are shown below:

Yearly Averages of the Quarterly Velocity in the Circulation of Money

	1995	1996	1997	1998	1999
Indonesia	2.336197	2.270387	2.251091	2.406618	2.475958
Korea	2.846886	2.856018	3.196027	3.598816	3.268476
Malaysia	1.138818	1.121339	1.127070	1.329333	1.219204
Mongolia	n.a.	n.a.	n.a.	n.a.	n.a.
Myanmar	n.a.	n.a.	n.a.	n.a.	n.a.
Nepal	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	2.958323	2.796725	2.624613	2.643391	2.354065
Singapore	1.037896	1.034451	1.068688	1.162106	1.070208
Sri Lanka	n.a.	2.227355	2.443784	2.451931	2.406261
Taiwan	0.56297	0.575022	0.557772	0.58929	0.554248
Thailand	2.849701	2.808938	2.870948	2.864495	2.46232

79. Humphrey D.B., "Payment Systems: Principles, Practice, and Improvements," World Technical Paper No. 260, 1995, p. 18-19.

The table shows that the quarterly velocity in the circulation of money in Indonesia had increased by 0.155 points or by 7% in 1998 from its 2.25 level in 1997. Similarly, the "turnover" of money in Korea rose by 0.34 points or by 12% in 1997 from the 2.86 figure for the year 1996, while registering an increase of 0.40 points or 13% in 1998 from its 3.20 level in 1997. While in the Philippines, the figures showed the country's velocity steadily slowing down from 1995 to 1999. The significant change occurred in 1996 when there was an increase of 5% from its 2.96 level in 1995. A much bigger increase occurred in 1999 when the 2.64 figure of 1998 rose by 0.29 points representing an 11% growth. In Singapore, the rise in the velocity in the circulation of money happened in 1998 when the 1.07 level of 1997 increased to 1.16 or by 0.09 representing a 9% growth. Sri Lanka, on the other hand, experienced in 1997 a fall in velocity equivalent to 0.22 points or a 10% decrease from the 2.23 figure in 1996. In Taiwan, there was no significant change in the "turnover" of money for the period 1995 to 1999. On the contrary, a significant decline was noted in Thailand when its level of velocity of 2.86 in 1998 dived to 2.46 in 1999 or a registered decrease of 0.40 points or 14%.

The quarterly figures on the "turnover" of money from 1995 to 1999 were subjected to further tests to validate any significant changes in the behaviour of the related variables for the stated period. Each country's quarterly figures for the period 1995 to 1999 were subjected first to Augmented Dickey-Fuller (ADF) unit root test to determine the stationarity of the variables. Then, the ADF test statistic was compared to the critical values at 1%, 5%, and 10%. At this stage, the behaviour of the variables, whether stationary or not, for the entire period can now be determined. Visual inspection was made on the line graph for each country for the entire period to pinpoint the particular time when any significant change has occurred. The variables were again subjected to ADF unit root test from 1995 up to the period when the significant change or "break" was noted. The ADF test statistic was again compared to the critical values to determine the stationarity of the variables. Finally, the ADF test statistic for the entire period was compared to the ADF test statistic in the subsequent test to determine if there is any significant difference between the two periods. The results of the ADF test statistic of the quarterly figures of the velocity in the circulation in money for the two periods of the SEACEN-member countries are summarised in the following tables:[80]

80. The line graphs and test statistics results are presented in a separate group of tables under ADF graphs and Tables section.

ADF Test Statistic and Critical Values for the period 1995 to 1999

	ADF Test Statistic	Critical Values		
		1%	5%	10%
Indonesia	-1.864923	-3.8572	-3.0400	-2.6608
Korea	-1.507420	-3.8572	-3.0400	-2.6608
Malaysia	-1.536754	-3.8572	-3.0400	-2.6608
Mongolia	n.a.	n.a.	n.a.	n.a.
Myanmar	n.a.	n.a.	n.a.	n.a.
Nepal	n.a.	n.a.	n.a.	n.a.
Philippines	-0.463022	-3.8572	-3.0400	-2.6608
Singapore	-2.189979	-3.8572	-3.0400	-2.6608
Sri Lanka	-4.349824	-3.8572	-3.0400	-2.6608
Taiwan	-2.462531	-3.8572	-3.0400	-2.6608
Thailand	0.307382	-3.8572	-3.0400	-2.6608

ADF Test Statistic and Critical Values from 1995 to the "Break" Period

	ADF Test Statistic	Critical Values		
		1%	5%	10%
Indonesia (1998:1)	-1.654767	-4.2207	-3.1801	-2.7349
Korea (1997:1)	-4.114732	-4.8875	-3.4239	-2.8640
Malaysia (1997:1)	-1.156778	-4.8875	-3.4239	-2.8640
Mongolia	n.a.	n.a.	n.a.	n.a.
Myanmar	n.a.	n.a.	n.a.	n.a.
Nepal	n.a.	n.a.	n.a.	n.a.
Philippines (1999:1)	-1.246001	-3.9635	-3.0818	-2.6829
Singapore (1997:1)	-2.925026	-4.8875	-3.4239	-2.8640
Sri Lanka (1997:2)	-1.935130	-6.7615	-4.0691	-3.2066
Taiwan (1997:2)	-1.810470	-4.6405	-3.3350	-2.8169
Thailand (1999:1)	-2.174924	-4.8875	-3.4239	-2.8640

The ADF statistic of quarterly "turnover" of money from 1995 to 1999 in all of the SEACEN-member countries, except Sri Lanka, showed a non-stationary behavior at 1% and 5% critical values. At the subsequent test which validated the period starting from 1995 up to the time when the significant "break" was noted, the ADF statistic for Korea displayed a stationary behaviour at 5% critical value while a non-stationary behaviour was noted for Sri Lanka at 1% and 5% critical values. This indicates that there was a significant change in the behaviour of the velocity in the circulation of money in Korea and Sri Lanka. The growth and significant change in the behaviour of the "turnover" of money in Korea may be attributed to its well- structured payment and settlement system. While in Sri Lanka, further analyses were conducted considering the absence of the quarterly data for the year 1995. A visual inspection of its line graph showed the existence of a significant 'break' which occurred during the period starting from the 2nd quarter of 1996 and ending at the 1st quarter of 1997. However, the cited evidence for the existence of a significant change in the behavior of the quarterly "turnover" of money noted in these periods is not sufficient for drawing a conclusion considering the absence of the data for the year 1995 and the limited number of observations used.

5. Policy Initiatives

5.1 Payment System Oversight

In designing a payment system, problems usually arise in trying to cater to all the needs, demands or requirements of users. Central banks, being the central authority in the payment systems arena, aims to achieve a consensus among the participants in addressing such problems. It was observed in many countries that conducting a forum where the central bank can obtain different views from the private sector are seen as one of the best solutions to effectively prevent the occurrence of serious problems and errors. This forum may take the form of a National Payments Council (NPC) comprising of the central bank and commercial banks as well as other financial organisations that actively participate in the payment system. It is at this forum where ideas pertaining to competition policies, roles of central banks, technological requirements for payment system initiatives, and other relevant and important matters, can be openly discussed, and therefore a consensus can be reached. Not only will the forum serve as a venue for brainstorming and achieving a consensus among the institutions involved, it will also serve as a body supporting the implementation of major initiatives which can greatly enhance

cooperation among the said institutions resulting to cheaper implementation costs. [81]

Under letters B and C of the responsibilities of the central bank in applying the Core Principles provide that the central bank should ensure that the system it operates comply with the Core Principles and oversee compliance with the Core Principles by systems it does not operate and have the ability to carryout this oversight.[82] There may be a wide variety of means by which the central can carryout and achieve these responsibilities depending on the country's legal and institutional framework. Most of the SEACEN-member countries, however, carryout these responsibilities through a statue-based system of oversight with specific tasks, responsibilities and powers assigned to them. Among the member countries, the BI Act of 1999 empowers the BI in Indonesia to exercise supervision and management over the National Payment System and credit card issuers. Currently, there is no provision for market surveillance in Indonesia. The BI, however, is presently drafting pertinent regulations that will cover all aspects of the payment system including money laundering.[83]

While the BOK in Korea retains the right to engage in the operation and management of the payment systems as provided under the BOK Act of 1977. Under this Act, the BOK has the general responsibility for maintaining and improving the safety and efficiency of the payment systems. With regard to BOK-Wire system, the BOK performs its oversight role through the issuance of regulations and direct provision of settlement accounts and services as well as application of sanctions to counter abnormal behaviour by the participants. It also oversees the operation of retail payment systems by participating in the decision-making process of the KFTC, the operator of the retail payment systems, through the chairmanship of the KFTC's General Meeting and as a member of the Board of Directors. The BOK also periodically receives statistics on retail payment and settlement from the KFTC. Moreover, the

81. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998.

82. CPSS, "Core Principle for Systemically Important Payment Systems," BIS, Basle, January 2001.

83. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

BOK can also participate on a joint basis in the Financial Supervisory Service's on-site inspections of banking institutions, and checking their compliance with the payment systems regulations.[84]

Moreover, the oversight role of the BOM in Mongolia is recognised under the Article 5 of the Central Banking Act, which states, "the fundamental tasks to be carried out by the BOM shall be [...] to promote smooth operation of the payment system." Under Article 20 of this Act, the BOM may provide such facility for the payment system, and may make regulations to ensure the efficiency and soundness of the payment system.[85]

In Singapore, the MAS oversight activities over payment systems or instruments are based primarily on the Banking Act, which made specific provisions on the RTGS systems (MEPS), the ACH (cheques and inter-bank GIRO clearing) and the multi-purpose stored-value cards (MPSVC). The MAS sets the policy framework, issues recommendations, develops and approves relevant regulations and rules governing the participants as well as the terms of use for the payment systems. For other payment systems or instruments where no explicit regulatory powers apply, for instance the NETS retail EFTPOS and ATM systems and networks, MAS exercises its oversight influence over how the service providers conduct their payment-related activities through the banks, which are either the participants or stakeholders of those systems. Often, MAS relies on its good working relationships with the system participants and stakeholders, and through effective moral suasion, to achieve its payment system objectives. MAS has a cross-departmental multi-disciplinary committee that meets to discuss issues related to the payment and settlement systems in Singapore. This forum facilitates information sharing between the different departments, especially between those involved in the supervision of banks and financial institutions and those performing oversight of payment systems, for effective decision-making. This Committee is also responsible for overseeing the securities settlement systems, and is represented by several MAS' senior management personnel. The MAS is also an

84. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

85. Ayush, T., Economist, Accounting and Automatisation Department, The Bank of Mongolia, "The Payment and Settlement Systems in Mongolia," August 2001.

active member of the global Committee for Payment and Settlement Systems (CPSS) under the auspices of the Bank of International Settlements (BIS).[86]

The CBC in Taiwan is authorised to monitor the payment system under the Article 47-3 in the newly revised Banking Law but limited only to large value fund transfer system. Currently, the MOF, the CBC, and the Central Deposit Insurance Corporation (CDIC) work together to supervise the financial institutions and financial markets in accordance with the rules and regulations set under the Program for the division of duties in Bank Examination among the Competent Authorities of October 1999.[87]

On the other hand, the rest of the member countries carryout these responsibilities based on custom and practice and rely on non-statutory or indirect approach. These countries are the following:

While there is currently no single payment systems act governing payment systems in Malaysia, BNM is empowered under the Banking and Financial Institutions Act 1989 (BAFIA) to regulate the operations of electronic fund transfer (EFT) systems. In promoting monetary stability and a sound financial structure, the stability of payment and settlement systems is important to BNM. According to Section 119 of the BAFIA, the prior approval from BNM is required to operate any electronic fund transfer system. Applications to BNM for consideration should provide the scheme of operation of the system and the rules, contracts, by-laws or other documents relating to the rights, duties and liabilities of the persons participating in the system. In addition, Section 19 of the BAFIA requires the operator of credit token business, which is defined to include credit and charge card system to obtain the prior approval of BNM. The BAFIA also empowers BNM to inspect the premises, equipment, machinery, books or other documents, accounts or transactions relating to the system. The other statute law, which relates to payment services in Malaysia, is the Bills of Exchange Act 1949.[88]

86. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

87. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

88. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

In Myanmar, a new department, namely the Banking Regulation Department was established in 1 February 2001 to review all existing banking regulations and when it is necessary, to issue new regulations including payment and settlement systems regulations.[89]

The BSP performs its oversight role in the payment systems in the Philippines through its careful monitoring of payment transactions in order to minimise the occurrence of systemic risks. In retail payment systems, the BSP takes the responsibility of identifying the barriers to a more efficient functioning of the payment systems, and accordingly resolving these barriers through the proper administration of existing rules and regulations. The rules, regulations and procedures under which the BSP clearing units operate are covered by the BSP clearing guidelines and procedures issued to all member banks/participants.[90]

In Sri Lanka, there is no specific provision for oversight or any regulation governing the payment system. But there are provisions in the MLA of 1949 and the Banking Act of 1988, for the general oversight or regulation of banking institutions, particularly the LCBs, which are the major direct participants in the payment system in Sri Lanka. The Director of the Bank Supervision has been empowered to regulate, supervise and examine the LCBs with the prime objective of ensuring the stability of the financial system of the country. The Banking Act of 1988 and its subsequent amendments and directives issued under the Banking Act provides the regulatory framework for effective regulation of the LCBs in the country. The regulatory framework generally is in line with the core principles stipulated by the Basel Committee for effective banking supervision.[91]

The CPSS observes "...either approach can work in its own setting - depending on the legal and institutional framework of the country and the acceptance of the approach by the institution overseen. The potential benefits of a statue-based approach to oversight, however, deserve serious consideration in countries newly establishing or significantly revising the oversight role

89. Maw, K.T., Research Officer, Research and Training Department, "The Payment and Settlement Systems in Myanmer," August 2001.

90. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

91. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

and related policies."[92] In addition, the CPSS points out that whatever the basis for the oversight regime, a number of steps should be taken both at the outset and ongoing basis as follows:[93]

- Identifying systems that are subject to central bank oversight. This should include all systemically important payment systems, which the central does not itself operate, although it is necessarily limited to systemically important system. Operators and users of the system should be made aware of the central bank's decision to exercise oversight.
- Reviewing and evaluating the design and operations of each existing systemically important payment system, to ensure that it meets and continues to meet each of the Core Principles. Overseers may require higher standards than the minima required by the Core Principles or they may have requirements about matters that are not covered by the Core Principles.
- Evaluating proposed new system at the design stage to minimise the cost of compliance.
- Evaluating systemically important payment system continuously. Overseer should collect information from system operators so that they can keep their evaluations up to date. Changes in the legal, technical or financial environment can have implications for compliance, as can changes to the system's design and operation. The central bank should be notified well in advance of any significant design or operational changes proposed, so that there is adequate opportunity to evaluate them.
- Ensuring that action is taken seriously to remedy any deficiencies in compliance, within a time-scale that is reasonable for the nature of the deficiency and the necessary action.

Finally, the CPSS identifies the following tools that central banks can use in overseeing the payment system:[94]

- Collect information from written sources (e.g. financial reports, statistics, rules and procedures, minutes of meeting of governing bodies, audit reports etc.) provided by payment operators and through discussions with relevant parties (operators, internal and external auditors, participants etc) as well as by on-site inspection.

92. CPSS, "Core Principle for Systemically Important Payment Systems," BIS, Basle, January 2001.

93. Ibid.

94. Ibid.

- Analyse information by identifying the systemically important payment system and review its design and operation using the Core Principles and other relevant payment system materials (e.g. those found on the BIS web site) as well as those other relevant bodies (internal and external auditors, authorities conducting independent assessment, such as the IMF and World Bank etc.).
- Take action by publicising the objectives and policies of oversight through speeches and publications, persuading the payment system operators to make changes to rules and regulations and making the provision of central bank settlement services dependent on relevant conditions as well as establishing formal agreements with payment system operators.

5.2 Competition

Good public policy on competition should strive for coherence and explicitness. It should be reviewed periodically to maintain its relevance to the needs of the changing world, economic forces and community values. Competition is usually influenced by the constraints imposed by the different institutions. Thus, a clear institutional framework will be of great help to the formulation of a coherent competition policy. In brief, Johnson et. al, explained ..."competition will tend to mean "open competition" consistent with the legitimate institutions of the country. ...Public sector actions to sustain competition tend to be regulation of the private sector to maintain the integrity of the market process, and public sector intervention to influence (shape) market structure. As regards the regulation, one objective would be to prevent unfair advantage being gained by one competitor vis-à-vis others. "Unfairness" would imply that the advantage was not being obtained in consequence of a superior product or cost or price advantage. Another objective could be to protect users of payment services from attempts of payment suppliers to gain unfair transacting advantage and vice versa. Typically, then, with the objective of ensuring open competition, public policy in the payments area must define and have a policy toward: (1) price collusion, (2) price discrimination, and (3) disclosure of information (including truth in advertising)."[95]

95. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998, p. 64.

The Core Principle IX provides that the system should have objective and publicly disclosed criteria for participation, which permit fair and open access. Access criteria, as explained by the CPSS, "...that encourage competition amongst participants promote efficient and low cost payment services. This advantage, however, may need to be weighed against the need to protect the systems and their participants from participation in the system by institutions that would expose them to excessive legal, financial or operational risks. Any restrictions on access should be objective and based on appropriate risk criteria. All access criteria should be stated explicitly and disclosed to interested parties."[96]

In most of the SEACEN-member countries, there is no specific legal provision prohibiting the entry to the payment system. Entry into the payment system, however, is subject to the authority or license obtained from the proper bodies in accordance with some criteria or rules and regulations issued and imposed by it. The objective of such criteria or rules and regulations is to supervise and regulate the entry and ensure safety and efficiency in the payment system, rather than to discourage or prevent new entrants into the payment system. The following are some of the initiatives taken by the SEACEN-member banks to address the issues on competition and access criteria.

In Indonesia, under Article 15, 17 and 18 of the BI Act, BI shall be the sole provider of clearing system and settlement services in Indonesia except in the areas where it could not provide such services. However, there is no legal provision prohibiting the entry to payment systems such as in the area of switching company for ATM and EFTPOS, issuer/acquirer of credit card, etc.[97]

A commercial bank in Mongolia may become a participant in the clearing house (CH) if it functions from an office located in Mongolia, which is subject to regulations imposed by the BOM, and it transmits payment messages to/from the CH only and meets the requirements of "The inter-bank clearing rules."[98]

96. CPSS, "Core Principle for Systemically Important Payment Systems," BIS, Basle, January 2001.

97. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

98. Ayush, T., Economist, Accounting and Automatisation Department, The Bank of Mongolia, "The Payment and Settlement Systems in Mongolia," August 2001.

While in the Philippines, the PCHC was formally established by the BAP as a private corporation, with a Board of Directors composed of members drawn from participating banks and institutions represented by their bank presidents and senior officers.[99]

Currently, the CBSL is the only institution, which operates and manages the interbank payment clearing arrangements and the settlement facilities. The CBSL has provided these facilities from the time of its inception as a requirement under the MLA for the provision of necessary facilities to improve the banking services in the country. But there is no specific legislation preventing other institutions to provide, whether individually or collectively, clearing arrangements for any type of payment instrument. Entry into the payment system by any institution/company as a banking institution is subject to the authority or license obtained from the Monetary Board with the approval of the Minister in-charge of Finance, in accordance with the criteria under the Banking Act.[100]

In Korea, there are no specific laws and regulations on competition in the payment systems and services. However, the Monopoly Regulation and Fair Trade Act, a general law stipulating prohibition of collusive practices and anti-competitive transactions in all kinds of business, can be applied to the payment transactions. Moreover, the BOK-Wire, a large-value payment system operated by the Bank of Korea, is open to all the participants of the system while admission from the General Meeting is required for non-banks to join the system. Currently, the KFTC operates exclusively all the 10 retail payment systems in Korea.[101]

The wholesale payment systems in Malaysia are currently operated by BNM. BNM is empowered under the Central Bank of Malaysia Act 1958 to establish clearing houses in Kuala Lumpur and in such other places as the Bank may consider necessary. The real-time gross settlement system, RENTAS, and the cheque clearing system, SPICK, operated by BNM are open to all licensed banking institutions in Malaysia. With regards to the retail payment

99. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

100. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

101. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

systems, MEPS, owned by a consortium of domestic banking institutions operate most of the retail payment systems in Malaysia. BNM intends to increase efficiency and competition in the payments system. Policies relating to introduction of new payment systems as well as access to existing payment systems would be reviewed in line with this. In recent years, access to the systems operated by MEPS, such as GIRO and the Internet Payment Gateway, was expanded to the foreign banks.[102]

Under Section 59A of the Banking Act, the MAS of Singapore is given the explicit powers to establish and operate one or more real-time gross settlement systems to settle payment and book-entry securities between and among participants. Full direct participation is open to any licensed-bank operating in Singapore, with no entrance fee levied on them. All payments made by direct participants are charged at a flat fee on a per payment message basis. Moreover, MAS is given the authority to establish, in conjunction with banks and other financial institutions, a clearing house to facilitate the clearing of cheques and other credit instruments under Section 59 of the Banking Act. Full direct participation in the clearing services is restricted to ordinary members, while associate members can only participate through an ordinary member. All licensed banks in Singapore are eligible to apply for membership. The committee of the clearing house determines the outcome of all membership applications, and imposes a one-time nominal fee on all new ordinary and associate members. Two appointed individuals in the committee represent the MAS so that it will have some influence over the decisions taken by the association that may affect the general public and other related parties more generally.[103]

5.3 Consumer Protection

Consumers will benefit from the payment methods that are inexpensive, rapid, convenient, accessible and reliable, with an acceptable level of risk. It is typically the general interest of the government to encourage these qualities in payment systems. Authorities may have specific objectives in protecting

102. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

103. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

consumers as well as other users of the payment system such as merchants and smaller financial institutions against financial or other types of risks.[104]

The Core Principle VII provides that the system should ensure a high degree of security and operational reliability and should have contingency arrangements for time completion of daily processing. The CPSS, under 7.7.24 of the Core Principles, explains the issues in relation to security and operational reliability that should be considered by the designers and operators of payment system.[105]

In general, the SEACEN-member countries recognise the importance of addressing the issues on consumer protection relative to payment and settlement systems. Among these issues are the protection of consumer from the system operators against excessive costs and the reliability of the system. However, only a few of the SEACEN member banks have specific laws or rules and regulations on payment system governing consumer protection. The consumers in the SEACEN-member countries, however, are generally protected under a special consumer protection law or act of the land. The following are some of the initiatives taken by the SEACEN-member banks to protect the consumers against excessive costs from system operators and to ensure the reliability of the payment system.

