Role of Payment and Settlement Systems in Monetary Policy and Financial Stability

Edited by

Aloysius Donanto H. Wibowo



The **SEACEN** Centre

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY

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Edited
Aloysius Donanto H. Wibowo

The South East Asian Central Banks (SEACEN)
Research and Training Centre
Kuala Lumpur, Malaysia

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Published by The South East Asian Central Banks (SEACEN)
Research and Training Centre
Level 5, Sasana Kijang
Bank Negara Malaysia
No. 2, Jalan Dato' Onn
50480 Kuala Lumpur
Malaysia

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Website: http://www.seacen.org

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ISBN: 978-983-9478-24-2

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Printed in Malaysia by Graphic Stationers Sdn. Bhd.

Foreword

The payment and settlement systems play a core intermediating function and operate as the "plumbing system" for financial markets to help ensure swift, safe and seamless flow of funds from one payment participant to another. Smooth and certain settlement of payments would reduce risks, including exchange rate risk, and improve liquidity management. In turn, this will not only enhance transaction certainty for the financial institutions, but also facilitate timely availability of critical information for supervisors and monetary authorities. Concurrently, prompt and smooth financial settlements should further enhance the effectiveness of monetary policy transmission and the overall conduct of monetary policy. Efficient payment and settlement systems are, therefore, critical infrastructures to the success of attaining monetary and financial stability.

The development of payment and settlement systems has been influenced by the rapidly changing technologies which drive the various innovations in the field of payment systems. Currently, payment systems are developed not only by banks but also non-banks. Innovations in payment systems which will facilitate economic transactions, may affect the wider economy in the long-run, including monetary and financial stability. Thus, the central bank has an important role in the development of payment systems, especially in the area of assessing and monitoring the development itself, in order to mitigate future risks that may affect monetary policy decisions and the stability of financial markets.

The objective of this study is to assess payment and settlement systems standards across the SEACEN economies, both on the retail and wholesale levels as well as to identify key challenges and issues to improve the efficiency of the payment and settlement systems of the SEACEN economies. It also seeks to identify areas where payment and settlement systems directly influence domestic monetary and financial stability and assess efforts to further develop and improve payment and settlement systems across the region. Lastly, the study also looks at regional cooperation in the area of payment and settlement systems involving SEACEN economies to evaluate the outcomes and shortcomings and identify key areas of cooperation going forward.

This collaborative research was led by the Project Leader, Mr. Aloysius Donanto H. Wibowo, Assistant Director in the Payment Development and Policy Group of Bank Indonesia and concurrently Visiting Senior Economist of The SEACEN Centre (OP 2012).

The SEACEN Centre wishes to express its sincere gratitude to the Project Leader and participating member central banks/monetary authorities and their researchers for actively participating in this project and preparing the chapters of their respective economies. They are namely, Dk Sri Joedianna Pg Haji Mohammad, Senior Manager, Monetary Policy and Financial Stability, Autoriti Monetari Brunei Darussalam; Mr. Phan Pijeivibol, Division Chief, Economic Research and International Cooperation Department, National Bank of Cambodia; Mr. Putu Paulus Adi Susila, Junior Analyst, Directorate of Accounting and Payment System, Bank Indonesia; Mr. Kim Jong Wook, Head, Payment Systems Research Team, Payment and Settlement System Department, The Bank of Korea; Mrs. Nwe Ni Tun, Deputy Director, Financial Market Department, Central Bank of Myanmar; Mr. Binod Raj Acharya, Deputy Director, Public Debt Management Department, Nepal Rastra Bank; Ms. Geralyn M. Zafra, Bank Officer V, Department of Economic Research and Mr. Rolando U. Bermas, Bank Officer V, Payment and Settlements Office, both of Bangko Sentral ng Pilipinas; Mr. P.G.G.N Rupasinghe, Assistant Director, Payments and Settlements Department, Central Bank of Sri Lanka and last but least Mr. Kuo-Hsing Chang, Senior Analyst, Department of Banking, Central Bank, Chinese Taipei.