Currently, there is no existing regulation on consumer protection related to payment system services in Indonesia. However, consumers in general are protected under the Consumers Protection Act No. 8/99 dated April 20, 1999. To improve efficiency and quality of bank services, BI issued BI Decree No. 27/164/Kep/Dir in March 31, 1995, which regulates the "Use of Information Systems Technology By Bank." Under this decree, bank management must adhere firmly to the principles of adequate control and security, and maintain bank secrecy. However, this decree is applicable only to banks.[106]

The Financial Supervisory Service (FSS) in Korea is responsible for the customer protection, as a rule maker in the business of financial institutions'

104. Report of the working party on electronic money, "Electronic Money: Consumer protection, law enforcement, supervisory and cross border issues," Group of Ten, BIS:http://www.bis.org. April 1997.

105. CPSS, "Core Principle for Systemically Important Payment Systems," BIS, Basle, January 2001.

106. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

payment services. The FSS establishes measures to resolve disputes relating to banks and non-banks and mediates disputes between consumers and financial institutions. The Financial Dispute Settlement Committee (FDSC) established by the FSS, in accordance with the Act Concerning the Establishment of the Financial Supervisory Organisation, is the supreme mediation body. The FDSC decision has the same effect as the reconciliation made by a court of law if the parties concerned accept the decision. The Committee enables consumers to reach speedy and convenient settlements of their financial disputes, without costly and time-consuming lawsuits. The Fair Trade Commission, a government agency in charge of removing anti-competitive regulations and securing fair trading practices in all businesses according to the Monopoly Regulation and Fair Trade Act, is also responsible for consumer protection and fair competition in the payment services area.[107]

In Mongolia, human related errors are usually tackled through verification of transactions. Daily transactions are backed up and stored on a separate machine. Payment messages and their details are encrypted from participant to participant.[108]

In Nepal, all domestic payments and settlement activities are processed through the clearing house, which is under the Central Bank. The NRB does not impose any service charges on domestic payments while for the cross border payments, the charges for communication viz. telex, telephone, mail etc. has to be borne by the concerned banks. [109]

In the Philippines, the PCHC charges the participating member banks with processing fees per transaction item sent through the system. Pricing policies are promulgated and approved by the Board of Directors of the PCHC, which is wholly owned by all commercial banks that are likewise members of the BAP. Moreover, in the PCHC system, all images of cheques sent for clearing are archived in microfilms and kept in a vault, while clearing reports and transaction lists are stored in CD ROMS. Indexing schemes were

107. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

108. Ayush, T., Economist, Accounting and Automatisation Department, The Bank of Mongolia, "The Payment and Settlement Systems in Mongolia," August 2001.

109. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

implemented to facilitate research and reproduction requirements. PCHC follows a 5-year minimum retention period for its archived files.[110]

There is no specific legal enactment to deal with payment and settlement systems in Sri Lanka. However, there are several laws, rules and regulations, contractual agreements and institutional arrangements that indirectly relate to payment service providers and protecting users of services extended by these institutions. Among these rules and regulations are as follows: in Sri Lanka, only LCBs, other than CBSL are permitted by law to accept demand deposits (transferable deposits). As LCBs are regulated by the CBSL, the regulatory and supervisory authority of CBSL over LCBs thus protects its customers. There are also provisions in the Banking Act and MLA to safeguard the deposits of the customers in instances of liquidations of banking institutions. Under the unfair Contract Terms Act No. 26 of 1977, it restricts the effectiveness of the terms of contract that exclude or restrict liability for negligence, and of standard terms of contract of business that are applied to consumers. The English Law in terms of the Civil Law Ordinance is applicable in relation to banking transactions. The conduct of business by banks and requirements with regard to the maintenance of confidentiality (privacy) are governed by Banking Act No. 30 of 1988. Some of the provisions of the Consumer Protection Act No. 1 of 1979 would apply in relation to misleading conduct, false representations, etc. Moreover, the Prescription Ordinance in Sri Lanka requires the financial institutions to keep detailed records of all transactions for at least a six-year period from the date each transaction was done.[111]

In Malaysia, BNM plays its role in requiring banking institutions to enhance consumer awareness as well as addressing consumer protection issues in the provision of their services. Recognising the need to address banks' customer complaints, BNM had also played a role in the setting up of a Banking Mediation Bureau in 1996 to provide a simple mechanism for dispute resolution without any cost to the customers of the banks or finance companies in Malaysia. The Bureau receives references from consumers who are not satisfied with the decisions of the banks or finance companies on their complaints or claims involving monetary loss as a result of their dealings with them. Amongst the complaints or claims involving monetary losses entertained are the charging of excessive fees, misleading advertisement, ATM

110. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

111. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

withdrawals and unauthorised use of credit cards. BNM has also issued guidelines on consumer protection on electronic fund transfers under the "Guidelines on Consumer Protection on Electronic Fund Transfers". The purpose of these guidelines is to provide a basic framework and establish the rights, liabilities, and responsibilities of customers and financial institutions related to electronic fund transfers. [112]

Although consumer protection is presently not an explicit objective of the MAS in Singapore, its current regulation and supervision framework for the financial system is directed at ensuring banks and other financial institutions to operate in a safe and efficient manner that would not compromise the interests of their customers. On the other hand, MAS also recognises that the provision of payment services is essentially based on a private retail banking relationship established between the banks and the consumers hence any disputes will be resolved among themselves. Moreover, the Association of Banks Singapore (ABS) has an established code of conduct for banks. The purpose of the code is to "set standards for good banking practice, to maintain confidence in the security and integrity of the banking system, and to ensure a fair relationship between banks and their customers." In addition, ABS is currently formalising a separate Interbank GIRO (IBG) Charter that outlines best business practices for the banks providing IBG services as well as the billing organisations in their relationships with consumers. Moreover, the Consumers' Association of Singapore (CASE), an independent non-statutory organisation, established in 1971, provides advice to consumers and assists them in seeking redress.[113]

In Taiwan, there are three dimensions of consumer protection that are considered in the administration of the payment systems. The first is concerned with the rights and obligations of the financial accounts such as checking accounts, saving accounts, or trust accounts; the second dimension is concerned with the privacy and safety of messages in transaction; and the last is about the price charge of payment service. The dimensions are premised on the concept that the consumers in most cases are the one of the inferior parties due to asymmetric information. Thus, they need to be protected by legislation or through other just third parties. The Consumer Protection Law

112. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

113. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

in the country was promulgated in November 1994 and the Committee of Consumer Protection was entrusted to execute this Law. Moreover, there is no single consumer protection law on payment systems. The relevant laws on consumer protection in the country are the "Banking Law", "Standard Contract for Financial Accounts", "The Master Agreement of Personal Computer & Network Banking Activities", "Guidelines Governing the Establishment and Management of Inter-Bank Financial Information Service Provider".[114]

6. Recent Trends and Developments

6.1 Legal Framework

Most of the SEACEN-member countries today are in the process of establishing the legal frameworks for their respective payment and settlement systems. Sri Lanka and Taiwan, among others, have already completed and submitted their proposed legal provisions to proper authorities for review and approval, while others are still in the early stage of preparing draft provisions. On the other hand, other SEACEN member countries like the Philippines have already laid down the legal frameworks with the passing of "Electronic Commerce Act of 2000" (R.A. 8792) into law on June 14, 2000.[115]

Similar to the Philippines, some of the member countries which have also laid down the legal frameworks for its payment instruments such as credit cards, ATM systems and electronic fund transfers, etc. were Korea and Nepal.

In line with the recommendation in its Financial Sector Master Plan, BNM in Malaysia is in the process of formulating a flexible, proactive and effective regulatory framework for the payments system to be adopted in its oversight of the payments system. In ensuring the smooth functioning of payment and settlement systems, BNM would adopt a regulatory framework that seeks to promote the safety and efficiency of the payment and settlement systems and to safeguard the interests of consumers. The framework would enable policies relating to payment and settlement systems to be efficiently implemented by the central bank. These policies would strengthen the payment systems as well as complement other initiatives taken by BNM in sub-

114. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

115. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

scribing to a more-supervised market approach. The framework would promote fair access and greater price transparency in the provision of retail services as well as encourage co-operation in the development of payment systems. In June 2000, BNM has launched its Internet banking guidelines for the banking industry, which sets among others, the requirement for security and transparency. In addition, when Malaysia launched the Multimedia Super Corridor (MSC) in 1996, the Government committed itself to laying down a legal framework for e-commerce and the Internet. The cyberlaws introduced that would instill confidence and encourage the public to conduct electronic transactions included the Computer Crimes Act 1997, the Digital Signature Act 1997 and the Communications and Multimedia Act 1998. In addition, the Government is enacting new laws including the Personal Data Protection Act and Electronic Transactions Act. [116]

6.2 Payment System Oversight

Recognising the importance of safe and efficient payment and settlement systems in fostering economic and financial stability, many SEACEN-member countries have either formed or expressed their intentions to form specialised government or private institutions to oversee the payment and settlement systems in the country. Among the SEACEN-member countries, Malaysia established the National Payment Advisory Council (NPAC) in May 2001. The BNM chairs the body and the members consist of associations of banking institutions, association of insurers, regulator of securities industry, government agencies, MEPS and international representatives. The objectives of NPAC include the following: to act as a reference body and provide advisory function in matters relating to the payment systems in the country; and to act as a body to provide market input in developing payment systems policies aimed at promoting efficiency, while ensuring the stability and integrity of the financial system.[117] While Thailand had recently taken the initiative to establish the Payment Systems Board (PSB) which is primarily tasked to make sure that the systems infrastructure for payments and settlements are safe and sound, and to effectively serve the needs of both private businesses and public institutions.[118]

116. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

117. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

118. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

6.3 Innovations

6.3.1 Upgrading of the Present System into an RTGS System and DvP for Securities Transactions

In recent years, many SEACEN-member countries have decided to introduce real-time gross settlement (RTGS) systems for large-value interbank funds transfers. This move was in response to the growing awareness of the need for sound risk management in large-value funds transfer system. Among the important benefits that an RTGS systems can offer are: it can serve as a powerful mechanism for limiting settlement and systemic risk in the interbank settlement process, since, it can effect final settlement of individual funds transfer on a continuous basis during the processing day and contribute to the reduction of settlement risk in securities and foreign exchange transactions by providing a basis for delivery-versus-payment (DvP) or payment-versus-payment (PvP) mechanisms.[119]

On November 17, 2000, the BI of Indonesia implemented the BI-RTGS. The BI-RTGS employs a netting scheme system and can process the following transactions: inter-bank transactions, rupiah transactions for foreign exchange settlements, government's account for its delivery and withdrawal transactions, and inter-consumer transactions. The BI-RTGS system also gives way to the integration and centralisation of its 12 branch accounts. Moreover, BI is also developing a DvP system in its BI-RTGS for the securities settlement both in the Stock Exchange and government securities.[120]

The Bank of Korea's RTGS system, named The Bank of Korea Financial Wire Network or BOK-Wire, was put into operation in mid-December 1994. BOK-Wire is an on-line network, which interconnects the central bank with financial institutions. Through BOK-Wire, large-value funds transfers among these institutions are electronically executed and settled through their current accounts held with the BOK. In addition, the Bank of Korea, in order to implement the CPSS/IOSCO's recommendations for securities settlement systems, will explore the possibility of DvP settlement for on-the-floor traded stocks through BOK-Wire this year.[121]

119. CPSS, "Real-Time Gross Settlement Systems," BIS, Basle, March 1997.

120. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

121. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

BNM introduced the RENTAS system to replace the existing SPEEDS system for interbank payment and scripless securities on 24 July 1999. The RENTAS System is a real time gross settlement system (RTGS) for the transfer and settlement of high value ringgit denominated interbank funds and scripless securities transactions. RENTAS System will enable payment instructions between the participants of the system to be processed and settled individually and continuously throughout the working day. All settled transactions are considered as final and irrevocable. Thus, the receiver is able to use the funds immediately without being exposed to the risk of the funds not being settled. This is in contrast to the existing SPEEDS, which is a deferred net settlement system, where payments are processed throughout the working day, but the actual entries across the books of BNM are only effect at the end of the day. The RENTAS System also contributes to the reduction of settlement risk in scripless securities transactions by providing a mechanism for DvP. This mechanism enables transfer instructions for both scripless securities and funds to be effected on a trade-by-trade basis, with final (unconditional) transfer of the securities from the seller to the buyer (delivery) occurring at the same time as the final transfer of the funds from the buyer to the seller (payment). Besides reducing the settlement risk for interbank funds transfers, the RENTAS System can help to reduce the risks in exchange for value settlement systems such as those for securities settlements. With the introduction of the RENTAS System, Malaysia becomes the seventh in Asia and 29th country in the world to introduce an RTGS System for interbank payments and securities transactions. The present settlement system of the Malaysian Stock Exchange, KLSE, complies with internationally accepted practices where DvP is employed as the method of clearing, delivery and settlement for all securities transactions. The DvP environment was further enhanced by the implementation of the Institutional Settlement Service (ISS) for direct business transactions in July 2001. The ISS for on-market transactions was first introduced in July 1999 to enable eligible financial institutions to clear and settle securities transactions on behalf of their institutional clients directly with SCANS and achieve DvP. Since the introduction of ISS, the clearing and settlement of on-market transactions for institutional investors have been enhanced significantly. ISS reduces the settlement risk exposure of institutional investors whilst enhancing the DvP environment in line with international settlement best practices and requirements. The implementation of ISS for direct business transaction is indeed a significant step in ensuring local and foreign institutional investors continue to have access to a secure and efficient clearing and settlement system. The KLSE has also successfully shortened the settlement period from T+5 to T+3 in December 2000, standardising the local settlement time frame with that of internationally

accepted G30 standard of final settlement of T+3. A central guarantee fund for SCANS was established in 2001 to provide the necessary resources for fulfilling its clearing and settlement obligations in the event of a default or collapse of a trading clearing member.[122]

In 1999, a new clearing regulation took effect in Mongolia, which requires all payments to be made through the commercial banks' head quarters in the capital in Mongolia. All 12 banks in Mongolia are clearing participants and hold their current accounts at the BOM. The system clears both retail and large value payments and is often considered a gross settlement system. However, it can be called a hybrid system, having the elements of both gross and net settlement, since current accounts are updated only at the end of the day when single net credit or debit position in each clearing bank's temporary account is transferred to its current account.[123]

Similarly, MIPS was enhanced to MIPS2 in April 2001 in the Philippines. The System also uses a gross settlement system where the processing and settlement of fund transfer instructions and scripless securities transactions take place simultaneously. It also provides intra-day finality for individual transfers and eliminates end-of-day net settlement process.[124]

On July 13, 1998, MAS launched MAS Electronic Payment System (MEPS). It also uses a real-time gross settlement system for Singapore dollar high value interbank fund transfer and DvP settlement of scripless for Singapore Government Securities. As of December 31, 2000, there were 136 banks participating in MEPS, of which, 91 banks were direct participants. [125]

The CBSL is currently in the process of upgrading the financial system infrastructure with the assistance of the World Bank. It involves the development and implementation of an integrated Payment and Settlement System consisting of (a) a Real Time Gross Settlement System (RTGS) for large value and other

122. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

123. Ayush, T., Economist, Accounting and Automatisation Department, The Bank of Mongolia, "The Payment and Settlement Systems in Mongolia," August 2001.

124. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

125. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

critical fund transfers and (b) setting up of a scripless central depository and settlement system for scripless government debt securities and its integration with RTGS to facilitate Delivery versus Payment (DvP). Participants of the RTGS would be commercial banks, primary dealers and any other institutions approved by the CBSL.[126]

The CBC in Taiwan has also engaged in the reconstruction of its CBC-Wire since 1997. Among the aims of the reconstruction are to implement an RTGS system and develop DvP for securities settlement.[127]

In Thailand, BAHTNET commenced operations in May 1995. It also employs a gross settlement system in which processing and settlement of fund transfer instructions and scripless securities transactions take place simultaneously. Since March 2000, most of the large value transfers (i.e., those over 10 million baht) were processed through BAHTNET.[128]

6.3.2 Merger, Integration, and Linkage of System Networks

In recent years, one of the most interesting developments in the payment and settlement system in the SEACEN-member countries is the merger, integration, and linkage of system networks. For the mutual benefit of the system operators, cooperation in developing shared payment and settlement systems has intensified in recent years. The primary motivations for this move were cost saving, service efficiency and safety in operating the payment and settlement system. Among the member countries, The Korea Financial Telecommunications and Clearing Institute (KFTC), the clearing center in Korea, is developing a new shared network system for electronic banking to process interbank fund transfers and to exchange financial information through pc banking, telebanking and internet banking. This move was made to enlarge and reorganise the existing network, the Automatic Response Service (ARS)

126. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

127. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

128. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

System. The new network system will be operated 24 hours a day, 7 days a week[129] and is expected to start operation in the middle of April 2001.[130]

MEPS, since its establishment in 1997, had initiated several projects to facilitate the sharing of payment systems infrastructure among its member banks. The Nationwide Payment and Clearing System (NPCS) implemented in June 1999 provided a backbone infrastructure for the switching, clearing and settlement for shared ATM, interbank GIRO, EFTPOS services, payment EDI, and credit, debit and e-cash transactions. The NPCS system will encourage the usage of electronic –based payment mechanisms and improve the clearing of miscellaneous banking transactions, which are small in value but large in terms of volume. The system provides various benefits to the banking system as well as the banking public, in terms of paperwork, processing cost and speed. In addition, MEPS had also developed an e-commerce payment gateway to process card-based payments for its member banks. E-commerce payment gateway is able to handle both SET and SSL protocols. It facilitates electronic commerce since its open network architecture enables it to be interfaced with other networks, including the Internet. There are also plans in BNM to further integrate the various domestic payment systems in Malaysia including interfacing the real time gross settlement with the securities settlement system to increase the efficiency of securities settlement as well as to reduce settlement risks.[131]

In Singapore, ACENET, a coalition of 4 local banks (OUB/UOBIKTB/OCBC), was launched on November 6, 2000.[132] ACENET will be marketing and managing ATM services for an integrated off-site ATM network. Its implementation will result to increased ATM access and improved range of services for customers, as well as cost savings through economies of scale for

129. At present, interbank funds transfers by means of pc communication, telephone and internet are carried out through shared Interbank Fund Transfer System (IFT) or shared CD/ATM System. Therefore, electronic banking was limited within the operation time of IFT or CD/ATM System.

130. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

131. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

132. Due to recent merger exercises, the 4 local banks have consolidated to just two (UOB and OCBC).

the participant banks. It will provide operational and technical services such as ATM cash replenishment, machine maintenance, upgrade of the network as well as the development of infrastructure and other ATM related services.[133]

Moreover, the CBC has approved the privatisation of the TCH to enhance its competitiveness with other private information service providers. Sixteen (16) local clearing systems will be linked together to a Nationwide Check Clearing Electronic Network. The linkage is expected to speed up the clearing process. A similar development occurred in Taiwan where the "Payment Credit Inquiry Network" was linked to the public Internet. A firewall-protected gateway is now in progress to make the payment credit inquiry system more convenient and available through the Internet and portable (cellular) telephones.[134]

6.3.3 Introduction and Proliferation of Smart Cards and E-Money

With the advent of the mergers and linkages of shared networks among the credit card companies, banks, ISP, and telecommunication companies, most of the SEACEN-member countries have witnessed the proliferation of Smart Cards and electronic money or e-money in recent years. A large number of e-money schemes have been introduced of which the common features are as follows: a value is stored electronically in a device such as an IC chip or a computer's hard drive. It is used as an instrument for general-purpose vehicle in making payments to different vendors. Value is usually transferred electronically from e-money storage vehicle to another, either at the point of sale or remotely and designed primarily for small-value payments. Hybrid e-money schemes are also emerging that can be used in both card-based and network-based system.

Since early 1996, K-CASH, a closed-loop card type and pan-bank e-money, has been developed by collaborative efforts of banks and credit card companies in Korea. The development of standards to combine both contact and contactless features with K-CASH was completed in July 1999. As a result of this effort, the pilot project for K-CASH was launched in July 2000 in the Yoksam-dong area, in the southern part of Seoul. In the latter part of

133. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

134. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

this year, K-CASH will be used for payment in Seoul subway transportation. Two medium-sized cities, Choonchun and Soowon, have also plan to construct payment systems using K-CASH in 2001. In January 1998, Mondex card system, by Mondex Korea, a subsidiary company of MasterGard Corp, was introduced in Korea. The issuer is Kookmin Bank, one of the commercial banks operating nationwide, launched the project in June 2001. In September 2000, Mybi card by Pusan Bank was introduced, which can be used as a credit card as well as a direct debit card. In addition, the corporate purchasing card was introduced by the commercial banks in 1999. It is a special credit card used to purchase specific goods and services of member firms. It is also used as a substitute for promissory notes by the purchasing firms in concert with the banks.[135]

MEPS has introduced an e-purse scheme called MEPS Cash in September 1999 at selected suburbs in Kuala Lumpur. Another development was the introduction of Payment Multipurpose Card (PMPC). The PMPC will be introduced in January 2002, whereby MEPS will handle the development of the PMPC and provide a common platform and infrastructure for its implementation. In April 2001, Malaysia created history by becoming the world's first to launch a Government Multipurpose Card (GMPC) incorporating multiple applications. MyKad, which stores biometric data on an in-built computer chip, is the first national smart card scheme of its kind in the world. MyKad, which is compulsory for Malaysia's citizens, will be issued to 20 million Malaysians by 2007. MyKad integrates multiple Government applications (national identity card, driving license, immigration and medical information) and 3 non-Government applications (e-purse scheme 'MEPS Cash', ATM application and a digital signature application based on PKI) on a single technology platform. Since April 2001, 600,000 cards have been issued and the figure is expected to reach two million by next year. In addition, an electronic bill payment service via kiosks, which accept payments via Visa and MasterCard credit cards, ATM cards of participating banks and MyKad, was also introduced during the year. This service covers payment of utility bills as well as prepaid uploading.[136]

135. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

136. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

In Myanmar, on-line credit card system has been introduced recently.[137]

Since January 2000, commercial banks have been authorised to issue credit cards to any Nepalese and/ or foreign currency account holder under the prescribed terms and conditions in Nepal. Conditions such as the duration and expenditure limit can also be fixed by commercial banks. Previously, only foreign currency account holders were eligible to acquire such credit cards.[138]

The proliferation of smart cards was also extensive in the Philippines. Among these smart cards were the Visa Electron Card, which is a debit card, that functions like a credit card by allowing the user to pay for purchases and bills using the card. However, instead of providing the user with a credit line, the card enables him to readily draw from his existing account with his bank. Another smart card is the Mondex "electronic wallet", which can be used with the same application as a credit card. However, it can be reloaded with value, either through reloading stations in high-traffic areas, bank automated teller machines and branches, and the internet. The card can be loaded also with other applications such as transportation tickets, loyalty programs, and identification information. In addition, the PLDT e-purse or VISA Cash Card was also introduced in the country. It is a stored value card that is likewise reloadable. It can be used to make phone calls at PLDT's payphones, to pay for purchases at the local department store, and food corporation's fast-food chain store. Users of the cash card may load value into the card either by debiting an amount from their bank accounts or over-the-counter, in identified reloading centers. Smart Money was launched recently. It is a smart card with magnetic-strip-based electronic purse that allows the cardholder to reload cash value into their cards through Smart-designated reloading centers. Reloading of cash value can also be done via mobile phones and GSM network.[139]

In Singapore, several new applications were introduced during the year including the use of CashCard for payment at car parks and vending machines and payment of toll and Vehicle Entry Permit charges at the checkpoints

137. Maw, K.T., Research Officer, Research and Training Department, , "The Payment and Settlement Systems in Myanmer," August 2001.

138. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

139. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

between Singapore and Malaysia. Internet and mobile phone top-up services were also introduced to increase the revaluation channels, which include ATMS, self-service kiosks, HomeNETS and selected petrol stations. Trials for the use of CashCard for payment of taxi fares commenced in November 2000 with the installation of terminals or devices that can accept payments via the CashCard, credit card and ComfortCharge card. This cashless payment mode would be embraced by Comfort's 10,000 cab-fleet over a 6-year period. With the incorporation of Visa's stored value mark, Visa Cash and the adoption of the open and non-proprietary Common Electronic Purse Specifications (CEPS), CashCard holders will also be provided with the added convenience of using the card to consummate overseas transactions in the near future.[140]

Currently, there are two multipurpose electronic money schemes, the E-money and e-purse by C.P. Seven Eleven that were initiated by the private sector in the development of electronic money and the use of smart card technology in Thailand. The BOT, in cooperation with Technology Center and other electronic and computer technology centers and private sector organisations, has determined the standards for the smart cards.[141]

6.3.4 Internet, Virtual, On-line/Real-time, E-Banking

Normally, financial institutions are centrally involved as payment service providers in smart card and internet payments. In some of the G-10 countries, however, the use of an open network delivery system involves other service providers, such as software licensers and internet service providers that work jointly with financial institutions. Moreover, in some of these countries, it may also be certification authorities-organisations that act as trusted third parties institutions to certify the identity of the counterparties in an e-commerce transactions; for example, by authenticating their digital signatures.[142]

In the SEACEN-member countries, Finatiq.com, the first true Internet-only bank in Singapore, was launched in April 2000. Touted as one of Asia's first true Internet-only bank, Finatiq.com plans to position itself as a trusted

140. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

141. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

142. CPSS, "Retail Payments In Selected Countries: A Comparative Study," BIS, Basle, September 1999.

third party, providing consumers with one-stop access to a whole suite of financial products and services. In addition, the Internet Banking Policy, introduced on July 19, 2000, indicates that MAS is prepared to grant new banking licenses for Singapore-incorporated banks to set up separate banking subsidiaries to pursue new business models (including internet-only bank).[143]

To govern the provision of banking products and services over the Internet, BNM issued the "Minimum Guidelines on the Provision of Internet Banking Services by Licensed Banking Institutions" in June 2000. Under the Guidelines, the Board of Directors and senior management of the banking institutions are entrusted with the responsibility of ensuring the feasibility, safety and integrity of the Internet banking activities that would pose risk of serious loss to depositors. The Guidelines include requiring banking institutions to put in place an effective and comprehensive risk management framework, Internet banking security policies, safeguards and administrative requirements for outsourcing, advertisements, web link arrangements, strategic alliances or partnerships, human resource requirements including training programmes, proactive consumer protection programmes and a Client Charter on Internet banking. Banking institutions are free to adopt more stringent measures and are expected to keep abreast not only with technological developments but also the needs of their customers. During the year, a total of eight domestic banks launched transactional Internet banking services. Virtually all of the banks that offer electronic services allow customers to perform account balance inquiries and statement request, request for stop cheque payments and new cheque books, remit payments and transfer funds among accounts and have access up-to-date information. More sophisticated systems allow customers to apply for loans and perform online share trading.[144]

The Philippine Stock Exchange (PSE) has recently permitted the country's first true Internet startup, Diversified Financial Network (DFNN), to float an initial public offering. DFNN, which is a Website that offers financial information, online banking, and stock trading, is scheduled to go public this year.[145]

143. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

144. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

145. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

6.3.5 E-Legal Tender

Recently, the Board of Commissioners of Currency, Singapore (BCCS) has announced its intention to issue Electronic Legal Tender (ELT) in the year 2008. ELT refers to today's currency notes and coins in electronic form, which serve the same functions.[146]

6.3.6 Electronic or E-Cheque

The CPSS defines Electronic cheques as payment instruments, which are prepared by either the purchaser or the merchant for the purchaser's payment authorisation. Once authorised, the purchaser may route the payment online through its own financial institution to the merchant (as with a credit transfer) or transmit the authorisation back to the merchant for collection through its financial institution (as with a debit transfer).[147]

In Taiwan, the government authority has approved the project on the research and development of electronic cheques as well as the Certificate Authority (CA) also known as the Trusted Third Party (TTP). It is expected that the electronic cheque will save cost and will be more efficient than the current physical cheque.[148]

6.3.7 Electronic System for B2B and B2C

The BOK is currently developing an electronic payment system for B2B and B2C e-commerce. This system offers on-line payment services for B2B e-commerce by linking purchasing and vending companies, banks, clearing centers and certification authorities, and allows processing of interbank settlement transactions. The payment methods available in this system are on-line remittance, corporate procurement loan, corporate purchasing card, and loans against securities. Its launching is scheduled in September of this year. Furthermore, in response to the growing e-commerce transactions, Payment Gateway system was introduced in October 2000 to act as an intermediary

146. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

147. Source: CPSS, "Retail Payments In Selected Countries: A Comparative Study," BIS, Basle, September 1999.

148. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

between the seller and buyer. It is connected to an existing ARS system, which facilitates the debiting of the amounts from the account of the buyer on the same day while crediting the account of the seller on the following business day.[149]

To address the problems posed by the use of promissory notes, which had been widely used as payment and credit instruments by buyers of goods and services in the domestic market in Korea, the BOK introduced the Corporate Procurement Loan System in January 2000. Under this system, a seller issues a bill of exchange drawn on a buyer instead of receiving a promissory note after delivery of goods and sends it for collection. The buyer's bank will pay the buyer, who will settle the bill of exchange with the loan, while the seller will receive the cash shortly after the fund settlement between the banks.[150]

6.3.8. Upgrading of the Present Systems into a Safer, More Efficient, and Cost Effective System

Other recent initiatives taken by many SEACEN-member countries were to further develop their payment systems for a safer and more efficient consummation of payment and settlement transactions. These initiatives were made in response to demands for a more speedy and reliable system as the volume and value of payment transactions were rapidly increasing mostly in the capital cities and immediate environs as a result of the growth in the number of financial market activities in relation to GDP. The following are some of the initiatives taken by the member banks to further make their present payment systems into a safer, more efficient, and cost effective.

6.3.8.1 Cheque Truncation

The Bank of Korea had introduced cheque truncation for cashier's cheques and paper-based giro of four large public utility companies in May and July 2000. With the cheque truncation system, the process of collection of cheques and bills is completed through the exchange of digital data without the actual transport of physical items.[151]

149. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

150. Ibid.

151. Ibid.

The banking industry in Singapore, in conjunction with the Singapore Clearing House Association and the Association of Banks in Singapore, is also developing a Cheque Truncation System targeted for implementation in 2002. Cheque truncation is a clearing system whereby the electronic images of cheques are captured at the point of deposit and transmitted for verification throughout the entire clearing process. Movement of paper cheques between the Automated Clearing House (ACH) and banks will therefore be eliminated, improving the efficiency of the cheque clearing cycle. It is also anticipated that on top of Singapore dollar cheques, US dollar denominated cheques will also go through the Cheque Truncation System.[152]

Optical image process will be used in cheque truncation in Taiwan to reduce the burden of physical delivery of cheques and bills.[153]

In Thailand, the BOT is in its early stage of implementing image technology to the banking industry for cheque truncation. In spite of the obstacles in the communication systems and law of the land, some medium and large sized banks in Thailand have started to adopt the image technology.[154]

6.3.8.2 Electronic, Automated Interbank Clearing System

BI is planning to enhance the process of payment and settlement transactions in SKEJ into pure electronic in the near future. It will also upgrade the reader/sorter machine in its Medan branch into an image basis system by the end of 2001. The upgrade was made in anticipation of an increase in the volume of items for clearing in the city. Moreover, the volume of notes in its Bandung branch had recently increased significantly to the extent that the local semi-automated clearing system could not cope up with the demand. This led BI to upgrade its present clearing system to one that is fully automated. BI also plans to install a special clearing for bulk transactions by the year-end 2001 to cope up with the significant increase in volume of bulk transaction payments, which affected the efficiency of reader sorter machines and, in turn, slowed down settlements. The process will be paperless wherein

152. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

153. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

154. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

banks will deliver pre-prepared diskettes/magnetic tapes containing information of bulk payments for settlement.[155]

In Malaysia, BNM had implemented a system using imaging technology for cheque clearing in the Central, Northern and Southern areas, since November 1997. The system, SPICK, is a combination of the automated cheque clearing system with the imaging of inward cheques for purposes of examination and verification of signatures by the Head Office and respective Regional Offices of the paying banks. Data on the inward cheques (the MICR line) are transmitted to the paying banks, followed by images of the cheques in CD format. The benefit is that the banks are able to process and verify the cheques based on the data and CDs received, without having to use the physical cheques. The objectives of SPICK include providing same day clearing for local cheques, extending the coverage of the local zone, reducing the day-hold of outstation cheques to a maximum of five days and reducing the handling and movement of physical cheques. BNM is planning to improve its cheque clearing services in the non-SPICK areas that is the states in the East Coast and East Malaysia. The viability of adopting cheque truncation to reduce the number of day-holds in these areas is being assessed. [156]

In the Philippines, the government is currently laying the groundwork for the setting up of a clearing and settlement house that would facilitate foreign investments in debt instruments. Expected to be in place by next year, this clearing house will help reduce risks in non-delivery. It is also envisioned to allow government securities dealers to link up with international clearing houses such as Cedel and Euroclear. It will transform the settlement system to one, which requires payment upon delivery of the instruments from the present book-entry system where no physical delivery takes place.[157]

In Thailand, T+1 day clearing process was aimed for all the local clearing houses in the country starting September 1997. The objective of this project, which was completed in November 2000, is to increase the efficiency of the provincial cheque clearing system, to reduce costs and the associated

155. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

156. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

157. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

risks, and to facilitate cash management for banks. Moreover, the BOT is also planning for a maximum 6-working days clearing for provincial bill for collection (B/C) procedures. In March 1999, the BOT started to issue the BOT Regulation on Reporting the Result of Provincial Bill for Collection to member banks. Under this regulation, banks must report the result of the collection for provincial B/C within 6 working days.[158]

6.3.8.3 Electronic and E-Giro System

In Korea, the KFTC developed and started to operate the electronic giro system in May 2000 and many companies including large utility corporations are now using this system. Under this new system, the payee sends a list of payments to the KFTC, and the KFTC notifies the payer of the payments requested by the payee through e-mail. The payer approves the payments and pays them through the Internet or the payer's bank withdraws automatically the payments from the payer's account. Then, the KFTC confirms the settlement amount of the payer's bank and the payee's bank, and sends netting settlement statement to the Bank of Korea.[159]

Interbank GIRO (IBG) services was launched in April 2000 in Malaysia. Currently, 11 financial institutions participate in the system. The service involves a daily exchange of digitised transactions through MEPS IBG system, allowing financial institutions to transmit payment instead of using the conventional bank drafts and cheques. This will reduce the time needed to credit the amount to a consumer's account, especially an outstation account and there will be no more extra paper work and cheques to process. MEPS is planning to enhance its IBG system to a web-enabled system to facilitate e-commerce.[160]

The ACH in Singapore has enhanced the existing GIRO system to a browser-based E-GIRO system in July 2001. The new system eliminates manual delivery of magnetic tapes between the participating banks and ACH. Participants can send and receive GIRO items, including returned and rejected items, electronically via a secured communication network. With E-

158. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

159. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

160. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

GIRO, clearing cycles for the direct credit and debit transactions could be shortened significantly.[161]

Similarly, an Inter-Bank Giro Services was also introduced in Taiwan recently. The system involves direct debit and credit of media fund transfer for business transactions.[162]

6.3.8.4 Electronic Funds Transfer at Point of Sale (EFTPOS)

MEPS has implemented a switching network for domestic debit card schemes. With this service, ATM cardholders of participating banks would be able to pay for purchases using their payment cards at participating merchants regardless of the acquiring bank through MEPS. MEPS will provide the central switching system to support the interbank debit ePOS transactions between the participating issuing and acquiring banks. Debit ePOS is not entirely new in Malaysia. Some banks are already offering such a service to their ATM cardholders on a proprietary basis whereby cardholders are only able to conduct debit transactions at merchants acquired by their respective banks. Debit ePOS is ideal for payments at retail outlets such as supermarkets, department stores, convenience stores and petrol stations as well as for paying utility bills. In addition, the introduction of MEPS Cash will provide a wider alternative for ePOS transactions.[163]

6.3.8.5 Financial EDI for Cashier Cheque

One of the major developments in paper-based payment system in Thailand is the development of Financial EDI to substitute the cashier cheque payments used for customs duty payments. Under this system, banks will be connected to the TradeSiam EDI VAN, which are composed of 7 propriety Trader EDI VANs and the Customs Department. Interbank transactions, however, are processed through the BATHNET.[164]

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161. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

162. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

163. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

164. Leelawankulsiri, T., Team Executive, Payment System Group, Bank of Thailand, "The Payment and Settlement Systems in the Thailand," August 2001.

In Malaysia, Dagang Net Technologies Sdn. Bhd. (DNT), a service provider, handles some 48 million electronic transactions annually and RM4.7 billion customs duty payment since 1996. In order to improve the efficiency of customs duty payment, DNT implemented Electronic Multi-Payment Gateway (e-MPAG) for the transmission of EDI messages for payment processes. Under the system, agents are able to make one single payment of customs duty for the release of multiple consignments. Supported by nine local banks, customs duty payments are made electronically via the e-MPAG through the use of smart cards and other security devices between the forwarding agents and participating banks.[165]

6.3.8.6 Web Infrastructures on the RTGS System

The BOT provides a web-based service access to BATHNET/2 for participants who are not SWIFT members in Thailand. It also provides services, via the BOT Web Portal, such as inquiry on account balances and movements, queue management, messages communication, and reports. To protect the transactions, the following security measures were installed: a) digital signature, b) message encryption, c) smart card and password, d) asymmetric PKI (Public Key Infrastructure), and e) vulnerabilities to be assessed by outside firm.[166]

6.3.8.7 Other Developments

The BI is currently developing the Remote Access Information System (RAIS) for all banks in Jakarta and several big cities in Indonesia. With RAIS, BI will broadcast all payment system information such as detail balances of clearing result, circular letter, up date bank code, etc. Banks could download all information data provided by Bank Indonesia with on line mode using telephone line (modem) and web browser application. Moreover, BI-Head Office and BI-Branches are currently maintaining settlement accounts of banks operating within and outside the region. This led to cash/liquidity problems in the system due to floats or money in transit. In response to the problem, BI is centralising all settlement accounts of banks in the RTGS.[167]

165. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

166. Ibid.

167. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

With the Centralised Settlement Accounts (CSA), BI-Branches need not maintain settlement accounts at their Accounting Systems.[168]

In November 1997, the KLACH[169] system was enhanced to SPICK system. Under the SPICK system, cheques drawn will be deposited by the payee to his bank for collection. The collecting banks will forward the cheques, by batches, to the BNM clearing houses for clearing. At the clearing houses, cheques will be sorted by paying banks and proper accounting entries will be effected. The data and images of cheque will be captured and forwarded to the paying banks that will verify and honor it.[170]

On the other hand, the CBM of Myanmar has taken stringent measures for the banks to conform to prudential regulations in order to ensure the financial system stability coupled with the development of payment systems. A comprehensive system of reporting is in place for verifying the bank's compliance with reserve, minimum liquidity, capital adequacy and loan provisioning requirements.[171]

In the urban areas in Nepal, most of the commercial banks operations are now computerised, while eight commercial banks have taken membership with the Swift system. Other banks have been encouraged to introduce modern technology to cope up with the developments in their neighbouring countries.[172]

168. The centralised system will also eliminate the need to use two systems in implementing inter-bank payment settlements, through its built-in system called Sistem Antar-Kantor Terotomasi dan Terintegrasi (SAKTI).

169. The KLACH system processes cheques and other clearing items such as Bankers Acceptances, cashier's orders, demand drafts, interest warrants, pension warrants, drawing vouchers and ringgit traveler's' cheques. Under the automated clearing system, commercial banks in the KLACH zone send to KLACH their daily collections of cheques and other clearing items. At KLACH, the cheques are proved and the amounts are MICR encoded (if they have not been already done). This mode of clearing enables all cheques received to be processed on the same day.

170. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

171. Maw, K.T., Research Officer, Research and Training Department, , "The Payment and Settlement Systems in Myanmar," August 2001.

172. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

Led by the CBSL, preliminary work to set up in-house Scripless Securities Trading System (SSTS) and an Electronic Fund Transfer (EFT) system for large value inter-bank fund transfers have already started in Sri Lanka. The SSTS, inclusive of the Central Depository System (CDS), has been developed for the use of primary auctions of government debt securities. Moreover, the head office of all commercial banks operating in Sri Lanka have recently been connected through a Wide Area Network (WAN) to the current account system of the CBSL through its main computer system. This is in line with the proposed Electronic Fund Transfer (EFT) system, which will be operational in the near future.[173]

In the foreign exchange market in the Philippines, the BAP and the BSP are currently considering to extend the current PDS trading to two other competing service providers, namely the Bloomberg and Reuters. These will improve information retrieval, price discovery and the capacity to obtain a fair value for the traded currency for participating banks. Also, by opening up the system to other service providers, information about currency and exchange rate movements will become available to a broader base of foreign banks and commercial clients.[174]

Lastly, more than half of the cheques issued in Taiwan are postdated and are drawn on other banks while banks maintain custody of these postdated cheques. To save cost and improve efficiency in clearing said cheques, it is planned that the TCH will act as the centralised custodian for the said cheques.[175]

173. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

174. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

175. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

Chapter IV

IMPLICATIONS OF THE PAYMENT AND SETTLEMENT SYSTEMS ON CENTRAL BANK FUNCTIONS AND ON MONETARY AND FINANCIAL STABILITY

Central banks have a wide range of monetary policy instruments that could be used in the conduct of monetary policies. Among the major monetary policy instruments that are being used are the Open Market Operations (OMO), Reserve Requirement (RR), and the Discount Window.[176] OMO and the changes in RR, as well as the discount rate affect the availability and cost of reserves to the banking system. These instruments do not attempt, however, to affect the purpose for which banks had put their funds. By using these powers, central banks seek to have total control over money supply and credit and the general level of interest rates.[177]

Payment system affects the efficiency and effectiveness of the functions of financial markets.[178] The instruments available for making payments, the clearing and settlement facilities to which financial market participants have access all have important implications to the functions of the financial markets. These instruments and facilities together with the institutional and organisational rules and procedures governing them greatly influence the speed, financial risks, reliability, and costs involved when financial market participants make payments.[179]

The payment system also affects the demand for and supply of central bank reserves. The size of the reserve buffers that banks demand in aggregate at given interest rates depends on the size and variability, more strictly speaking, the predictability of the daily flows between the banks as a group and central bank, as well as the flows between individual banks.

176. Other monetary policy instruments that are widely used by the central banks are selective credit controls, margin requirements, foreign exchange operations, and moral suasion.

177. Horvitz, P.M., Ward, R.A., Monetary Policy and the Financial System, Fifth Edition,

178. Please refer to Chapter II under 1.3.1 for the explanations on the relationship of the payment system to the money supply, and monetary policy.

179. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998.