The SEACEN Centre also thanks Mr. Ronasak Ruengvirayudh, Former Director (Retired) of the Payment System Policy Department of Bank of Thailand for his useful comments and suggestions in his review of the integrative report. Lastly, the assistance of staff members of SEACEN's Research and Learning Contents Department is acknowledged for the completion of this study. The views expressed in this study, however, are those of the authors and do not necessarily reflect those of The SEACEN Centre or the SEACEN member central banks.

September 2013

Hookyu Rhu
Executive Director
The SEACEN Centre
Kuala Lumpur

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Executive Summary

The development of payment and settlement systems has been influenced by the rapidly changing technologies which drive the various innovations in the field of payment systems. Currently, payment systems are developed not only by banks but also non-banks. Innovations in the payment systems which will facilitate economic transactions, may affect the wider economy in the long-run, including monetary and financial stability. Thus, the central bank has an important role in the development of the payment systems, especially in the area of assessing and monitoring the development itself, in order to mitigate future risks that may affect monetary policy decisions and the stability of financial markets.

In addition, since the payment and settlement systems have been integrated with other systems, the role of the payment systems in economic stability has now increased. The payment systems may also affect the stability of the banking and financial system. For this reason, this study is intended to determine the relationship between the payment and settlement systems, monetary policy and financial stability.

The development of the payment systems is at different stages in SEACEN economies, varying with the economic development in the respective economies. For example, some economies in SEACEN are already implementing the Real-time Gross Settlement (RTGS) system while others are still using the Cheque Clearing House. While central banks in the respective SEACEN economies play varying roles, all nonetheless have the responsibility for oversight of the payment and settlement systems which are regulated by specific laws. Therefore, the payment and settlement systems in SEACEN economies have high interdependencies with the role of the central banks in its implementation. From the team reports, we can conclude that the central bank in the respective economies performs a notable role in the payment and settlement systems by:

- Providing or operating the payment facility for final settlement to financial institutions i.e., providing the RTGS and operating the Automated Clearing House;

- Issuing policy related to the payment and settlement systems;

- Providing credit facilities for banks (as a lender of last resort); and

- Providing oversight of the systems, to ensure that the systems are working in a sound, efficient and effective manner.

Quantitative and qualitative analyses are used in this study to look at the relationship between the payment systems, monetary policy and financial stability. The quantitative approach used is the determinant of the velocity of money considering that velocity is affected by many factors such as economic development, innovations, financial deepening, interest rates, inflation, etc.

The basic formula MV = PT was used and its derivation p * = m + v * - q *. Using data M2, inflation and GDP, the results show that there is a significant relationship between GDP, M2 and inflation rate in that the velocity of money will increase in line with the increase in GDP, while the increase in M2 will reduce the velocity of money. The velocity of money is also influenced by financial innovations. As the usage of non-cash payment instruments in SEACEN economies is expected to rise, non-cash payment instruments will play a significant role in money demand and will further affect prices, GDP and monetary policy.

Meanwhile, the qualitative analysis looked at the incidences of the Asian and Global financial crisis. It is important to note that while the Asian financial crisis caused SEACEN economies to falter, it also taught valuable lessons. Since the Asian financial crisis, most central banks in SEACEN economies had strengthened their financial systems. This was the reason why most SEACEN economies only experienced minimal impacts from the recent global crisis.

This research study also reveals that there is a set of monetary policy instruments used by monetary authorities such as open market operations, interest rate policy, monetary targetting framework, minimum reserve requirement, etc. It is widely known that monetary policy and the payment and settlement systems have interdependencies. Any disruption would affect the payment systems and price stability, which may in turn also have an impact on monetary policy implementation. Therefore, central banks need to find a way for safeguarding price stability while at the same time ensuring the smooth functioning of the payment systems by drawing a clear line between providing intraday liquidity for payment system purposes and providing credit for monetary policy implementation.

The use of central bank money in final settlement is one element that demonstrates an implicit link between the payment systems, monetary and financial stability. A reliable and resilient infrastucture for distributing the ultimate settlement asset is a key requirement for stability and effective implemention of monetary policy.