Related to the latter aspect, the size of the buffer will also depend on the efficiency of market mechanisms for reallocating reserves between surplus and deficit banks. The desired size of the reserve buffer also depends on the institutional details of the payment systems, including the technology of payments and settlements.[180]

Recognising the importance of safe and efficient payment and settlement systems in the smooth and effective conduct of monetary policies to foster financial stability, many SEACEN-member countries have undergone changes and reforms in their payment and settlement systems in recent years. The following are the testimonial evidences of the implications of the payment and settlement systems on the central bank functions governing monetary and financial stability in the SEACEN region:

1. Shorter Lag of Information on Bank's and Domestic Liquidity

In Indonesia, the BI-RTGS system allows settlement of payments almost instantaneously with the transactions made which enables banks to accurately monitor and estimate their exposures to liquidity arising from lags or delay in information. It also produces a more accurate and timely information on banks' liquidity position, which helps monetary authorities to assess broad monetary movements, implement measures and gauge the impact of such measures within a shorter period of time.[181]

Similarly, the establishment of BOK-Wire in Korea enables BOK to monitor the bank's flows and position of funds more quickly and accurately.[182]

In Malaysia, the RENTAS system permits inquiry of positions by BNM and financial institutions. Participants of RENTAS are allowed to monitor, in real-time, incoming and outgoing payments. The introduction of RTGS will demand active intraday liquidity management. Banks and their cus-

180. Ibid.

181. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia "The Payment and Settlement Systems in Indonesia," August 2001.

182. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

tomers will give greater attention to the scheduling of their payments and the control of intra-day credit exposures.[183]

In the Philippines, the BSP enters into repurchase (RP) or reverse repurchase (RRP) agreements with banks, and in the purchase/sale of government securities in the conduct of open market operations (OMO). BSP's borrowings and lendings are thus, settled through direct debits/credits against banks' demand deposit accounts (DDAs), while interbank transactions are settled in the same day using the MIPS. In turn, this system has enhanced the efficiency in managing DDAs of banks due to the shortened lag in the flow of information on DDA balances. MIPS allows the settlement of payments almost instantaneously with the transactions made thus, enabling banks to accurately monitor and comply with their reserve requirements as well as to estimate their liquidity position.[184]

In Singapore, MEPS allows transactions to be settled on a gross, instantaneous and irrevocable basis across settlement accounts with MAS. It provides real-time information/data on liquidity flows resulting from the myriad of transactions in the interbank money market.[185]

While in Sri Lanka, the monetary policy framework targets broad money, while using reserve money as an intermediate target. Hence, it is imperative that information on these variables be obtained at least with a one-day time lag otherwise the whole targeting framework would fall apart. The existing payment system delivers said information with one-day time lag thus helps the CBSL in the accurate assessment of market liquidity.[186]

183. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

184. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

185. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

186. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

2. Credit Risk Control

All large value transfers were shifted to BI-RTGS in Indonesia. The system offers a DvP[187] facility and thus reduces significantly the risk of non-delivery of securities and non-settlement of transactions at the same time. The credit risks that used to come from floats were reduced substantially.[188] Similarly, RENTAS in Malaysia consists of two sub-systems, namely: IFTS and SSTS. The securities transactions are conducted through the SSTS, which also offers a DvP facility. BATHNET/2 in Thailand also offers a DvP facility.

In the Philippines, the BSP plays an active role in the purchase and sale of government securities for its own account. Transfers of securities are recorded under the ROSS system. This system facilitates the trading of government securities under a DvP scheme on RTGS basis. In its rediscounting operations, proceeds of loans are directly credited to borrowers' DDAs while corresponding loan payments are immediately debited against the said accounts. Thus, this system also reduces the risk of non-delivery of securities for both the government and securities dealers.[189]

In Singapore, to resolve any systemic payments gridlock, MAS will extend intra-day funds through the primary dealer banks. All intra-day credit facilities extended must be collateralised with SGS. However, it may have implications on monetary conditions, e.g. "spill-over" to overnight credit. To limit this risk, repayment of intra-day credit is automatic within the same day in MEPS.[190]

187. Delivery-versus-payment (DvP) is a link between a securities transfer system and a funds transfer system that ensures the delivery occurs if, and on if, payment occurs.

188. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia "The Payment and Settlement Systems in Indonesia," August 2001.

189. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

190. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

3. Improved Accuracy and Precision of Measurement of Monetary Aggregates

With the implementation of BI-RTGS in Indonesia, the clearing time was significantly reduced from T+1 to. T+0 thus preventing the occurrence of large floats. This results to a more accurate measure of monetary aggregates, which helps the BI in coming up with more precise monetary policy decisions.[191]

The ability of RENTAS system in Malaysia to produce 'real-time' information on domestic liquidity helps BNM to accurately measure monetary aggregates, which will be used to formulate monetary policy.[192]

The payment and settlement systems in Mongolia provide the BOM with summary of information on a daily basis for use in the conduct of monetary policies. The system, however, can produce information for a shorter period of time when necessary.[193]

The quick and accurate recording of transactions, which is affected by the payment and settlement system, is one of the major areas of concern in the implementation of the monetary policy by the CBSL. In view of the fact that monetary aggregates are targets, it is extremely important that these values reflect current conditions. Delays and inefficiencies in the present payment and settlement system can distort these variables significantly. With the implementation of the proposed RTGS system, delays and inefficiencies would be reduced significantly, thus helping CBSL in the implementation of monetary policy with precision and accuracy.[194]

Similarly, with the automation of the payment and settlement system in the Philippines, the system produces a more accurate and timely information on the banks' liquidity position which, therefore, helps monetary au-

191. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia "The Payment and Settlement Systems in Indonesia," August 2001.

192. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

193. Ayush, T., Economist, Accounting and Automatisation Department, The Bank of Mongolia, "The Payment and Settlement Systems in Mongolia," August 2001.

194. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

thorities to assess broad monetary movements, implement measures and gauge the impact of such measures within a shorter period of time. Consequently, there is more accuracy and precision in the manner broad monetary aggregates such as reserve money RM), base money (BM) and domestic liquidity (M3) are being reported. This contributes to a more effective implementation of monetary policies.[195]

4. Pre-Warning Device

Recently, a system known as the Monetary and Financial Information System (MFIS) was incorporated into BOK-Wire. The MIFS gathers information from participating banks about bank loans and deposits, foreign exchange positions, required reserves, etc. on a real time basis. This new system, which replaced the previous mail and facsimile reporting system, helps the BOK to detect factors that could cause a disturbance in the economy because it shortens the recognition of lag in implementing the necessary measures.[196]

With the real-time information/data on liquidity flows provided by MEPS in Singapore, it enables MAS to identify any unusual behaviour that may impact on the smooth operation of the payments system. The MAS being acutely aware of the close linkage between the payment system and its monetary operations ensures that any changes to the payment system are pursued in a coordinated and complementary manner to monetary policy implementation processes.[197]

The new RTGS system in Taiwan, which the CBC acts as an operator and supervisor of the system, generates timely information, which are used as pre-warning signals by the CBC to watch and supervise the operation of the banks.[198]

195. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

196. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

197. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

198. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

Similarly, the payments and settlement system also provides the early warning signals for problem banks in Nepal. It was observed that two large commercial banks in Nepal, the Banijya Bank and Nepal Bank Limited, are facing problems now for not taking seriously the signals that emanated from the payments system. It was also pointed out that this is one of the reasons why these banks are in a mess currently.[199]

5. Faster Transmission and Implementation of Monetary Policies

The use of paperless payment instruments and the development of electronic payment systems did not only affect the pattern of settlement and the stock of money held by the private sector but also accelerated the transmission of monetary and credit policies in Korea. It was observed that the share of cash in M1 began to drop from the early 1980s when the Bank Giro System and in-house on-line systems were put into operations. This trend has been accelerated further when electronic funds transfer methods, such as the Interbank CD/ATM System and the IFT System, came into full use in 1990. The reduction in the share of cash in M1 could well increase the creation of deposit money.[200]

In Malaysia, RENTAS delivers fast and accurate transmission of information such as lending rates, credit availability and availability of government securities, which helps in the implementation of timely monetary policies by BNM.[201]

Similarly, it was observed in the Philippines that with the automation of the payment and settlement system, time lags between transactions had been significantly reduced, thus facilitating the transmission of monetary policy actions to the financial markets, which contributes to a more effective implementation of monetary policies.[202]

199. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

200. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

201. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

202. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

The transmission mechanism in Sri Lanka essentially moves from the CBSL's repo and reverse repo rate, to call market rates, to market liquidity, to changes in the lending rates and rates on government securities, to credit availability and finally to real variables. It was observed that the efficiency and effectiveness of this mechanism is vitally affected by the present payment and settlement system.[203]

In formulating monetary policies, the CBC is in general concerned with four categories: (1) instruments: referring to variables which are directly controllable by the monetary authorities; (2) indicators: providing preliminary information to the authority about the stance of policy; (3) targets: indicating an early signals about the outcome of economic goals; (4) goals: also meaning final targets, such as "full employment without inflation." The net position changes in the current accounts of banks maintained at the CBC can abstract some useful information about the balance situations, tight or loose, of banks as a whole or individually. The patterns of net position changes in current accounts might be a useful indicator for monetary policy reference.[204]

203. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

204. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

1. Summary and Conclusions

Central banks derive tremendous benefits from a successful maintenance of safe and efficient payment and settlement system. These benefits include: a more stable financial system, reduction of transaction costs, more efficient use of financial resources, improved financial market liquidity, and a more smooth and swift conduct of monetary policies.

There had been a growing recognition, in recent years, of the need to minimise, if not completely eliminate, the significant risks inherent of payment and settlement systems. While a majority of the SEACEN-member countries had responded by implementing reforms in their respective systems, others have not yet gone through the same process but expressed readiness in implementing the same reforms. Thus, an in-depth study on this subject was deemed timely and useful for the SEACEN central banks in their quest for the best possible payment system.

It was observed that in the evolution of payment system, governments seldom had specific policies for the overall development of payment systems and a few of them have enacted legislation specifically governing entries to the system, the relationships between the participants and their responsibilities for the well being of the system. Among the conditions and characteristics that largely determine the country's payment system are as follows: country size and population density, banking system concentration and interconnectedness, payment instrument legal structure and antitrust laws, crime rates and other cultural factors, risk and efficiency tradeoffs for different transactions and payment instruments (relative payment costs versus user requirements and needs).

The core principles for systemically important system described payment system as a set of instruments, procedures and rules for the transfer of funds among participants. It is typically based on agreements made between the system operators and the participants who may either be directly or indirectly involved with the system. The use of technical infrastructures or any other means by which the transfer of funds shall be effected forms part of the agreement.

A payment system must be tailor-made or especially designed to suit and satisfy the unique requirements of a particular country. However, it was observed that a number of common factors are known for their significant influences on the systems' success. These factors include speed, certainty, reliability, safety and security, convenience, and costs.

An efficient payment system is very important as it promotes economic activities, improves control of monetary aggregates, reduces transaction costs, increases velocity of the circulation of money, controls and hampers the growth of credit risks, develops financial sector, promotes security and reliability, creates new products, institutions, and develops new financial markets.

The concerns of the fundamental policies on payment systems are not so much focused on the risks posed by individual institutions or those confined to particular market segments, but rather the systemic type of risk, i.e, the possibility of failure on the part of participants to meet their contractual obligations which, in turn, may cause other participants to default resulting to a chain reaction causing broader scope of financial difficulties or damages. Payment and settlement systems, therefore, are potential key channels through which systemic crisis can intervene in the process of implementing payments and settlements between the different players or participants in the financial market. To prevent the occurrence of systemic type of risks, a number of risk management measures were designed as follows:

- Ensuring settlement finality within netting systems by establishing appropriate membership criteria, exposure limits, collateralisation and loss-sharing arrangements, and by shortening time lags in settlements (generally to achieve same-day settlement).
- Promoting, as feasible, real-time gross settlement (RTGS) systems.
- Economic pricing, collateralisation, and limits on central bank intraday credit.
- Requiring settlement in the books of the central bank by all clearing systems.
- Fostering international cooperation to reduce risks in cross-border payments.

The recent initiatives taken by many SEACEN-member countries were to further develop their payment systems, e.g. the introduction and inclusion of an RTGS system for LVTSs into the payment system for a safer

and more efficient consummation of payment and settlement transactions. These initiatives were made in response to demands for a more speedy and reliable system as the volume and value of payment transactions were rapidly increasing mostly in the capital cities and immediate environs as a result of the growth in the number of financial market activities in relation to GDP. In addition, many SEACEN-member countries are currently drafting the legal frameworks, rules, regulations, and policies that will govern the payment and settlement systems in their country. Moreover, many of these countries have already formed, or in the process of forming, or about to form specialised government or private institutions to oversee the payment and settlement systems in their respective places.

Survey evidence on the payment instruments used for payments shows that the SEACEN-member countries are moving towards a cash-less society as reflected by the significant growth in the use of non-cash payment instruments. However, these electronic products are still in their relatively early stage of development. Cheque remains the most widely used payment instrument in nine out of ten member countries in spite of the decrease in its popularity as a payment instrument. Cash still plays an important role as a payment instrument in many SEACEN-member countries. The magnitude of the payment instruments availability depends on the legal, business and technological environments found within and across the SEACEN-member countries while the current mix of the payment instruments largely depends on the historical developments within the domestic system.

As observed by the SEACEN-member countries, some of the implications of payment and settlement systems on the central functions affecting monetary and financial stability were as follows:

- Shorter lags of information on bank's and domestic liquidity.
- Credit risk control.
- Improved accuracy and precision of measurement on monetary aggregates.
- Serves as a pre-warning device.
- Faster transmission and implementation of monetary policies.

2. Recommendations

2.1 The Roles of Central Banks in the Payment and Settlement Systems

The maintenance of a safe and efficient system for handling payment and settlement transactions is one of the major concerns of central banks as part of their functions as regulatory and monetary authorities. These institutions play a very important role in the payment and settlement systems inasmuch as their liquid liabilities, more particularly their reserve balances are being used as instruments through which the bulk of domestic payment obligations are finally settled.[205] The central banks' involvement starts from designing and creating the system by formulating rules and regulations, setting up standards, and creating policies that will govern the nation's payment and settlement services. The central bank as the "lender of last resort" must have the means to monitor and oversee the activities of institutions participating in the payment system so they can make themselves immediately available for assistance and intervention whenever necessary. Given the central bank's roles and its special responsibility to avoid systemic risk, any large-value payment mechanism requires the central bank's particular attention.[206]

Another important component of the central bank's primary role is to create an organisational structure that will promote good interaction between domestic and external actors as well as a harmonious relationship between different functions and interests. This will be made possible with the establishment of central bank's national payments council (NPC), which shall be given the task of implementing some reforms in the existing payment systems. The NPC shall serve as a talking shop or venue for forum among commercial banks and their central banks to discuss and agree on the development of a harmonious relationship between interbank and intrabank payment systems, how to establish and oversee the functions of the national payment system and how to coordinate and align the central bank's and commercial banks' policies regarding payment systems. NPC will also serve as a channel to absorb external technical assistance.[207]

205. Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., "Payment Systems, Monetary Policy, and the Role of the Central bank," IMF, 1998, p. 35.

206. Listfield R., Negret F.M., "Modernising Payment Systems in Emerging Economies," World Bank Policy Research Working Paper 1336 (1994), pp. 13-17.

207. Ibid.

The following are the recommended roles, which the SEACEN member banks assume to ensure the safety and efficiency of the systems for payments and settlements.

2.1.1 Modernisation of Clearing House

The CBM and NRB should lead in the development of payment and settlement system in their respective country. As the private commercial banks payment and settlement transactions have increased significantly in recent years, the CBM and NRB need to consider the computerisation and increase of its clearing and settlement services to improve its present level of efficiency.[208] A similar recommendation applies for Indonesia wherein the BI implement interbank clearing activities among the clearing houses in the provinces and cities. This ensures a more accurate schedule of cross-city and cross-province payments, reduces operational costs, and paves the way for the implementation of a bulk interbank payment system that makes retail payments more efficient.[209]

In Sri Lanka, the CBSL must consider to form an on-line electronic fund transfer system to facilitate secured and timely settlement of large value payments. At present, large value fund transfers in this country are processed through paper-based instruments in which settlements are done on an end of day gross settlement basis. This procedure tends to increase exposures to elements of uncertainty or settlement risk as the participants will only know the final settlement of each transaction on the day immediately following the day the payments and settlements were made.[210]

2.1.2 Discourage Use of Paper-based Payment Instruments

For Korea, it is recommended that BOK discourage the use of paper-based payment instruments (e.g., cheques and promissory notes) and encour-

208. Maw, K.T., Research Officer, Research and Training Department and Adhikari, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

209. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

210. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

age, instead, the development of electronic payment instruments to minimise costs. Cheques and promissory notes are widely circulated through endorsements in Korea and, therefore, any default on the part of the original issuer can cause a domino effect to several other users involved in the transactions.[211]

2.1.3 Embrace Innovative and Efficient Delivery Channels

Malaysia's BNM is recommended to allow and encourage banking institutions to embrace more innovative and efficient delivery channels such as the Internet and mobile phones which are increasingly becoming essential parts of the modern banking system. At the same time, a set of minimum standards should be in place to ensure that such innovations will not compromise financial stability and integrity. [212]

2.1.4 Allow Foreign Bank to Setup Shared ATM Networks

It is recommended that BNM allow incumbent foreign banks to set up shared ATM networks. Currently, foreign banks in Malaysia individually manage a limited number of ATM machines. It is envisioned that the presence of more alternative ATM networks operated by foreign banks will attract further dynamism in the traditional payment networks and provide alternative payment channels for the consumers.[213]

2.1.5 Establish a Non-Profit Organisation Bank Card Centre

It is recommended that the CBM must consider establishing a BankCard Centre as non-profit organisation consisting of all card-issuing banks for more manageable and efficient card payments.[214]

211. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

212. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

213. Ibid.

214. Maw, K.T., Research Officer, Research and Training Department, "The Payment and Settlement Systems in Myanmar," August 2001.

2.1.6 Form an On-Line Electronic Fund Transfer

In Sri Lanka, the CBSL must consider to form an on-line electronic fund transfer system to facilitate secured and timely settlement of large value payments. At present, large value fund transfers in this country are processed through paper-based instruments in which settlements are done on an end of day gross settlement basis. This procedure tends to increase exposures to elements of uncertainty or settlement risk as the participants will only know the final settlement of each transaction on the day immediately following the day the payments and settlements were made.[215]

2.1.7 Reinforce the Conduct of a Basic Research

For Taiwan, it is recommended that the CBC reinforce the conduct of a basic research on the payment system taking into consideration the recent information technology boom which allowed the integration of front office with the back office into one system. It is important to note that the payment system should not be looked upon as a mere downstream of accounting paper work since it can act and play a more active role in the smooth implementation of monetary policies. [216]

2.1.8 Develop a Pre-Warning System

It is recommended that CBC develop a pre-warning system to closely monitor the operations and activities of the system for a timely diagnosis of any abnormal situation involving payment transfers, as well as to promote the status of current payment and settlement division through the expansion of its organisation and more involvement of personnel with specialised knowledge in information technology.[217]

2.1.9 Encourage Compliance with the Core Principles for Systemically Important Payment and Settlement Systems

A self-assessment of the MEPS against the Core Principles is currently being carried out to determine the level of compliance of MEPS in Singa-

215. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

216. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

217. Ibid.

pore. The MEPS is considered a systemically important payment system in Singapore and is owned and operated by the MAS. It is perceived that compliance with the Core Principles ensure that MEPS meets the current best practices of safety and efficiency. Thus it is recommended that MAS continue to work towards this objective for MEPS, and also apply the Core principles, or relevant aspects of it, to other payment systems with system-wide impact.[218] Similarly, it is also recommended that the BSP in the Philippines promote compliance with the Core Principles for all the SIPS in the country.[219]

It is recommended for Taiwan that CBC examine and assess the current payment and settlement system to determine whether it has complied with the Core Principles for Systemically Important Payment System as recommended by the CPSS/IOSCO. It is suggested further that CBC develop some concrete methodologies to realise compliance with the core principles.[220]

The CBSL is in the process of introducing an RTGS system for large value fund transfers that will overcome inefficiencies inherent in the existing payment and settlement system. In view of this development, it is recommended that CBSL ensure the compliance of the RTGS system with the Core Principles.[221]

2.1.10 Support Continuous Linked Settlement

Preparations for the inclusion of the Singapore dollar into the Continuous-Linked Settlement (CLS) initiative have already started in Singapore. This initiative will greatly reduce the settlement risks inherent in cross bor-

218. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

219. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

220. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

221. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

der currency trades by allowing trade settlement to take place on a payment-vs-payment (PvP) basis. It is recommended that MAS continue to facilitate and provide support wherever necessary for the successful and timely inclusion of the SGD as a CLS-currency.[222]

2.1.11 Management of Risks

For Korea, it is recommended that BOK exert more efforts to minimise the risks involved in the net settlement systems since these systems maintain an open position until their final settlement. In these systems, a single shortfall in liquidity can cause a temporary gridlock, which could escalate into an extreme case involving systemic risk. It is also recommended that the BOK try to reduce settlement risks arising from securities settlement and foreign exchange settlement, in coordination with the supervisory authorities.[223]

It was observed that, under the present payment and settlement system, the procedures for management of credit risk, liquidity risk, settlement risk and systematic risks associated with the payment/settlement system are not clearly defined in Sri Lanka. It is therefore recommended for CBSL to address the issue of risk management in the process of developing its safe and efficient payment system.[224]

In Indonesia, it is recommended that BI address the issues of failure to settle arrangements between participants in the clearing system to avoid moral hazard and reduce cost of funds in the interbank money market.[225]

2.1.12 Foster Regional Cooperation

The payment and settlement systems in the SEACEN-member countries have steadily evolved in reaction to increasing volumes and values of

222. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

223. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

224. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

225. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

transactions, technological progress, and a growing awareness of both the public and private institutions of the risk inherent in clearing settlement arrangements. A similar evolution, however, has not occurred in cross-border payments systems in the region, which still rely heavily on traditionally correspondent banking arrangement in spite of a considerable increase in the volume and value of transactions.

It is recommended in the Philippines that the BSP foster regional cooperation of payment system policy, especially in areas such as the legal framework, risk management policies in clearing and settlement systems, business hours, and certain standards and infrastructure. The mechanism of the regional cooperation can be set up in a such a way that those member countries with highly developed and well structured payment and settlement systems can help those member-countries with less developed systems for payment and settlement in terms of technical know how. Among the SEACEN-member countries, Singapore, Korea, and Taiwan can be considered as those the ones with highly developed payment and settlement systems. On the other hand, the payment and settlement systems in Malaysia, Thailand, Philippines, and Indonesia can be classified as moderately developed. The payment and settlement systems of the rest of the member-countries can be considered as less developed.