List of Abbreviations

ACH	Automated Clearing House
ACU	Asian Clearing Union
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CCP	Central Counterparty
CGFS	Committee on the Global Financial System
CIT	Cheque Imaging and Truncation
CPSIPS	Core Principles for Systemically Important Payment Systems
CPSS	Committee on Payment and Settlement Systems
CSD	Central Securities Depository
DNS	Deferred Net Settlement
DvD	Delivery Versus Delivery
DvP	Delivery Versus Payment
EFT	Electronic Fund Transfer
FMI	Financial Market Infrastructure
FSB	Financial Stability Board
ICSD	International Central Securities Depository
IOSCO	International Organization of Securities Commissions
LEI	Legal Entity Identifier
LVPS	Large-value Payment System
OTC	Over-the-Counter
POS	Point-of-Sale
PS	Payment System
PSS	Payment and Settlement System
PvP	Payment versus Payment
RCCP	Recommendations for Central Counterparties
Repo	Repurchase Agreement

RPS	Retail Payment System
RSSS	Recommendations for Securities Settlement Systems
RTGS	Real-time Gross Settlement
SEACEN	South East Asian Central Banks (SEACEN) Research and Training Centre
SIPS	Systemically Important Payment System
SSS	Securities Settlement System
TR	Trade Repository

Chapter 1

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY : INTEGRATIVE REPORT

By
Aloysius Donanto H. Wibowo[1]

1. Introduction

In the recent decades, technology has greatly influenced the development of the payment and settlement system. The implementation of these technologies has opened up a variety of payment transaction processing and encouraged the innovation of technology-based banking services. This increasing variety can be seen from the growing usage of non-cash payment such as credit cards, debit cards and electronic money which are widely used today. Payment instruments nowadays are being developed not only by banks but also by non-bank institutions. The existence of a wide range of electronic payments services has facilitated non-cash payment transactions, anytime and anywhere, through an electronic network. However, this development of payment and settlement system has a relevance for monetary and financial stability, as well as the overall economic development. Thus, most central banks today are monitoring the development in the payment and settlement system and assessing its impact on monetary policy transactions and the efficiency and stability of financial markets.

Moreover, the payment and settlement system can also become a channel through which financial risks can be transmitted accross markets and financial institutions. Disturbances of systemic relevance can arise as a result of operational problems or technical difficulties in the payment and settlement system. These can affect banks' liquidity positions, demand for money and the ability to clear and settle transactions, putting participants at risk and threaten the stability of the financial system. Moreover, increased payment and settlement system integration has exposed economies (including SEACEN economies) to contagion risks. Ever since the financial crisis, the Asian financial crisis and the recent global financial crisis for example, the role of the payment and settlement system has been subjected to critical assessment and evaluation.

---

1. The Project Leader is Assistant Director in the Payment Development and Policy Group of Bank Indonesia and concurrently Visiting Research Economist of The SEACEN Centre in OP 2012.

In order to address this concern, this research project aims to study the role of the payment and settlement system in fostering financial stability and implementation of monetary policy. The report comprise of findings, summary of payment and settlement system statistics and analysis on the relationship between the payment and settlement system, monetary policy and financial stability.

Section 1 of the Integrative Report provides the background and introduction for this research. It delves into the importance of payment and settlement system for maintaining financial stability and providing the monetary policy linkages. Section 2 provides the theoretical background on how the payment and settlement system affects financial stability and its relationship with monetary policy. Section 3 gives a description of the payment and settlement system in SEACEN economies, focusing on financial market infrastructures that require close monitoring. Section 4 sets out the relationship between payment system and financial stability, while the Section 5 sets the relationship between payment and settlement system and financial stability. Section 6 describes the crisis which were faced by the SEACEN economies recently, and also the relationship between this crisis and the financial market's strength and vulnerabilities. Section 7 looks at the empirical study about the relationship among PSS, monetary policy, and financial stability. Section 8 draws a conclusion and sets out recommendations to improve the safety and efficiency of the payment and settlement system.

2. Literature Review

Technological advancement which led to a changing payment and settlement system had increased the importance of payment and settlement system for economies. The emergence of new financial instruments has a considerable influence in the growth of financial activities. It also influenced changes in payment systems within the community. These rapid technological changes also led to increased involvement of central banks in PSS.