In addition, it is suggested that the CBC of Taiwan re-enforce international communications and cooperation by supervising cross-border fund transfer systems considering that the Internet revolution has changed the business mode towards global logistic and banking finance without frontier.[226]

2.1.13 Serve as an Oversight Body to Regulate, Administer and Facilitate Operations of the PSS

With the expansion of the banking system and the introduction of new technology, the Nepal Rastra Bank must take more responsibility in enhancing the effectiveness of the payment and settlement systems such that it becomes capable of timely monitoring the system in order to minimise settlement problems.[227]

226. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei "The Payment and Settlement Systems in Taiwan," August 2001.

227. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

Indonesia must take a similar course of action by introducing regulations on payment system oversight to ensure safe implementation of payments and settlements.[228]

The Philippines, on the other hand, must establish a national payment council (NPC) responsible for overseeing the implementation of payments and settlements in the country.[229]

A study on the need for a more formalised approach towards payment system oversight is in progress in Singapore. It is perceived that by formally legislating the MAS' objectives for and roles in the payment system, and publicly disclosing its major policies, it achieves the objectives under Responsibility A of the Core Principles.[230]

In Sri Lanka, the CBSL must establish an institutional and a regulatory framework to oversee or monitor the payment settlement systems and its compliance with the core principles that would be operated by other institutions or organisations to ensure the secured and efficient payments and settlements.[231]

With the rapid change in payment technology and structures of financial service industries in Malaysia, it is viewed that it would be more efficient and effective for the market forces to play the pivotal role in the development of the payment and settlement systems. This would allow greater competition and increase innovation in this area particularly in the retail payment systems, as well as drive competition to a greater height. Thus, it is recommended that BNM adopt a facilitative rather than a developmental role, especially in the retail payment systems without compromising the minimum-security standards. BNM, in its oversight of the payment systems, must also adopt a flexible, proactive and effective regulatory framework that seeks

228. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

229. Torreja, M.L. Jr., Visiting Research Economist, The SEACEN Research and Training Centre,' "The Payment and Settlement Systems in the Philippines," August 2001.

230. Chiun-Yi, J. L., Assistant Manager, Payment and Settlement Systems Division, Monetary Authority of Singapore, "The Payment and Settlement Systems in Singapore," August 2001.

231. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, "The Payment and Settlement Systems in Sri Lanka," August 2001.

to improve the efficiency of payment related infrastructures while maintaining its safety and integrity.[232]

In Korea, it was observed that the BOK's oversight role in the design and operation of the payment systems has become more important. Thus, BOK must coordinate its oversight and supervisory functions with those of the Financial Supervisory Commission and the Ministry of Finance and Economy.[233]

In Taiwan, it is recommended that CBC compile the relevant statistical data available on the payment and settlement system and use the same as reference for a better understanding and grasps of the real situation that will make it easier to discover hidden potentials, if any, for further developments on payment instruments, and easier to determine its impact on the existing monetary definition and transmission mechanism.[234]

2.1.14 Lead in the Creation of Rules and Regulations, Standards, Policies in the Nation's Payment and Settlement Systems

The financial environment in Nepal had developed significantly in recent years. The introduction of new instruments and services coupled with the use of modern means of payment system has made the financial market more complex and difficult to manage. In the absence of a special act, it has been difficult to efficiently conduct payment and settlement activities in the country. Thus, it is recommended that NRB come forward with a separate act to efficiently operate the payment and settlement system in the country.[235] Similarly, it is also recommended in Indonesia that BI promote the establishment of Electronic Fund Transfer Act to cover all electronic transactions.[236]

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232. Razak, A. A., Senior Executive, Payment System Department, Bank Negara Malaysia, "The Payment and Settlement Systems in Malaysia," August 2001.

233. Kim, Y., Head, Payment Systems Planning Team, Payment System & Treasury Service Department, The Bank of Korea, "The Payment and Settlement Systems in Korea," August 2001.

234. Chang, K. H., Senior Economist, Banking Department, The Central Bank of China, Taipei, "The Payment and Settlement Systems in Taiwan," August 2001.

235. Adhikary, J. P., Deputy Director, Foreign Exchange Department, Nepal Rastra Bank, "The Payment and Settlement Systems in Nepal," August 2001.

236. Setiawan. I., Analyst, National Payment System Development Bureau, Bank Indonesia, "The Payment and Settlement Systems in Indonesia," August 2001.

Moreover, one of the shortcomings identified in the present payment/ settlement system in Sri Lanka is the non-existence of a proper legal framework. It is therefore recommended that the CBSL take the initiative, in conjunction with other relevant ministries and institutions directly or indirectly involved in payment settlement systems, to formulate an appropriate legislation to cover the issues relating to the payment and settlement system.[237]

2.2 Areas for Further Research

The present study drew heavily its analyses, interpretations and conclusion from the survey data and testimonial evidences submitted by the country researchers designated by the SEACEN-member countries for this collaborative project. The methodology employed in the cross-country analysis and interpretations of data were the trend analysis. With regard to the implications of the payment and settlement systems on the central functions on monetary and financial stability, this study relied heavily on the testimony given by the SEACEN-member countries. There was no statistical technique used to validate the claims made on the said implications neither was there an empirical investigation conducted by any of the SEACEN-member country to support said claims. In this regard, it is recommended that a further research study be conducted to investigate the implications of the payment and settlement systems on the monetary aggregates, interest rates, and foreign exchange rates using more sophisticated econometric tools on each of the SEACEN-member countries. Example, MIPS, a net settlement system in the Philippines, started operations in 1997. Thus, it would be interesting to know the effect of MIPS on the monetary aggregates, interest rates, and foreign exchange rates. By analysing the behaviour of the monetary aggregates, interest rates, and foreign exchange rates before and after the establishment of MIPS using econometric tools, empirical evidences would now be made available to establish the impact or implications of the said system.

237. Kamalasiri, A., Deputy Chief Accountant, Banking Department, Central Bank of Sri Lanka, during the first workshop on the research project on "The Payment and Settlement Systems in Sri Lanka," Aug. 2001.

Chart

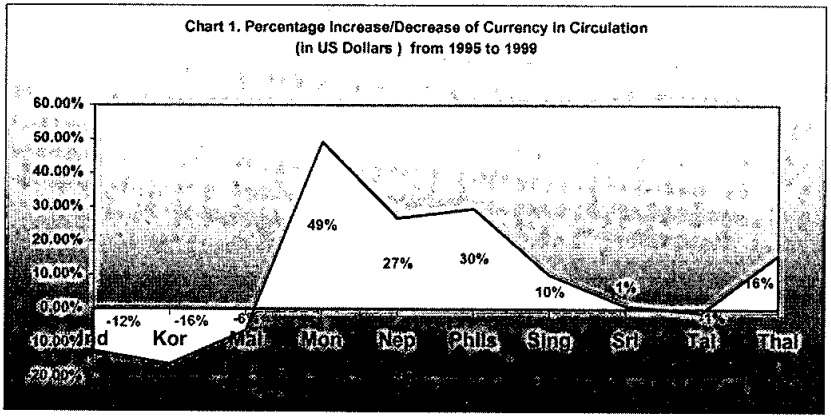


Chart 1. Percentage Increase/Decrease of Currency in Circulation
(in US Dollars) from 1995 to 1999
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
10.00%
20.00%
49%
27%
30%
10%
1%
16%
-12%
-16%
Kor
Mal
Mon
Nep
Phils
Sing
Sri
Tai
Thai

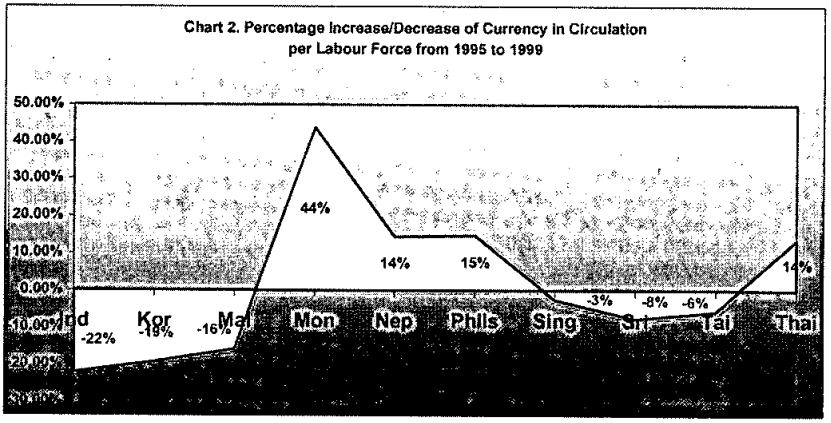


Chart 2. Percentage Increase/Decrease of Currency in Circulation
per Labour Force from 1995 to 1999
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
10.00%
20.00%
44%
14%
15%
-3%
-8%
-6%
14%
-22%
-19%
-16%
Kor
Mal
Mon
Nep
Phils
Sing
Sri
Tai
Thai

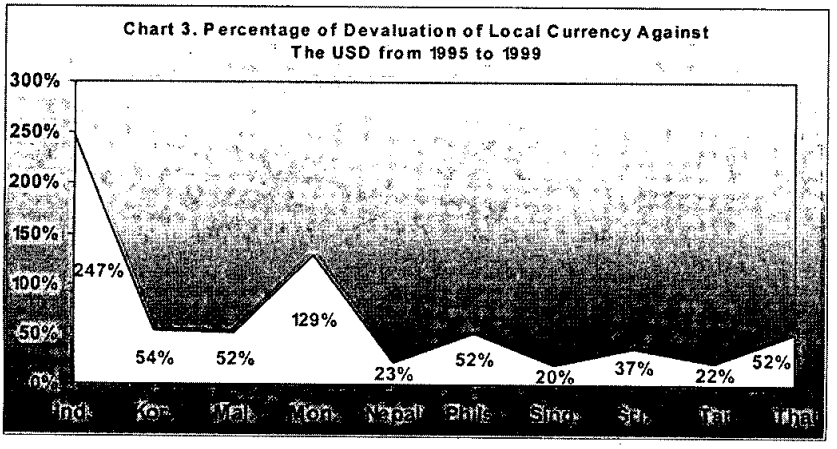
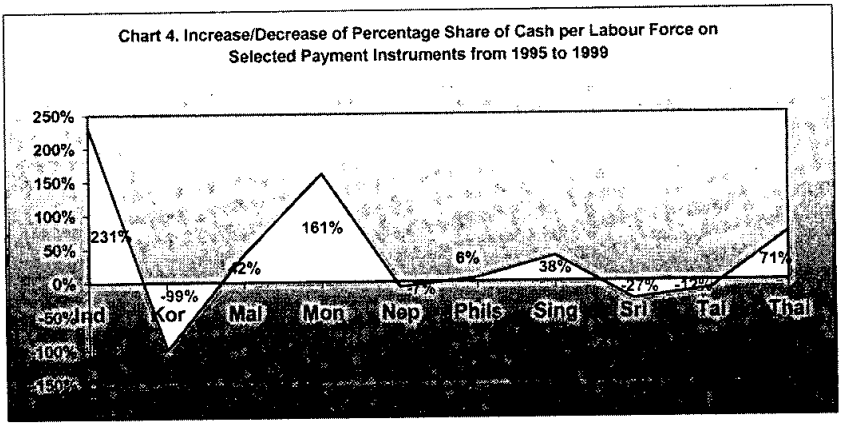
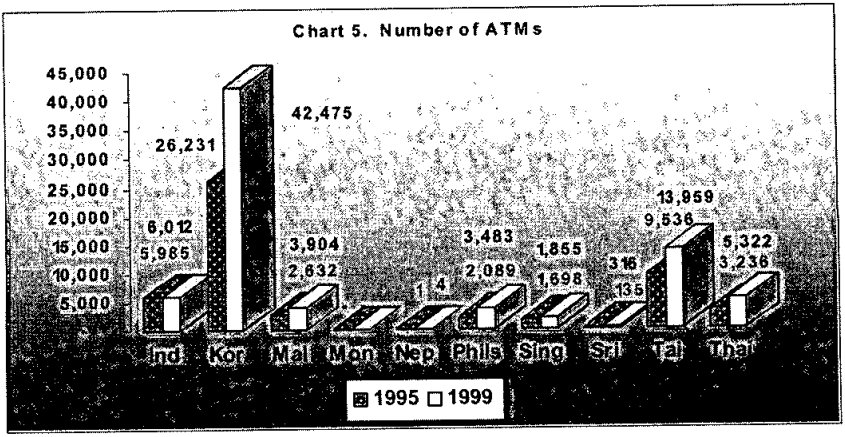
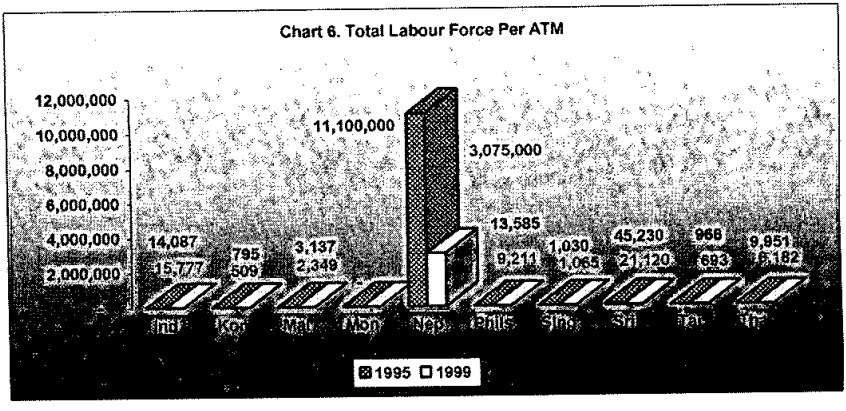


Chart 3. Percentage of Devaluation of Local Currency Against
The USD from 1995 to 1999
300%
250%
200%
150%
100%
50%
0%
247%
54%
52%
129%
23%
52%
20%
37%
22%
52%
Kor
Mal
Mon
Nepal
Phils
Sing
Sri
Tai
Thai

Chart-continued







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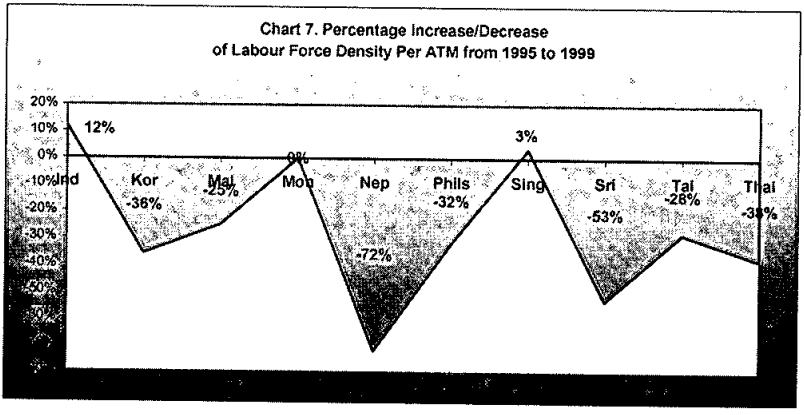

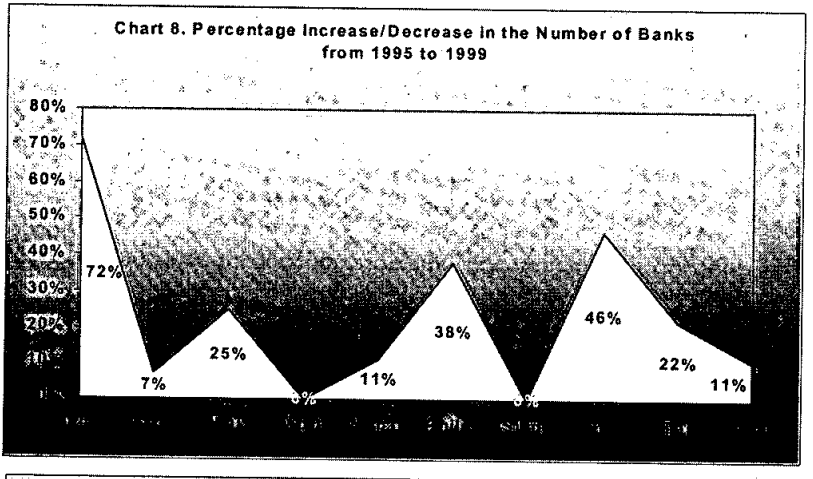

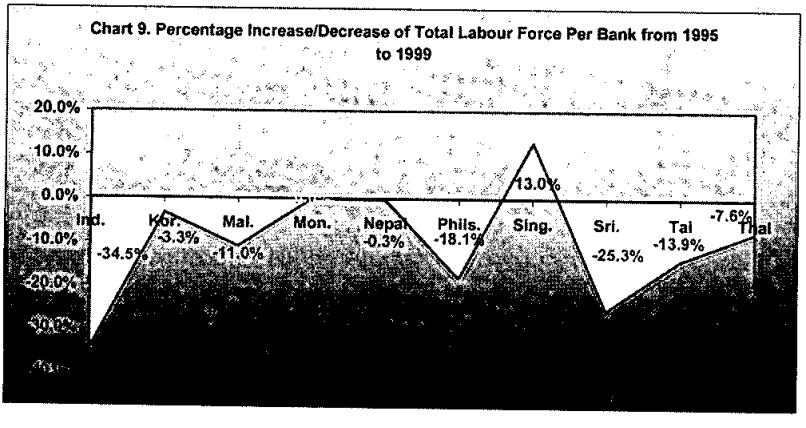

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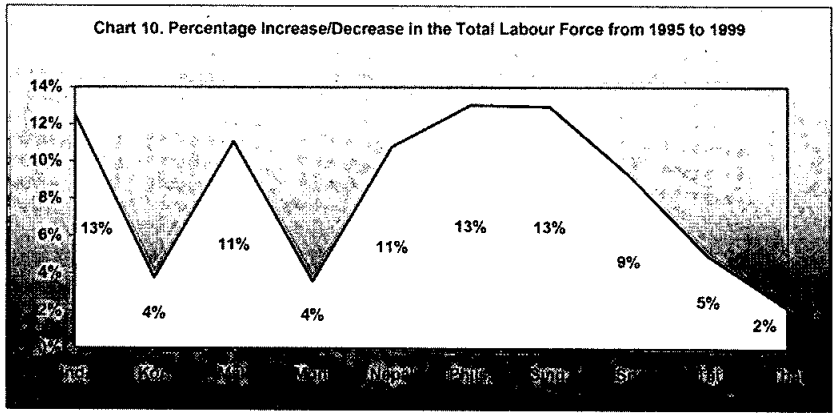

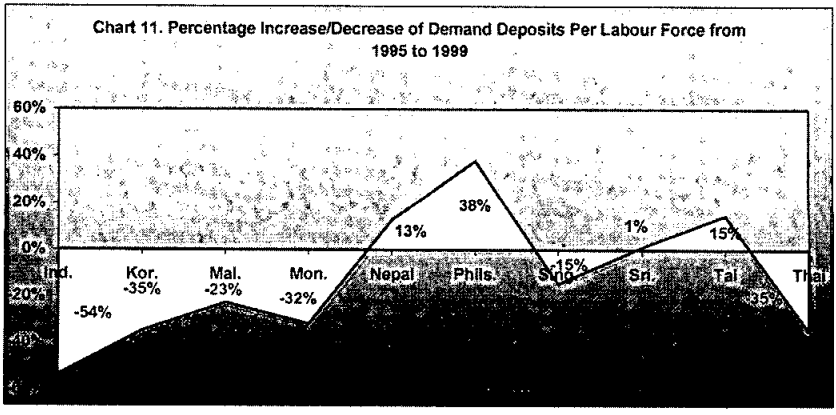

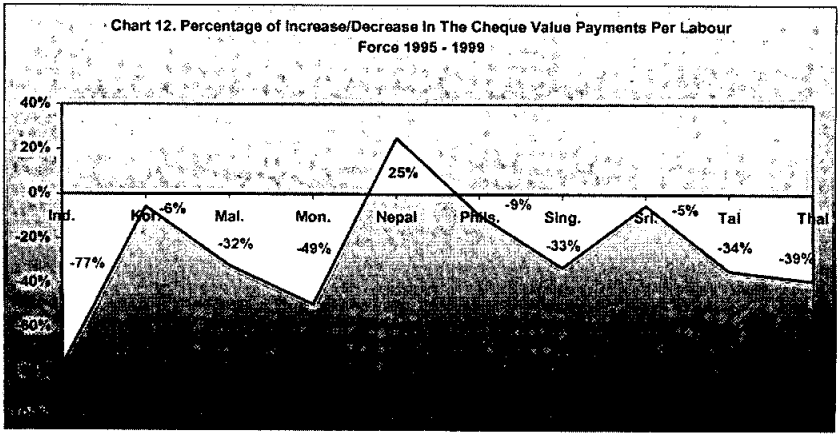

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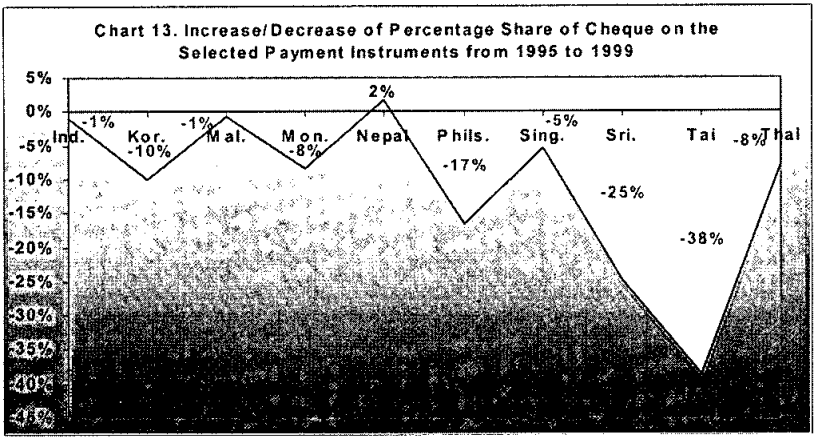

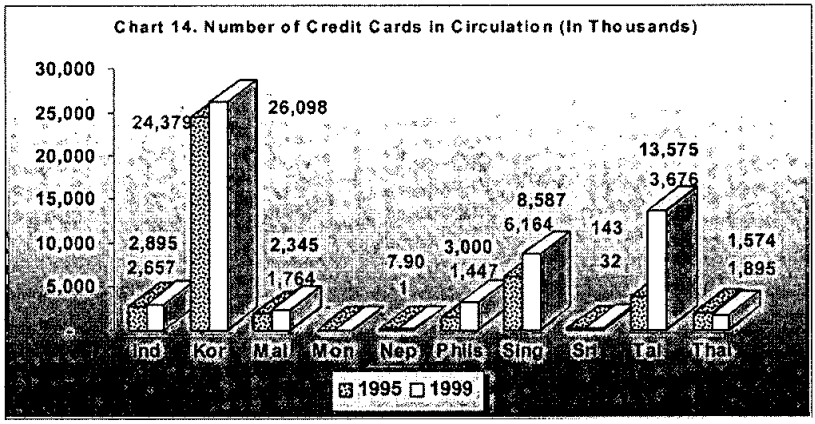

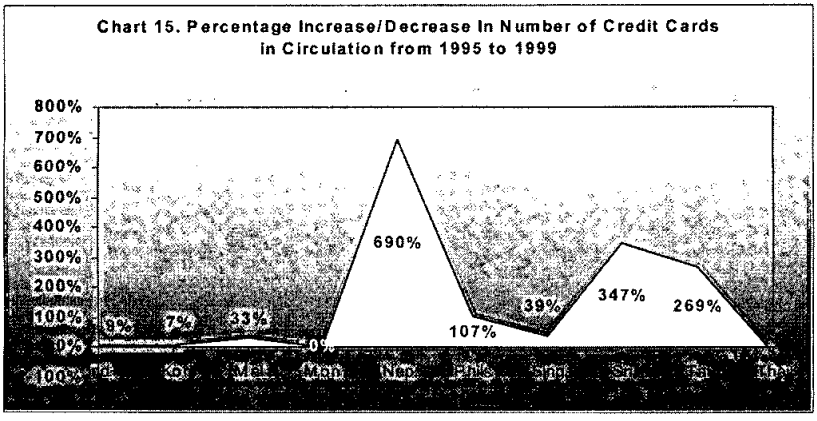

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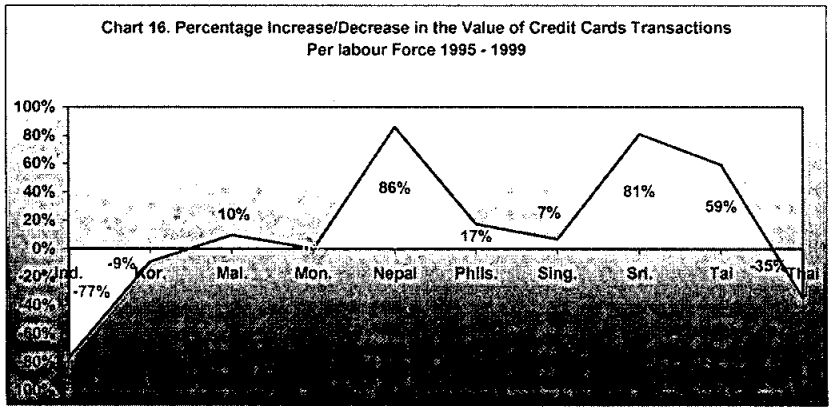

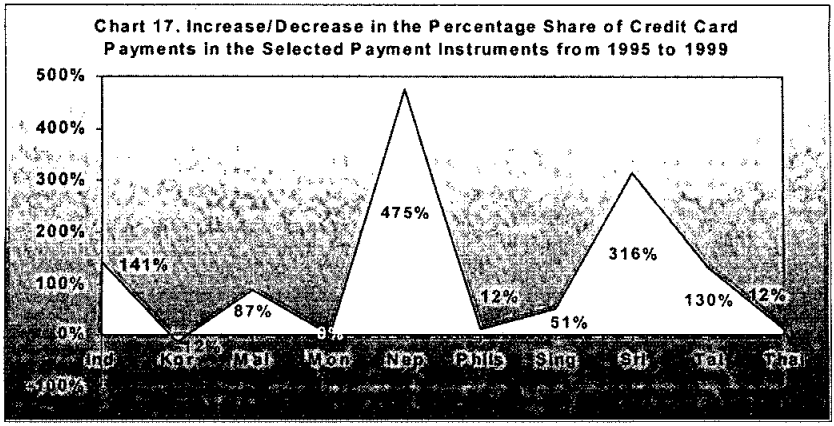

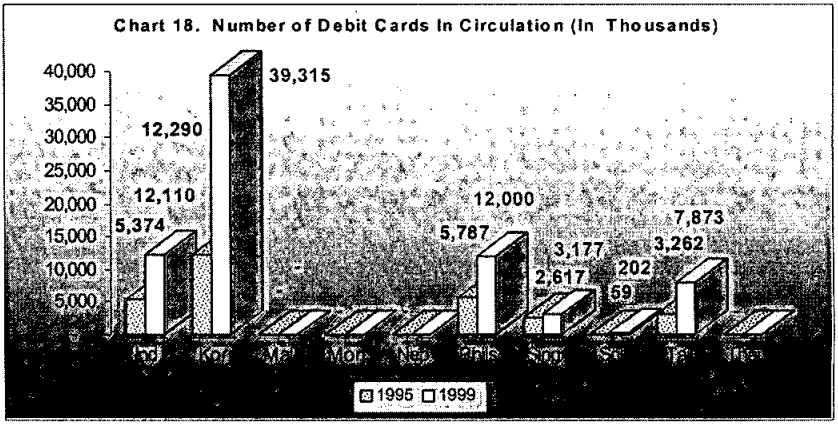

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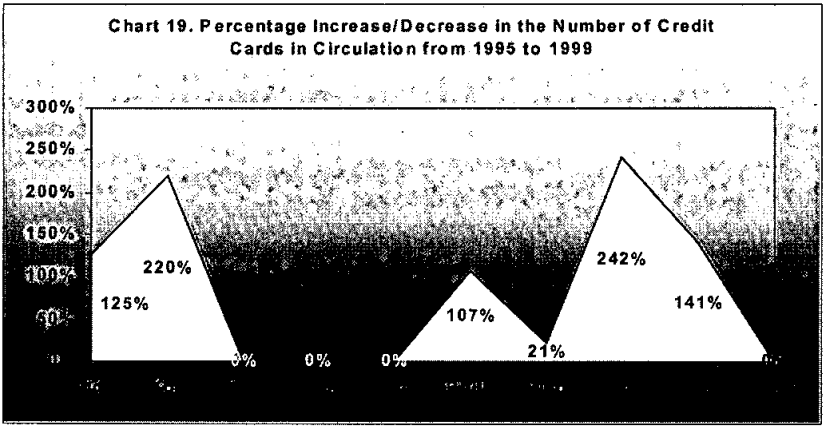

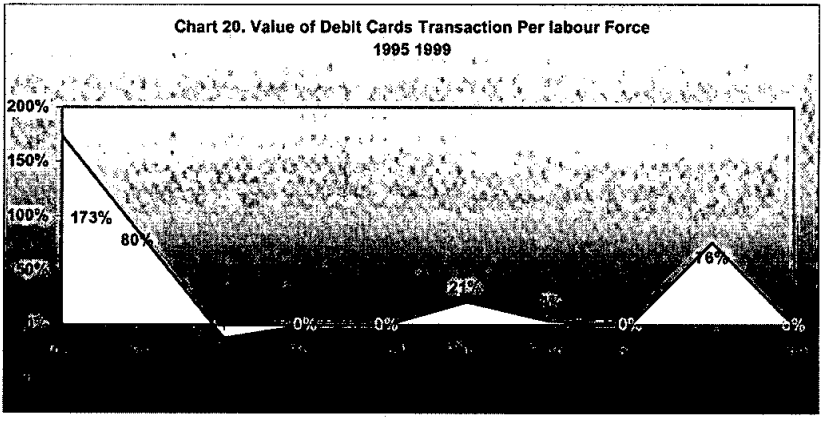

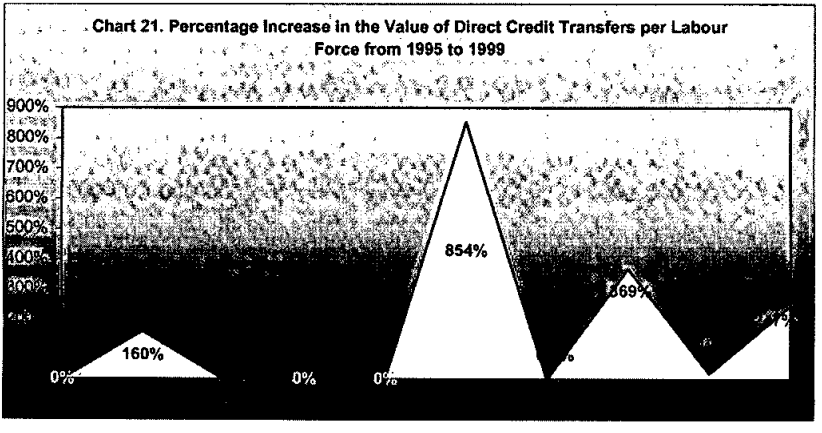

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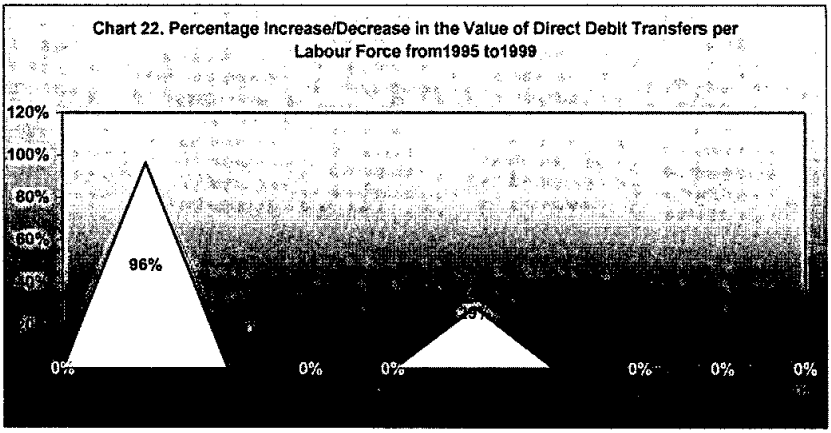


Tables

Summary of Selected Data Table 4 (SS Table 4) (Value In Mio USD, Volume in Thousands, No. of Networks In Tens)

	Indo.[1]	Korea[2]	Mal.[3]	Mong.[4]	Nepal	Phils[5]	Sing.	Sri Lanka	Taiwan	Thailand
Cash 1999	9220	16372	6521	85	509	5589	8371	831	18939	15544
% of Change from '95	-12%	-16%	-6%	49%	27%	30%	10%	1%	-1%	16%
No. of Cr. Cards '99	2895	26098	2345	n.a.	7.9	3000	8587	143	13575	1574
% of Change from '95	9%	7%	33%	n.a.	690%	107%	39%	347%	269%	-17%
Vol. of Cr. Card Trans. '99	29578	376651	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
% of Change from '95	92%	79%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Val. of Cr. Card Trans. '99	1327	50168	3	n.a.	3	430	5272	75	18531	4022
% of Change from '95	-36%	-5%	23%	n.a.	684%	37%	21%	473%	157%	-24%
No. Dr. Cards '99	12110	39315	n.a.	n.a.	n.a.	12000	3177.17	201.65	7873	n.a.
% of Change from '95	125%	220%	n.a.	n.a.	n.a.	107%	21%	242%	141%	n.a.
Vol. of Dr. Trans. '99	16000	1892	n.a.	n.a.	n.a.	n.a.	75802	n.a.	n.a.	n.a.
% of Change from '95	34%	187%	n.a.	n.a.	n.a.	n.a.	62%	n.a.	n.a.	n.a.
Val. Dr. Card Trans. '99	410	82	n.a.	n.a.	n.a.	562	3829	n.a.	3	n.a.
% of Change from '95	208%	87%	5713%	n.a.	n.a.	37%	17%	n.a.	85%	n.a.
Vol. of Dir. Cr. Trans. '99	n.a.	992665	1650	n.a.	n.a.	479	12020	834	61008	3041
% of Change from '95	n.a.	67%	6%	n.a.	n.a.	81%	17%	607%	90%	37913%
Val. of Dir. Cr. Trans. '99	n.a.	1463716	427	n.a.	n.a.	3779	30058	14813	7496746	176872
% of Change from 1995	n.a.	169%	-15%	n.a.	n.a.	978%	14%	412%	25%	255%
Vol. of Dir. Dr. Trans. '99	n.a.	461355	2160	n.a.	n.a.	168	17360	n.a.	n.a.	n.a.
% of Change from '95	n.a.	191%	66%	n.a.	n.a.	29%	n.a.	n.a.	n.a.	n.a.
Val. of Dir. Dr. Trans. '99	n.a.	23431	14	n.a.	n.a.	93	8884	n.a.	n.a.	n.a.
% of Change from '95	n.a.	104%	-85%	n.a.	n.a.	45%	12%	n.a.	n.a.	n.a.
Vol. of Cheques Cleared '99	78088	1027172	153910	658500	274.509	116.21	92180	37428	170228	68797
% of Change from '95	-27%	2%	59%	26%	50%	14%	17%	27%	5%	-26%
Val. of Cheques Cleared '99	660271	8135602	265079	581	2278	18990	288235	32363	1285683	1770998
% of Change from '95	-74%	-2%	-25%	-48%	38%	2%	-24%	4%	-31%	-37%
No. of ATM Machines '99	6	42	4	n.a.	n.a.	3	2	n.a.	14	5
% of Change from '95	n.a.	62%	48%	n.a.	300%	67%	9%	134%	46%	64%
Vol. of Trans. '99	408766	324312	235	n.a.	32	n.a.	10100	n.a.	475666	333585
% of Change from '95	138%	115%	11%	n.a.	181%	n.a.	-17%	n.a.	54%	40%
Val. of Trans. '99	10974	92452	14579	n.a.	3	n.a.	1414	n.a.	182295	24825
% of Change from '95	21%	123%	-71%	n.a.	602%	n.a.	-20%	n.a.	38%	15%
No. of Networks '99	38	1	1	n.a.	n.a.	n.a.	2	2	390	1
% of Change from '95	-37%	n.a.	-50%	n.a.	n.a.	n.a.	n.a.	n.a.	59%	n.a.
No. of EFTPOS '99	5	1100	n.a.	n.a.	n.a.	n.a.	18	2	8	n.a.
% of Change from '95	21%	61%	n.a.	n.a.	n.a.	n.a.	55%	1102%	62%	n.a.
Vol. of Trans. '99	2952	1892	n.a.	n.a.	n.a.	n.a.	65740	n.a.	242	n.a.
% of Change from '95	52%	187%	n.a.	n.a.	n.a.	n.a.	90%	n.a.	79%	n.a.
Val. of Trans. '99	107	82	n.a.	n.a.	n.a.	n.a.	2415	n.a.	5	n.a.
% of Change from '95	-48%	88%	n.a.	n.a.	n.a.	n.a.	61%	n.a.	-68%	n.a.
No. Networks '99	5	1	n.a.	n.a.	n.a.	n.a.	1	2	21	1
% of Change from '95	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	62%	n.a.

[1] Figures for credit card 1996, Debit Card 1996, [2] Figures for debit card 1996, [3] Figures for debit card 1998, Cheques 1996
[4] Figures for cheques 1996, [5] Figures for credit and debit card 1996, direct credit 1996, direct debit 1997, cheques 1996

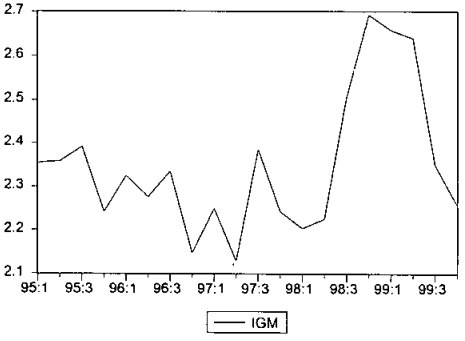
SS Table 5. Summary of Quarterly Velocity in the Circulation in Money																				
	1995				1996				1997				1998				1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Indonesia	2.35	2.36	2.39	2.24	2.32	2.28	2.34	2.15	2.25	2.13	2.39	2.24	2.20	2.22	2.50	2.69	2.66	2.64	2.35	2.26
Korea	2.69	2.90	3.05	2.74	2.76	2.95	2.76	2.96	2.87	3.04	3.20	3.67	3.83	3.87	3.32	3.38	3.29	3.38	3.31	3.10
Malaysia	1.10	1.13	1.18	1.15	1.09	1.15	1.13	1.12	1.05	1.09	1.15	1.22	1.28	1.34	1.39	1.30	1.28	1.24	1.24	1.12
Mongolia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Myanmar	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Nepal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	2.88	2.97	2.98	3.01	2.74	2.86	2.84	2.75	2.58	2.58	2.66	2.69	2.55	2.56	2.76	2.70	2.39	2.45	2.41	2.16
Singapore	1.00	1.01	1.08	1.06	1.02	1.02	1.04	1.05	0.98	1.03	1.08	1.18	1.11	1.20	1.21	1.12	1.03	1.07	1.12	1.05
Sri Lanka	n.a.	n.a.	n.a.	n.a.	2.10	2.06	2.36	2.39	2.49	2.28	2.50	2.51	2.53	2.30	2.47	2.51	2.38	2.32	2.44	2.48
Taiwan	0.55	0.54	0.59	0.57	0.58	0.54	0.61	0.57	0.56	0.52	0.58	0.57	0.58	0.56	0.62	0.60	0.59	0.54	0.56	0.53
Thailand	2.94	2.82	2.82	2.83	2.65	2.93	2.83	2.82	2.71	2.95	2.95	2.87	2.99	2.93	2.86	2.68	2.54	2.55	2.65	2.11

Tables and Charts for ADF Unit Root Tests

Indonesia

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (IGM) for Indonesia

ADF Test Statistic and Critical Values for the period 1995 to 1999



ADF Test Statistic	-1.864923	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

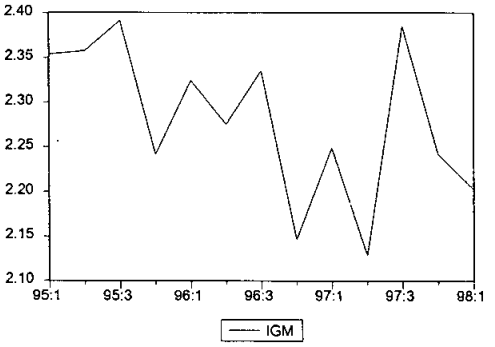
*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IGM)
Method: Least Squares
Date: 07/24/01 Time: 15:10
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IGM(-1)	-0.429697	0.230410	-1.864923	0.0819
D(IGM(-1))	0.099739	0.260475	0.382912	0.7072
C	1.005351	0.543226	1.850705	0.0840

R-squared	0.198750	Mean dependent var	-0.005693
Adjusted R-squared	0.091917	S.D. dependent var	0.152074
S.E. of regression	0.144916	Akaike info criterion	-0.874308
Sum squared resid	0.315011	Schwarz criterion	-0.725913
Log likelihood	10.86877	F-statistic	1.860374
Durbin-Watson stat	2.070876	Prob(F-statistic)	0.189784

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.654767	1% Critical Value*	-4.2207
		5% Critical Value	-3.1801
		10% Critical Value	-2.7349

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IGM)
Method: Least Squares
Date: 07/24/01 Time: 15:14
Sample(adjusted): 1995:3 1998:1
Included observations: 11 after adjusting endpoints

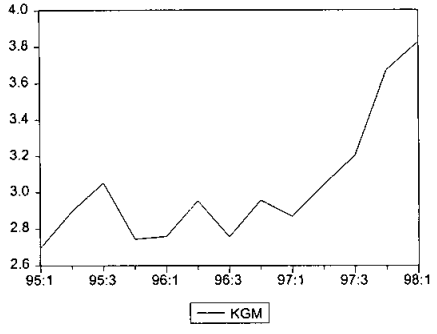
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IGM(-1)	-0.802607	0.485027	-1.654767	0.1366
D(IGM(-1))	-0.323169	0.319804	-1.010522	0.3418
C	1.812356	1.108490	1.634977	0.1407

R-squared	0.638120	Mean dependent var	-0.014055
Adjusted R-squared	0.547650	S.D. dependent var	0.135204
S.E. of regression	0.090934	Akaike info criterion	-1.730363
Sum squared resid	0.066152	Schwarz criterion	-1.621847
Log likelihood	12.51700	F-statistic	7.053393
Durbin-Watson stat	1.912725	Prob(F-statistic)	0.017150

Korea

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (KGM) for Korea

ADF Test Statistic and Critical Values for the period 1995 to 1999



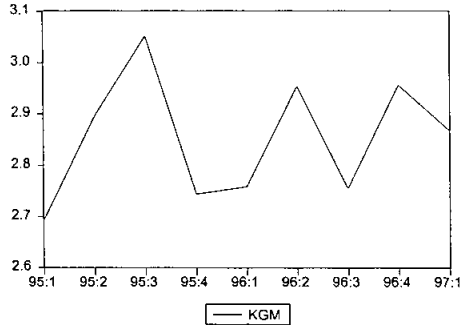
ADF Test Statistic	-1.507420	1%	Critical Value*	-3.8572
		5%	Critical Value	-3.0400
		10%	Critical Value	-2.6608