As a part of the economic system, the payment system allocates funds according to each parcipants' rights and obligations. In an inefficient allocation of fund, the financial system will be unstable, thus hampering economic growth. An unreliable PSS also can expose its participants to risks and transmit those risks from one system to another causing systemic impacts which can lead to a crisis in the economy. If a crisis occurs, the costs for recovery from the unstable financial system can be immense. Therefore, payment and settlements system are a notable part of the economic and financial infrastructure in modern economies.

The soundness and efficiency of the PSS contributes to economy development and financial stability. An efficient payment system is important to the well functioning of the entire economy because it facilitates the exchange of goods, assets, and services. The speed and convenience for making payment transactions will have the potential to affect economic activities.

2.1 Payment and Settlement Systems Theories

According to the Red Book by CPSS, the payment system is a set of instruments, banking procedures, and typically interbank funds transfer system that ensure the circulation of money; while the settlement system is a system used to facilitate the settlement of transfers of funds or financial instruments. From this definition, we can see that this sytem may become a major channel which transmits shocks across participants, both in domestic and international markets. Failure in one or more payment system participant to meet its required obligations will cause other participants to be unable to meet their obligations when due. Such failure may cause significant liquidity or credit problems and as a result might threaten financial stability. Financial markets might become unstable if a gridlock occurs, which is a situation that arise in funds transfer system where the failure of some transfer instructions (because there is insufficient funds) prevent a substantial number of other instructions from other participants from being executed. Therefore a payment system needs to be well designed and efficient to overcome this problem.

2.2 Contribution of Payment Systems to Financial Stability and Monetary Policy

In recent years, payment systems have undergone a remarkable change. These changes, however, influence the operation of monetary policy, and is not a one-way interaction. Monetary policy also influences the payment system, just like payment systems affects monetary policy (Schmitz, 2006). The study on the importance of payment and settlement system was motivated by the events of the BankHaus Herstatt bankruptcy in 1974 and the New York Stock Exchange Crash of 1987. Eversince then, the payment system has been gaining in importance in terms of central bank concern (CPSS, 2000).

A safe and sound payment and settlement system plays an important role in maintaining financial stability. A robust and properly maintained payment system infrastructure can still perform well during a global financial crisis, not hampering national financial growth. Therefore, a central bank needs to improve the payment and settlement system to ensure the safety and soundness of the financial system.

However, there is potential trade-off between the safety and efficiency of payment system, or namely there is a trade-off between the objective of minimising the risk of payment system and the objective of maximising the speed of transactions and minimising the cost associated with the payment system.Cost reduction, at some point, may result in slower or inaccurate services. Lower risk is much more preferred than higher risk, but it also cost more. Therefore, an equal balance between risk and efficiency is highly desired. Payment systems, therefore, can be subjected to a range of risks, which are similar to those of the banking sector although they are not exactly the same. According to the Core Principles for Systemically Important Payment systems by CPSS- BIS, payment systems can be subject to a range of risks, including: ***credit risk***, ***liquidity risk***, ***legal risk***, ***operational risk, systemic risk***.

1. Credit risk – is the risk that occur when a party within the system will be unable to fully meet its financial obligations within the system currently or at any time in the future.

2. Liquidity risk – is the risk when a participant 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. It can be decreased by sufficient collateral.

3. Legal risk – is the risk that a poor legal framework or legal uncertainties will cause or exacerbate credit or liquidity risks

4. Operational risk – is the risk that operational factors such as technical malfunctions, operational mistakes will cause or exacerbate credit and liquidity risks

5. Systemic risk –is the risk of the inability of system participants to meet their obligations, or a disruption in the system itself, resulting 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 of financial markets.

2.3 Principles of Financial Market Infrastructure

With objectives is to prevent systemic crises that could arise due to gridlock situations, CPSS formulated the Principles of Financial Market Infrastructure as a standard to strengthen the existing international standards for Systemically

Important Payment System, Central Security Depositories (CSDs), Securities Settlement System (SSSs) and Central Counter Parties (CCPs).

The Principles for Financial Market Infrastructures (FMIs) are designed to make FMIs more resilient to financial crisis and participant defaults, in particular. The standards set out a specific minimum requirement to ensure a common minimum level of risk management across FMIs and countries. The CPSS – IOSCO (Committee on Payment and Settlement Systems - International Organization of Securities Commissions) also issued the Assessment Methodology for the Principles for FMIs which contains detailed methodology for determining the degree to which an FMI observes the principles and a relevant authority observes the responsibilities.

The principles for FMIs are broadly designed for application on all systemically important payment systems and applicable to FMIs operated by central banks. The focus of the principles is on ensuring that FMIs operate as smoothly as possible by providing guidance for addressing risk and efficiency in financial market infrastructures. Although most principles are applicable to all types of FMIs, only a few principles are relevant to specific types of FMIs. Of the 24 principles in the publication, 19 principles are applicable to the payment system. These 19 principles provides specific guidance for the payment system.

The overall organisation of the principles consists of 9 elements that include: General Organisation, Credit and Liquidity Risk Management, Settlement, Central Securities Depositories and Exchange-of-value Settlement Systems, Default Management, General Business and Operational Risk Management, Access, Efficiency and Transparency. Some of co-related principles are categorised into one element as shown below.

Table 1
Nine Elements of Principles of Financial Market Infrastructure

The Elements	Principles	PS	CSD	SSS	CCP	TRs
General organisation	1: Legal basis	x	x	x	x	x
	2: Governance	x	x	x	x	x
	3 : Framework for the comprehensive management of risks	x	x	x	x	x
Credit and liquidity risk management	4 : Credit risk	x		x	x	
	5 : Collateral	x		x	x	
	6 : Margin				x	
	7 : Liquidity risk	x		x	x	
Settlement	8 : Settlement finality	x		x	x	
	9 : Money settlements	x		x	x	
	10 : Physical deliveries		x	x	x	
Central securities depositories and exchange-of-value settlement systems	11 : Central securities depositories		x			
	12 : Exchange –of-value settlement systems	x		x	x	
Default management	13 : Participant-default rules and procedures	x	x	x	x	
	14 : Segregation and portability				x	
General business and operational risk management	15 : General business risk	x	x	x	x	x
	16 : Custody and investment risks	x	x	x	x	
	17 : Operational risk	x	x	x	x	x
Access	18 : Access and participation requirements	x	x	x	x	x
	19 : Tiered participation arrangements	x	x	x	x	x
	20 : FMI links	x	x	x	x	x
Efficiency	21 : Efficiency and effectiveness	x	x	x	x	x
	22 : Communication procedures and standards	x	x	x	x	x
Transparency	23 : Disclosure of rules, key procedures, and market data	x	x	x	x	x
	24 : Disclosure of market data by trade repositories					x

As mentioned previously, the PFMIs are considered the new standards for the five key types of FMIs but each FMI type can adopt different principle standards. As can be seen in Table 1, payment systems are incorporated within the 19 principles while CSD (Central Securities Depositories) have to comply to 15 principles.

In the construction of PFMIs, the previous standard for the payment system which is the CPSIPs (Core Principles for Systemically Important Payment Systems) are still valid and can be incorporated in the new PFMIs. Some new elements include additional principles that are concerned with the mitigation of risk and access and participation requirements.

3. Overview of the Payment Systems in the SEACEN Economies

The payment and settlement system has played an important role in promoting economic growth. From the project team papers, it can be gathered that the payment and settlement systems (PSS) have contributed to the objectives of financial stability and monetary policy. A secure and efficient PSS is a prerequisite for the growth of the financial market. This importance of the PSS has resulted in SEACEN economies reforming their payment and settlement systems. This section sets out the analysis of the PSS in SEACEN economies.

3.1 Role of Central Bank in PSS

In general, the central bank has an important role in the continuity of the PSS in the economy. For this, the central bank's functions are focused in two core areas of maintaining price stability and financial stability. In accordance with its role in maintaining financial stability, the central bank has a responsibility to ensure that the banking and financial sector is able to meet public demand for liquidity. As a consequence, the central bank has to guarantee the soundness and efficiency of the PSS.