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(KGM)
Method: Least Squares
Date: 07/24/01 Time: 15:18
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KGM(-1)	-0.246170	0.163306	-1.507420	0.1525
D(KGM(-1))	0.075518	0.251953	0.299732	0.7685
C	0.791852	0.520341	1.521794	0.1489
R-squared	0.131899	Mean dependent var		0.011173
Adjusted R-squared	0.016152	S.D. dependent var		0.232211
S.E. of regression	0.230328	Akaike info criterion		0.052389
Sum squared resid	0.795766	Schwarz criterion		0.200784
Log likelihood	2.528501	F-statistic		1.139550
Durbin-Watson stat	1.985701	Prob(F-statistic)		0.346159

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-4.114732	1% Critical Value*	-4.8875
		5% Critical Value	-3.4239
		10% Critical Value	-2.8640

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(KGM)
Method: Least Squares
Date: 07/24/01 Time: 15:21
Sample(adjusted): 1995:3 1997:1
Included observations: 7 after adjusting endpoints

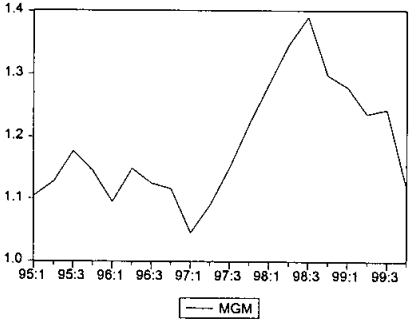
Variable	Coefficient	Std. Error	t-Statistic	Prob.
KGM(-1)	-2.298714	0.558655	-4.114732	0.0147
D(KGM(-1))	0.658987	0.323032	2.040003	0.1109
C	6.577400	1.596090	4.120946	0.0146

R-squared	0.846467	Mean dependent var	-0.004149
Adjusted R-squared	0.769700	S.D. dependent var	0.202356
S.E. of regression	0.097110	Akaike info criterion	-1.528421
Sum squared resid	0.037721	Schwarz criterion	-1.551603
Log likelihood	8.349475	F-statistic	11.02649
Durbin-Watson stat	1.743178	Prob(F-statistic)	0.023572

Malaysia

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (MGM) for Malaysia

ADF Test Statistic and Critical Values for the period 1995 to 1999



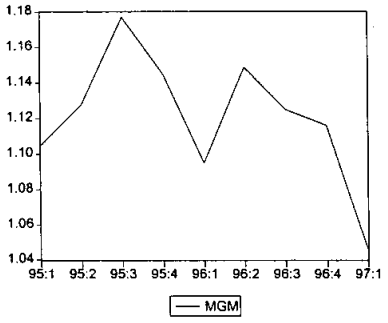
ADF Test Statistic	-1.536754	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MGM)
Method: Least Squares
Date: 07/24/01 Time: 15:25
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MGM(-1)	-0.233344	0.151842	-1.536754	0.1452
D(MGM(-1))	0.328990	0.283181	1.161765	0.2635
C	0.275868	0.181552	1.519498	0.1494
R-squared	0.168083	Mean dependent var		-0.000579
Adjusted R-squared	0.057161	S.D. dependent var		0.060102
S.E. of regression	0.058359	Akaike info criterion		-2.693385
Sum squared resid	0.051087	Schwarz criterion		-2.544990
Log likelihood	27.24047	F-statistic		1.515322
Durbin-Watson stat	1.908017	Prob(F-statistic)		0.251536

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.156778	1% Critical Value*	-4.8875
		5% Critical Value	-3.4239
		10% Critical Value	-2.8640

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MGM)
Method: Least Squares
Date: 07/24/01 Time: 15:34
Sample(adjusted): 1995:3 1997:1
Included observations: 7 after adjusting endpoints

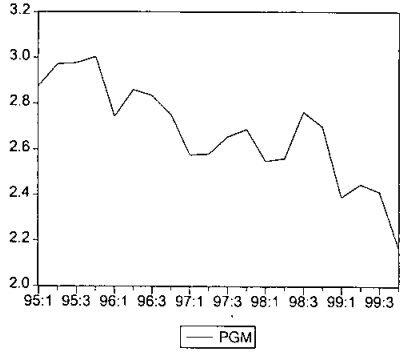
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MGM(-1)	-1.319863	1.140981	-1.156778	0.3117
D(MGM(-1))	0.443277	0.734943	0.603145	0.5789
C	1.483762	1.292764	1.147744	0.3151

R-squared	0.269303	Mean dependent var	-0.011819
Adjusted R-squared	-0.096045	S.D. dependent var	0.047523
S.E. of regression	0.049753	Akaike info criterion	-2.865957
Sum squared resid	0.009902	Schwarz criterion	-2.889138
Log likelihood	13.03085	F-statistic	0.737113
Durbin-Watson stat	1.315722	Prob(F-statistic)	0.533918

Philippines

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (PGM) for Philippines

ADF Test Statistic and Critical Values for the period 1995 to 1999



ADF Test Statistic	-0.463022	1% Critical Value*
		5% Critical Value
		10% Critical Value

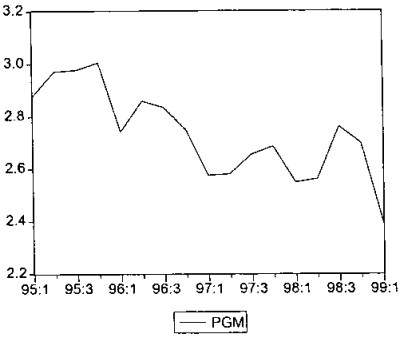
*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PGM)
Method: Least Squares
Date: 07/24/01 Time: 15:41
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic
PGM(-1)	-0.092767	0.200351	-0.463022
D(PGM(-1))	-0.120365	0.290706	-0.414044
C	0.201769	0.543615	0.371162

R-squared	0.041705	Mean dependent var	
Adjusted R-squared	-0.086068	S.D. dependent var	
S.E. of regression	0.142807	Akaike info criterion	
Sum squared resid	0.305906	Schwarz criterion	
Log likelihood	11.13276	F-statistic	
Durbin-Watson stat	1.994355	Prob(F-statistic)	

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.246001	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PGM)
Method: Least Squares
Date: 07/24/01 Time: 16:10
Sample(adjusted): 1995:3 1999:1
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PGM(-1)	-0.320834	0.257491	-1.246001	0.2365
D(PGM(-1))	0.020882	0.333978	0.062525	0.9512
C	0.842972	0.709839	1.187555	0.2580

R-squared	0.125697	Mean dependent var	-0.038803
Adjusted R-squared	-0.020020	S.D. dependent var	0.137890
S.E. of regression	0.139263	Akaike info criterion	-0.928044
Sum squared resid	0.232731	Schwarz criterion	-0.786434
Log likelihood	9.960329	F-statistic	0.862613
Durbin-Watson stat	1.749758	Prob(F-statistic)	0.446653

Singapore

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (SGM) for Singapore

ADF Test Statistic and Critical Values for the period 1995 to 1999

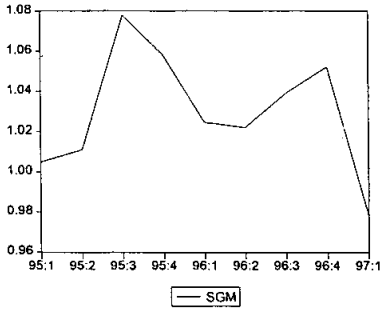
ADF Test Statistic	-2.189979	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SGM)
Method: Least Squares
Date: 07/24/01 Time: 16:13
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SGM(-1)	-0.494713	0.225898	-2.189979	0.0447
D(SGM(-1))	0.124924	0.257618	0.484920	0.6347
C	0.535653	0.243586	2.199034	0.0440
R-squared	0.250606	Mean dependent var		0.002288
Adjusted R-squared	0.150687	S.D. dependent var		0.061234
S.E. of regression	0.056432	Akaike info criterion		-2.760547
Sum squared resid	0.047769	Schwarz criterion		-2.612152
Log likelihood	27.84492	F-statistic		2.508084
Durbin-Watson stat	1.833903	Prob(F-statistic)		0.114902

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-2.925026	1% Critical Value*	-4.8875
		5% Critical Value	-3.4239
		10% Critical Value	-2.8640

*MacKinnon critical values for rejection of hypothesis of a unit root.

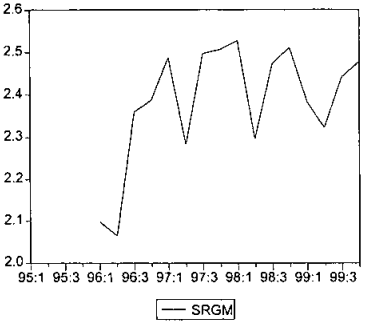
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SGM)
Method: Least Squares
Date: 07/24/01 Time: 16:17
Sample(adjusted): 1995:3 1997:1
Included observations: 7 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SGM(-1)	-1.923999	0.657772	-2.925026	0.0430
D(SGM(-1))	0.713468	0.480865	1.483718	0.2120
C	1.992722	0.682691	2.918924	0.0433
R-squared	0.683790	Mean dependent var		-0.004670
Adjusted R-squared	0.525685	S.D. dependent var		0.044225
S.E. of regression	0.030458	Akaike info criterion		-3.847428
Sum squared resid	0.003711	Schwarz criterion		-3.870610
Log likelihood	16.46600	F-statistic		4.324908
Durbin-Watson stat	1.184913	Prob(F-statistic)		0.099989

Sri Lanka

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (SRGM) for Sri Lanka

ADF Test Statistic and Critical Values for the period 1995 to 1999



ADF Test Statistic	-4.349824	1% Critical Value*	-4.0113
		5% Critical Value	-3.1003
		10% Critical Value	-2.6927

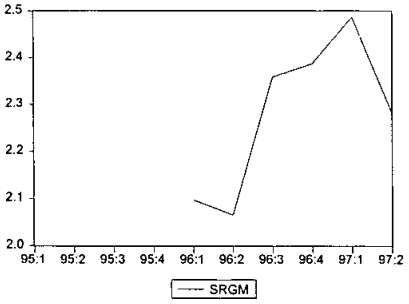
*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SRGM)
Method: Least Squares
Date: 07/24/01 Time: 16:42
Sample(adjusted): 1996:3 1999:4
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SRGM(-1)	-0.980655	0.225447	-4.349824	0.0012
D(SRGM(-1))	-0.005805	0.188253	-0.030835	0.9760
C	2.379154	0.538683	4.416608	0.0010

R-squared	0.682714	Mean dependent var	0.029486
Adjusted R-squared	0.625025	S.D. dependent var	0.151098
S.E. of regression	0.092525	Akaike info criterion	-1.735264
Sum squared resid	0.094170	Schwarz criterion	-1.598323
Log likelihood	15.14685	F-statistic	11.83451
Durbin-Watson stat	2.385353	Prob(F-statistic)	0.001811

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.935130	1% Critical Value*	-6.7615
		5% Critical Value	-4.0691
		10% Critical Value	-3.2066

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SRGM)
Method: Least Squares
Date: 07/24/01 Time: 16:43
Sample(adjusted): 1996:3 1997:2
Included observations: 4 after adjusting endpoints

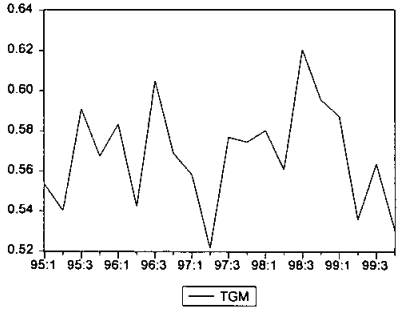
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SRGM(-1)	-1.017298	0.525700	-1.935130	0.3036
D(SRGM(-1))	-0.047743	0.672316	-0.071013	0.9549
C	2.424254	1.194756	2.029078	0.2915

R-squared	0.833403	Mean dependent var	0.054508
Adjusted R-squared	0.500208	S.D. dependent var	0.206355
S.E. of regression	0.145885	Akaike info criterion	-0.898297
Sum squared resid	0.021282	Schwarz criterion	-1.358576
Log likelihood	4.796594	F-statistic	2.501247
Durbin-Watson stat	2.347516	Prob(F-statistic)	0.408164

Taiwan

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (TGM) for Taiwan

ADF Test Statistic and Critical Values for the period 1995 to 1999



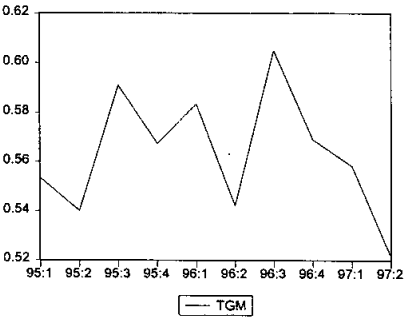
ADF Test Statistic	-2.462531	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TGM)
Method: Least Squares
Date: 07/24/01 Time: 16:46
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TGM(-1)	-0.933597	0.379121	-2.462531	0.0264
D(TGM(-1))	-0.128806	0.260782	-0.493922	0.6285
C	0.532382	0.216373	2.460483	0.0265
R-squared	0.526678	Mean dependent var		-0.000542
Adjusted R-squared	0.463568	S.D. dependent var		0.037767
S.E. of regression	0.027661	Akaike info criterion		-4.186583
Sum squared resid	0.011477	Schwarz criterion		-4.038187
Log likelihood	40.67924	F-statistic		8.345441
Durbin-Watson stat	1.617575	Prob(F-statistic)		0.003662

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.810470	1% Critical Value*	-4.6405
		5% Critical Value	-3.3350
		10% Critical Value	-2.8169

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TGM)
Method: Least Squares
Date: 07/24/01 Time: 16:47
Sample(adjusted): 1995:3 1997:2
Included observations: 8 after adjusting endpoints

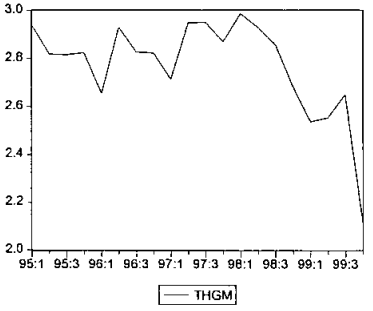
Variable	Coefficient	Std. Error	t-Statistic	Prob.
TGM(-1)	-1.636806	0.904078	-1.810470	0.1300
D(TGM(-1))	0.152714	0.530237	0.288012	0.7849
C	0.929909	0.514804	1.806335	0.1307

R-squared	0.630442	Mean dependent var	-0.002339
Adjusted R-squared	0.482619	S.D. dependent var	0.041128
S.E. of regression	0.029583	Akaike info criterion	-3.923220
Sum squared resid	0.004376	Schwarz criterion	-3.893430
Log likelihood	18.69288	F-statistic	4.264838
Durbin-Watson stat	1.456255	Prob(F-statistic)	0.083025

Thailand

Augmented Dickey-Fuller Unit Root Test on GDP/M1 Ratio (THGM) for Thailand

ADF Test Statistic and Critical Values for the period 1995 to 1999



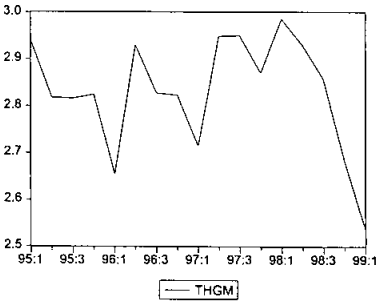
ADF Test Statistic	0.307382	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(THGM)
Method: Least Squares
Date: 07/24/01 Time: 16:51
Sample(adjusted): 1995:3 1999:4
Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
THGM(-1)	0.109308	0.355611	0.307382	0.7628
D(THGM(-1))	-0.549183	0.378335	-1.451579	0.1672
C	-0.354117	0.999060	-0.354450	0.7279
R-squared	0.133325	Mean dependent var		-0.039371
Adjusted R-squared	0.017768	S.D. dependent var		0.177450
S.E. of regression	0.175867	Akaike info criterion		-0.487166
Sum squared resid	0.463938	Schwarz criterion		-0.338771
Log likelihood	7.384498	F-statistic		1.153759
Durbin-Watson stat	1.785379	Prob(F-statistic)		0.341919

ADF Test Statistic and Critical Values from 1995 to the "Break" Period



ADF Test Statistic	-1.253874	1% Critical Value*	-3.9635
		5% Critical Value	-3.0818
		10% Critical Value	-2.6829

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(THGM)
Method: Least Squares
Date: 07/24/01 Time: 16:53
Sample(adjusted): 1995:3 1999:1
Included observations: 15 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
THGM(-1)	-0.639991	0.510411	-1.253874	0.2338
D(THGM(-1))	0.030434	0.379727	0.080146	0.9374
C	1.800938	1.455926	1.236971	0.2398

R-squared	0.201673	Mean dependent var	-0.018751
Adjusted R-squared	0.068619	S.D. dependent var	0.135401
S.E. of regression	0.130673	Akaike info criterion	-1.055384
Sum squared resid	0.204905	Schwarz criterion	-0.913774
Log likelihood	10.91538	F-statistic	1.515721
Durbin-Watson stat	1.761245	Prob(F-statistic)	0.258871

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ANNEXES
AND
GLOSSARY

Annex 1

Responsibilities of the central bank in applying the Core Principles

I. The central bank should define clearly its payment system objectives and should disclose publicly its role and major policies with respect to systemically important payment systems.

II. The central bank should ensure that the systems it operates comply with the Core Principles.

III. The central bank should oversee compliance with the Core Principles by systems it does not operate and it should have the ability to carry out this oversight.

IV. The central bank, in promoting payment system safety and efficiency through the Core Principles, should cooperate with other central banks and with any other relevant domestic or foreign authorities.

Annex 2

The Core Principles
Public policy objectives: safety and efficiency in systemically important payment systems
Core Principles for systemically important payment systems

I. The system should have a wellfounded legal basis under all relevant jurisdictions.

II. The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.

III. The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.

IV. The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.*

V. A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.*

VI. Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk.

VII. The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.

VIII. The system should provide a means of making payments which is practical for its users and efficient for the economy.

IX. The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.

X. The system's governance arrangements should be effective, accountable and transparent.

* Systems should seek to exceed the minima included in these two Core Principles.

Minimum Standards for Netting Schemes
(The Lamfalussy Principles)

I. Netting schemes should have a well-founded legal basis under all relevant jurisdictions.

II. Netting scheme participants should have clear understanding of the impact of the particular scheme on each of the financial risks affected by the netting process.

III. Multilateral netting systems should have clearly-defined procedures for the management of credit risks and liquidity risks which specify the respective responsibilities of the netting provider and the participants. These procedures should also ensure that all parties have both the incentives and the capabilities to manage and contain each of the risks they bear and that limits are placed on the maximum level of credit exposure that can be produced by each participant.

IV. Multilateral netting schemes systems should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single net-debit position.

V. Multilateral netting systems should have objective and publicly-disclosed criteria for admission, which permit fair and open access.

VI. All netting schemes should ensure the operational reliability of technical systems and the availability of back-up facilities capable of completing daily processing requirements.

Figure 2. Life cycle of a payment (credit transfer)

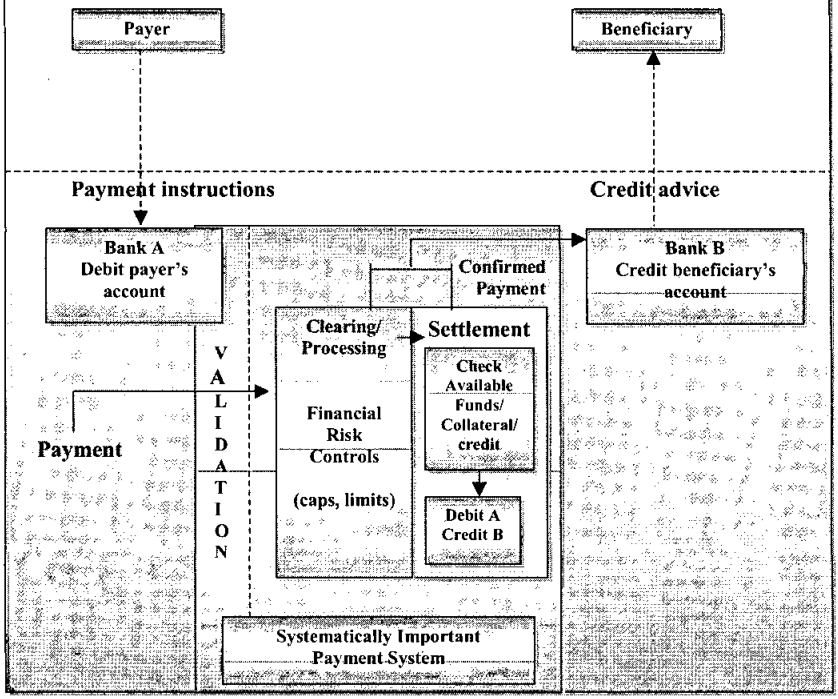
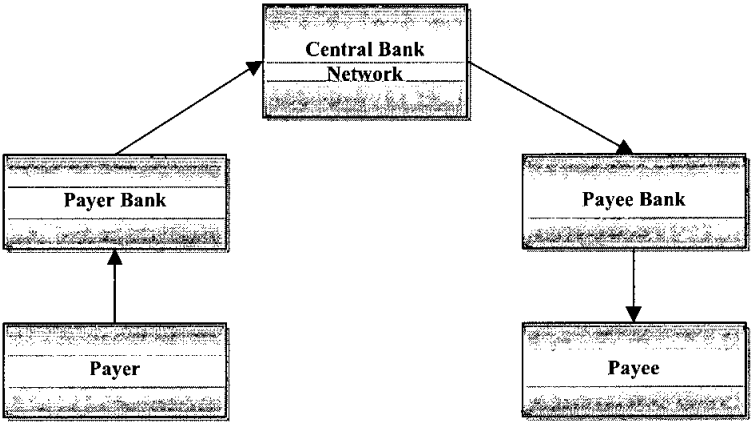
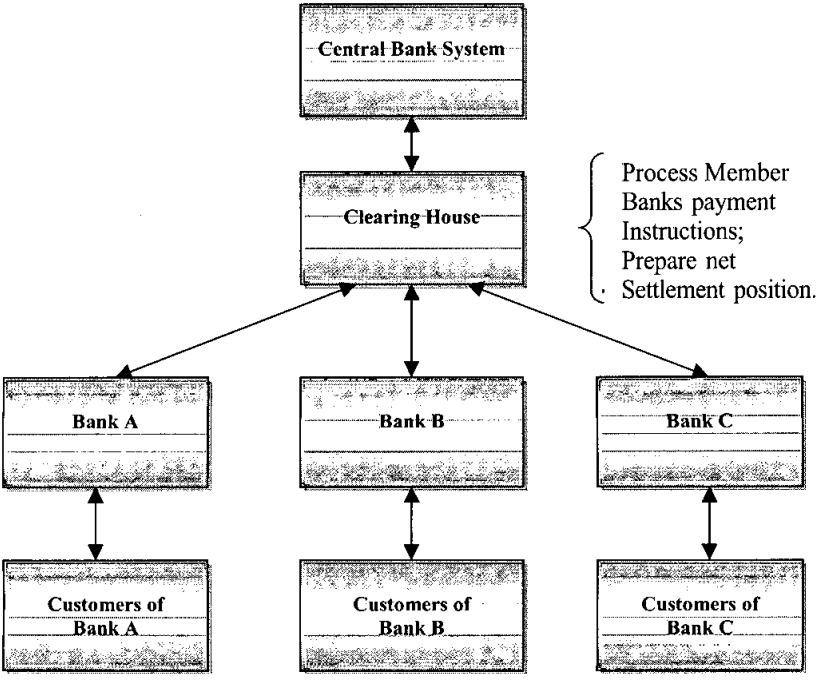