Table 2
Role of Central Bank in SEACEN Economies

Economy	Role of Central Bank in Payment and Settlement Systems	Regulated Law
Brunei Darussalam	To assist in the establishment and functioning of efficient payment systems and to oversee them	Section 4 of the AMBD Order, 2010
Cambodia	NBC (National Bank of Cambodia) has statutory responsibility for oversight of the payment system	Article 7 of the Law on Organization and Conduct of NBC (1996)
Indonesia	BI (Bank Indonesia) has one main objective which is to attain and maintain the stability of the Indonesia Rupiah (IDR). To reach its goals, BI has taken a leading function in developing Indonesia Payment and Settlement System in order to increase the smoothness, efficiency, safety and the trustworthy of Indonesia PSS	BI Act
South Korea	BOK (Bank of Korea) has oversight of the payment and settlement system in order to heighten safety and efficiency of the nation's payment system as a whole	BOK Act
Myanmar	CBM (Central Bank of Myanmar) is in charge of the functions of both monetary and financial sector stability. The CBM has responsibilities for an efficient, fast, sound and reliable national payment system and has oversight for the payment mechanism.	Central Bank of Myanmar Law 1990
Nepal	As a central bank, NRB (Nepal Rastra Bank) is responsible for supporting the monetary policy goals, to maintain financial stability and to promote the efficiency of the financial system.The Nepal Rastra Bank Act has also entrusted the responsibility of supervision and control over banks and financial institutions to NRB. For the sound and efficient operation of the financial system, NRB regularly inspects and supervises the bank and financial institutions. However, there is no specific provision regarding the oversight of the payment and settlement system in Nepal.	Nepal Rastra Bank Act, 2001

Economy	Role of Central Bank in Payment and Settlement Systems	Regulated Law
Philippines	BSP (Bangko Sentral ng Pilipinas) pursues the following primary activities: maintaining price stability through the conduct of prudent monetary policy; promoting financial stability through effective banking supervisions and regulation; and ensuring the safety, soundness and efficiency of the payment and settlement system	BSP Charter
Sri Lanka	The CBSL (Central Bank of Sri Lanka) is the authority for the preparation of a plan for a national payment system. The CBSL performs three key roles in the PSS namely, 1. Overseeing the payment, clearing and settlement system 2. Operating systemically important payment and settlement systems, and 3. Formulating a national payments policy and developing the payment systems	Payment and Settlement Act, No 28 of 2005 (PSSA)
Chinese Taipei	The CBC (Central Bank, Chinese Taipei) is entrusted to maintain the sound operation of the payment and settlement system	CBC Act, Banking Act

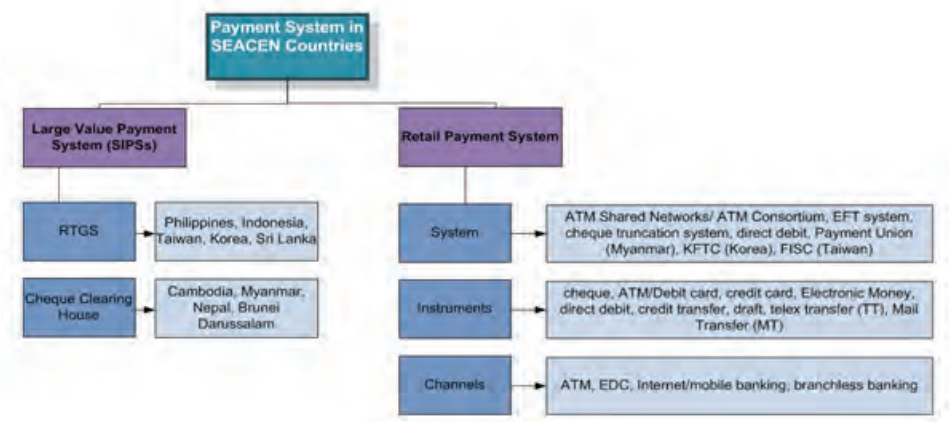
According to the project team reports, the central banks have the responsibility for the oversight of the PSS and they are regulated by specific laws (see Table 3 for details). Therefore, the development of the PSS in SEACEN economies has high interdependencies with the role of central banks. From Table 2, we can conclude that the central bank of each of the economy performs a notable role in the PSS by:

- Providing or operating the payment facility for final settlement of financial institutions, i.e., provides the RTGS and operating the Automated Clearing House;
- Issuing policies related to the PSS;
- Providing credit facilties for banks (as a lender of last resort); and,
- Providing oversight of the PSS to ensure that the systems are working in a sound, efficient and effective manner.