Figure 3. Basic Concept of Fund Transfer Systems

A. Gross – Real Time Settlement Across CB's Books



B. Net/ End-of-Day Settlement



Payment and Settlement System Organisation and Cost Recovery

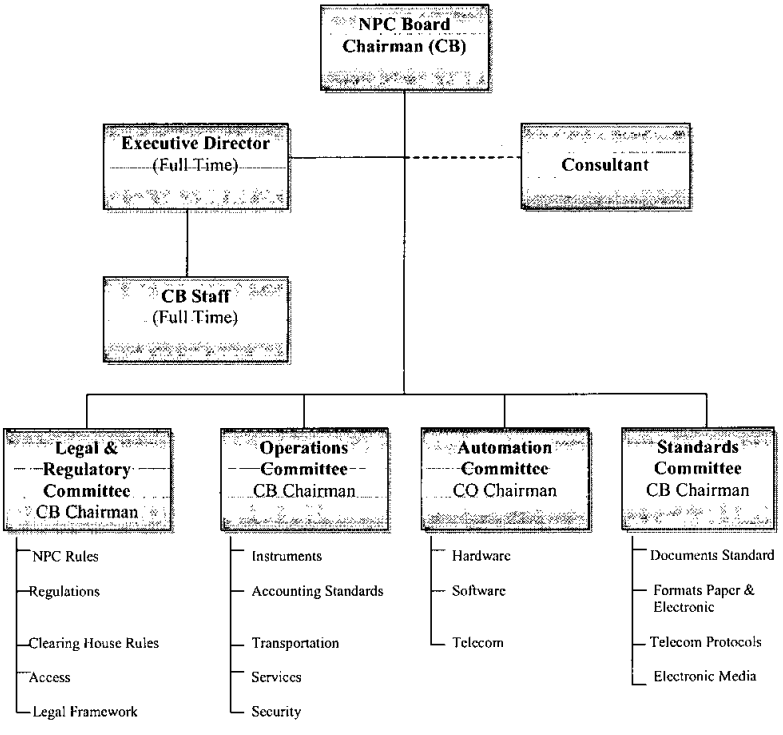
There are several ways on how to organise the interbank payment systems. Some countries employ their own unique method but most of them use several other methods. In establishing common rules, formats and instruments of the payment systems, a close coordination and cooperation between commercial banks and their central bank is necessary. However, it is also common for large commercial banks to operate within a segment of the payment system for smaller, downstream correspondent banks.

Payment Systems may be organised in the following models as observed by Listfield et. al.:

- **Model 1 - Headed by a Coordinating Body (Oversight).** In this model, the largest banks have equity ownership in the association and receive voting rights in return. Users may pay for services on a per usage (item fees) basis or annual assessment basis (often tied to prior year's usage). One of the advantages of this model is that the coordinating body provides governance. In some countries (Canada and the U.K.), the coordinating body provides guidance for rules and standards and operates the interbank system.
- **Model 2 - Establishment of Local Associations (Clearing houses).** In the second model, the local associations set the collection rules and procedures for the local area. Most payments tend to be cleared within a local commercial zone, although this is less true for commercial than for consumer payments. The organisation and funding for local clearing houses tends to be similar to national associations.
- **Model 3 - Central Bank Operates a Payment System.** In this model, the central bank operates a payment system (often in competition with the private sector.) Eligible financial depository institutions participate in pay fees based on usage only (no outside equity partners). The method of establishing these fees varies from full cost recovery to partial subsidisation.
- **Model 4 – Correspondent Bank Payment System.** A large bank provides payment services (subject to rules and standards) to smaller banks. The correspondent bank provides such services to fully utilise capacity obtained for in-house purposes. The costs are usually recovered.

Source: Listfield R., Negret F.M., *"Modernising Payment Systems in Emerging Economies,"* World Bank Policy Research Working Paper 1336 (1994), pp. 13-17.

Figure 8. National Payment Council
(Sample Organizational Structure)



Note CB = Central Bank, and CO = Commercial Bank
The allocation of the Chair of the proposed Committee to CB or CO can vary from country to country

Annex 8

Measures Adopted to Address Financial Risk Management in Payment System

Exposure Limits

(As explained by: Jonhson O.E.G., Abrams R.K., Destresse J.M., Lybek T., Roberts, N.M., Swinburne M., *"Payment Systems, Monetary Policy, and the Role of the Central bank,"* IMF, 1998, pp. 43-44.)

"...Exposure limits, commonly called *debit caps* and *credit limits*, are often used to contain systemic risks; these can be established as bilateral or multilateral limits. Among interbank large-value systems, these are fully developed (for intance, CHIPS in the United States and Chaps in the United Kingdom). The net debit caps and net credit limits can, in principle, be absolute amounts or can be specified as multiples of capital. Ideally, for each participant there are at least two desirable controls: a net debit cap and a bilateral net credit limit. More specifically, there is, first of all, *a network-specific net debit cap*, defined as the maximum debit that a participant, by agreement, can have vis-à-vis other participants of the same system. Second, there is a bilateral net credit limit that specifies the maximum that a participant is willing to have as a net credit position vis-à-vis another participant. Each participant typically provides the system administrator with the bilateral credit limits it has established for all other participants."

Collateralisation and Loss-Sharing Arrangements

(As explained by: Baliño T.J.T., Jonhson O.E.G, Sundararajan V., Payment System Reforms and Monetary Policy, *Finance & Development,* World Bank, p.3.)

"...Collateralisation and loss-sharing arrangements often involve network participants posting collateral to facilitate settlement in case of settlement failure by a participant. Typically, highly liquid assets such as government securities will be used as collateral, with such assets held in a network account at a securities depository (for example, at the central bank).

...In the absence of adequate loss-sharing arrangements, payment networks can provide for partial unwinds or total unwinds. A partial unwind occurs when a failed participant's obligations are deleted from the network's accounts and the settlement calculations are redone. A total unwind occurs when settlement is canceled for the transaction period and all transactions have to be redone, as desired by participants, under the new circumstances. Unwind solutions have become increasingly unpopular because they can cause systemic disruptions."

Reducing Time Lags

(As explained by: Baliño T.J.T., Jonhson O.E.G, Sundararajan V., Payment System Reforms and Monetary Policy, *Finance & Development,* World Bank, p.3.)

"...Reducing time lags in settlement can greatly reduce financial risks by reducing the risk that a debtor might fail. All major (and especially large-value) interbank funds transfer networks either have or plan to have same-day settlement. Central banks are, more and more, opting for real-time gross settlement when building their own systems. Since settlement takes place transaction by transaction, exposure time becomes virtually zero. Progress in information technology has made these systems easier and less costly to build and operate."

GLOSSARY

Term	Definition	Source
Automated Clearing House	An electronic clearing system in which payment orders are exchanged among financial institutions, primarily via magnetic media or telecommunications, and handled by a data-processing centre.	
Bank Reserves	Deposits held by banks with the central bank.	
Bilateral exposure	One party's exposure to another party.	
Bilateral netting	Arrangement between two parties to net their bilateral obligations. The obligations covered by the arrangement may arise from financial contracts, funds transfers or both.	
Bill of Exchange	A written order form one party (the drawer) to another (the drawee) to pay a specified sum on demand or on a specified date to the drawer or to a third party specified by the drawer. Widely used to finance trade and, when discounted with a financial institution, to obtain credit.	
Book-entry system	An accounting system that permits the transfer of claims (e.g. electronic transfer of securities) without the physical movement of paper documents or certificates.	
Cash Card	Card used only in ATMs or cash dispensers (other cards often have a cash function that permits the holder to withdraw cash).	
Cash dispenser	Electromechanical device that permits consumers, typically using machine-readable plastic cards, to withdraw banknotes (currency) and, in some cases, coins.	
Caps	Quantitative limits on the funds transfer activity of individual participants in a system; limits may be set by each individual participant or may be imposed by the body managing the system; limits can be placed on the net debit position or net credit position of participants in the system.	
Cheque	A written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer. Cheques may be used for settling debts and withdrawing money from banks. See also bill of exchange.	

Central bank credit (liquidity) limits	A standing credit facility that can be drawn upon by certain designated account holders (e.g. banks) at the central bank. In some cases, the facility can be used automatically at the initiative of the account holder, while in other cases the central bank may retain some degree of discretion. The loans typically take the form either of advances or overdrafts on an account holder's account which may be secured by a pledge of securities (also known as lombard loans in some European countries), or of traditional rediscounting of bills.	
Chip Card	Also know as an IC (integrated circuit) card. A card containing one or more computer chips or integrated circuits for identification, data storage or special-purpose processing used to validate personal identification numbers (PINs), authorise purchases, verify account balances and store personal records. In some cases, the memory in the card is updated every time the card is used (e.g. an account balance is updated).	
CHIPS	Is an acronym standing for "Clearing House Interbank Payment System," a private large value credit transfer system operated by the New York Clearing House and owned by the New York clearing banks.	
Clearing house	The central location or central processing mechanism through which payment system participants agree to exchange payments.	
Clearing system	A set of procedures whereby financial institutions present and exchange data and/or documents relating to funds or securities transfers to other financial institutions at a single location (clearing house). The procedures often also include a mechanism for the calculation of participants' bilateral and/or multilateral net positions with a view to facilating the settlement of their obligations on a net or net net basis. See also netting.	**Red Book** Blue Book EM-CPSS
Collateral	An asset that is delivered by the collateral provider to secure an obligation to the collateral taker. Collateral arrangements may take different legal forms; collateral may be obtained using the method of title transfer or pledge.	**OTC**
Credit risk	The risk that a party within the system will be unable fully to meet its financial obligations within the system either when due or at any time in the future.	
Credit transfer	An electronic or paper message authorised by the payer instructing an institution holding the payer's account to transfer funds from the payer's account to the account of a nominated payee at the same or another institution.	

Cross-border netting	An arrangement to net positions or obligations between or among parties in more than one country or jurisdiction.	
Cross-border-trade	A trade between counterparties located in different countries.	**x-border**
Cross-currency settlement risk	See principal risk	**Red Book**
Daily settlement	Completion of settlement on the day of value of all payments accepted for settlements.	**Core Princi-ples**
Daylight credit	Credit extended for a period of less than one business day; in a credit transfer system with end-of-day final settlement, day-light credit is tacitly extended by a receiving institution if it accepts and acts on a payment order even though it will not receive final funds until the end of the business day. Also call daylight overdraft, daylight exposure and intraday credit.	**DvP** Red Book Blue Book ***SDF***
Debit card	Card enabling the holder to have his purchases directly charged to funds on his account at a deposit-taking institution (may sometimes be combined with another function, eg that of a cash card or cheque guarantee card).	**Red Book** Blue Book ***EM-CPSS*** Retail
Debit transfer system	A fund transfer system in which debit transfer instruments (for example, checks) made or authorised by the payer move from the financial institutions of the payee to the financial institution of the payer and result in a charge (debit) to the account of the payer.	
Deferred net settlement system	A system that effects the settlement of obligations or transfer between or among counterparties on a net basis at some later time.	**ETDC**
Delivery versus delivery	A link between a securities transfer system that ensures that delivery occurs if, and only if, payment occurs.	**DvP** x-border SDF ETDC

Delivery versus payment system	A mechanism in an exchange-for-value settlement systems that ensures that the final transfer of one asset occurs if and only if the final transfer of (an)other asset(s) occurs. Assets could include monetary assets (such as foreign exchange), securities or other financial instruments. See exchange-for-value settlement systems, final transfer.	**Red Book** Blue Book
Direct debit	Pre-authorised debit on the payer's bank account initiated by the payee.	**Red Book** Blue Book
Dvp schemes as defined by the G10	In model 1, transfer instructions for both securities and funds are settled on a trade-by-trade basis, with final transfer of the securities from the seller to the buyer (delivery) occurring at the same time as final transfer of the funds from the buyer to the seller (payment). In model 2, securities transfer instructions are settled on a gross basis with final transfer of securities from the seller to the buyer (delivery) occurring throughout the processing cycle, but the funds transfer instructions are settled on a net basis, with final transfer of funds from the buyer to the seller (payment) occurring at the end of the processing cycle. In a model 3, transfer instructions for both securities and funds are settled on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle.	**Blue Book**
Electronic money	Value stores electronically in a device such as a chip card or a hard drive in a personal computer.	**Retail**
Electronic purse	A reloadable multi-purpose prepaid card which may be used for small retail or other payments instead of coins. See multi-purpose prepaid cards.	**Blue book** EM-CPSS EM-ECB
Electronic wallet	A computer device used in some electronic money systems which can obtain an IC card or which IC cards can be inserted and which may perform more functions than an IC cards.	**EM-Sec**
Embedding	In IC card manufacturing, the process by which the chip module is mounted on the plastic carrier (card).	**EM-Sec**
Encryption	The use of cryptographic algorithms to encode clear text data (plaintext) into ciphertext to prevent unauthorised observation.	**Em-Sec** EM-CPSS EM-ECB

End-of-day gross settlement systems	Funds transfer systems in which payment orders are received one by one by the settlement agent during the business day, but in which the final settlement takes place at the end of the day on a one-by-one or aggregate gross basis. This definition also applies to gross settlement systems in which payments are settled in real time but remain revocable until the end of the day.	**Blue Book**
Face-to-face payment	Payment carried out by the exchange of instruments between the payer and the payee in the same physical location.	**Red Book** Blue Book EM-CPSS EM-ECB Retail
Final settlement	Settlement which is irrevocable and unconditional	**Red Book** Blue Book
Final settlement	The discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional.	**SSS**
Final transfer	An irrevocable and unconditional transfer of funds which effects a discharge of the obligation to make the transfer. The terms "delivery" and "payment" are each defined as a final transfer. See provisional transfer.	**DvP** Red Book Blue Book x-order SDF ***Retail***
GIRO Finality risk	The credit transfer payment system offered by banks, post offices and postal banks in many European countries. Payment is effected through a single GIRO form which permits the bank or post office to direct debit the payer's account and credit the payee's account. The risk that a provisional transfer of funds or securities will be rescinded.	**SDF**
Financial risk	Term covering a range of risks incurred in financial transactions-both liquidity and credit risks. See also liquidity risk and credit risk.	**Core Principles**

Firewall	A hardware-and/or software-based system that is used as an interface between the internet and a computer system to monitor and filter incoming and outgoing communications.	**Em-Sec**
Funds transfer system	A formal arrangement based on private contract or statute law, with multiple membership, common rules and standardised arrangements, for the transmission and settlement of money obligations arising between the members. See Interbank Funds Transfer System.	**Blue Book**
Gridlock	A situation that can arise in a funds or securities transfer system in which the failure of some transfer instructions to be executed (because the necessary funds or securities balances are unavailable) prevents a substantial number of other instructions from other participants from being executed. See also failed transaction, queuing, systemic risk.	**Red Book** Blue Book SDF
Gross settlement system	A transfer system in which the settlement of funds or securities transfer instructions occurs individually (on an instruction basis)	**x-border** SDF
Hydbrid system	A payment system that combines characteristics of RTGS systems and netting systems.	**Core Principles**
Internet	An open worldwide communication infrastructure consisting of interconnected computer networks and allowing access to remote information between computers.	**Em-Sec** EM-CPSS EM-ECB
interoperability	A situation which payment instruments belonging to a given scheme may be used in other countries and in systems installed by other schemes. Interoperability requires technical compatibility between systems, but can only take effect where commercial agreements gave been concluded between the schemes concerned.	**EM-ECB**
Intraday liquidity	Funds which can be accessed during the business day, usually to enable financial institutions to make payments in real time. See also intraday credit.	Core Principles
Irrevocable transfer	A transfer which cannot be revoked by the transferor.	
ISO	International Organisatiom for Standardization: an international body whose members are national standards bodies and which approves, develops and publishes international standards.	EM-SEc

Large-value funds transfer system	A funds transfer system through which large-value and high-priority funds transfer are made between participants in the systems for their own account or on their customers. Although, as a rule, no minimum value is set for the payments they carry, the average size of payments passed through such systems are sometimes known as wholesale funds transfer systems.	EM-CPSS Blue Book
Large-value payments	Payments, generally of very large amounts, which are mainly exchanged between banks or between participants in the financial markets and usually require urgent and timely settlement.	EM-CPSS Blue Book
Legal risk	The risk of loss because of the unexpected application of law or regulation or between a contract cannot be enforced.	x-border ETDC OTC SDF SLT
Legal risk	The risk that a party will suffer a loss because laws or regulations do not support the rules of the securities settlement systems, the performance of related settlement arrangements, or the property rights and other interests held through the settlement system. Legal risk also arises if the application of laws and regulations is unclear.	SSS
limit	See credit limit	Core Principles
Liquidity risk	The risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debit obligations at some unspecified time thereafter.	Red Book Blue Book
Magnetic ink character recognition	A technique, using special MICR machine-readable characters, by which documents (ie cheque, credit transfers, direct debits) are read by machines for electronic, processing. See Optical character recognition (OCR)	Red Book Blue Book
MICR	See magnetic ink character recognition	
Margin	Margin has at least two meanings. In the future/commodity markets, margin is a good faith deposit (of money, securities or other financial instruments) required by the futures clearing system to assure performance. In the equities markets, margin is a sum of money deposited by a customer when borrowing money from a broker to purchase shares. The money deposited with the broker is the different between the purchase value of the shares and the collateral value of the shares. See haircut.	Red Book Blue Book DvP

Market risk	The risk of losses in on and off balance-sheet positions arising from movements in market prices.	ETDC
Minimum standards of the lamfalussy report (Lamfalussy standards)	The six minimum standards for the design and operation of x-border and mulcurrency netting schemes or systems. (i) Netting systems should have well-founded legal basis under all relevant	
Netting	The agreed creation from multiple positions or obligations of a single position/obligation, which is calculated as the sum of positive positions, or obligations owing less the sum of negative positions or obligations owed. Netting/offsetting may take several forms, which have varying degrees of legal enforceability in the event of default of one of the parties.	
Operational risk	The risk that operational factors such as technical malfunctions or operational mistakes will cause or exacerbate credit or liquidity risks.	
Payment system	An agreed upon way to transfer value between buyers and sellers in a transaction; It comprises the rules, standards, instruments, institutions, and technical means for exchanging financial value between two parties; It defines the procedures, rules, standards and instruments used to exchange financial value between two parties discharging obligation.	
Real-Time Gross Settlement System (RTGS)	A gross settlement system in which both processing and final settlement of funds transfer instructions can take continuously (i.e. in real time). As it is gross settlement system, transfers are settled individually, that is without netting debits against credits. As it is real-time settlement system the system effects final settlement continuously rather than periodically	
SEACEN	Stands for South East Asian Central Banks. SEACEN is a non-profit international organisation of the central banks in the South East Asian region.	
Settlement	The process of transferring the transaction value between the originating and the receiving bank. To settle payment transactions, the two participating banks must have account relationships with each other or each must have accounts with a common third party; an act that discharges financial obligations between two or more parties	
Systematic disruption	The events which may affect the stability of the financial system by its transmission from one financial institution to through the payment systems, among others.	

Systematic risk	The risk resulting from a disruption in the system causing the inability of other system participants or financial institutions in other parts of the financial system to meet their obligations as they become due. Such a failure could cause widespread liquidity or credit problems and, as a result, could threaten the stability of the system or of financial markets.	
Systematically important payment system	A payment system, which is insufficiently protected against risks, or disruption within, exists, that could trigger systematic disruptions in a wide range of financial system in a certain area.	
S.W.I.F.T	Is an acronym standing for "Society for Worldwide Interbank Financial Telecommunications." It is a commercial organisation established for the benefit of banks and financial institutions throughout the world. It operates a network of communications allowing for transmission of financial messages (in a specific S.W.I.F.T. standard). It is neither a bank, nor a payment system, but a message carrier. The system can be used by banks and other financial institutions for money transfers, for opening letters of credit, netting operations and the exchange of general, "free format" messages.	
TARGET	Is an acronym standing for "Trans-European Automated Real-Time Gross Settlement Express Transfer" system. It is the main payment system of Euroland. It s structure mirrors that of the Euro system. The Euro system is the central bank of the euro area. It is formed by the real-time settlement (RTGS) systems run by the national central banks. These systems are connected by an "Interlinking" system, which mainly consists in a set of common procedures and in the use of a single information carrier for cross-border payments: S.W.I.F.T.[1]	
Wholesale Transfer System	An inter-bank funds transfer system where large-value and high priority funds are transferred between banks on their own account or on behalf of customers.	

1. Defined and explained by Godeffroy J.M., European Central Bank, "Introduction of TARGET in the European Monetary Union:" Current Topics In Payment And Settlement Systems, Papers presented at a CPSS Asian-Pacific workshop, Hong Kong SAR, May 1999, CPSS, BIS, Basel, Switzerland, December 1999, p. 5.