3.2 Overview of the PSS in SEACEN Economies

In general, payment systems in all SEACEN economies can be broadly classified into the large value payment system and retail payment system (Chart 1).

Chart 1
Types of Payment Systems in SEACEN Economies



The Systemically Important Payment System (SIPS) plays an important role in the overall stability of the payment system. According to According to the Core Principles for Systemically Important Payment systems by CPSS- BIS , SIPSs are a major channel by which shocks can be transmitted across domestic and international financial system and market. Economic disturbances may be transmitted through poorly designed SIPSs, causing contagious financial shocks across markets and borders. Thus, the importance of SIPSs has compelled SEACEN economies to reform their PSSs to minimise risks.

The SIPS in SEACEN economies comprise of the Large Value Payment System (RTGS and/or cheque clearing house) and Securities Settlement System. According to project team reports, respective systems in the SEACEN economies are listed in Table 3.

Table 3
Systemically Important Payment Systems in SEACEN Economies

Economy	Systemically Important Payment System	Type
Brunei Darussalam	Cheque Clearing and Settlement System	Cheque Clearing
Cambodia	NBC Clearing House	Cheque Clearing
Indonesia	BI-RTGS	RTGS
Korea	BOK-Wire+ , KFTC-operated systems	RTGS, cheque clearing system, interbank electronic payment system and paper giro system
Myanmar	Cheque Clearing System	Cheque Clearing
Nepal	Nepal Clearing House Limited (NCHL)	Cheque Clearing
Philippines	Philpass	RTGS
Sri Lanka	Lanka Settle, Cheque Imaging & Truncation System in Sri Lanka (CITS), Automated Trading System by Colombo Stock Exchange (CSE)	RTGS, Cheque Clearing Sytem, Securities Settlement system.
Chinese Taipei	CBC's Inter-bank Funds-transfer System (CIFS)	RTGS

3.2.1 Systemically Important Payment Systems

In funds transfer, measures have been adopted to address risk in payment systems, especially in payment system that are considered important (Systemically Important Payment System – SIPS). These systems are time critical to the overall functioning of the entire payment system. In SEACEN economies, SIPSs are the large value payment systems comprising of three categories as follows :

- ***RTGS System***

Most economies in SEACEN are using the RTGS system, which clear and settle for large value payments. All RTGS users in SEACEN economies reported

that they are using RTGS to minimise the lags in clearing and settlement which may affect the liquidity demand positions. This need for the settlement of balances will affect the daily liquidity demand of commercial banks and may affect money market interest rates. For this reason, many central banks are willing to provide standing liquidity balances and/or overdrafts which could reduce the need to hold large amounts of clearing balances. All economies with RTGS systems also reported that their central banks act as the operator for RTGS system (see Appendix VII). In economies with the RTGS system, the sources of liquidity come from opening balances and funds received from participants during the day. Credit facilities are provided by the RTGS operator as a means to enhance system liquidity. The central bank, as an operator, provides some form of credit in the form of loan/repo or collateralised account overdrafts. All RTGS operators in the economies are using the pricing policy (by differentiated charges) to promote a smooth flow of payment through the day. The centralised queuing facilities are used as liquidity management tools. Basic First-in-first-out queuing resolution mechanism is used in the queuing facilities.

- ***Cheque Clearing System***

On the other hand, RTGS system for high-value transactions in Brunei Darussalam, Cambodia, Myanmar and Nepal have not been developed yet. These countries are using the Cheque Clearing System for its Large Value Funds Transfers (LVFT). In Cambodia and Myanmar, the Cheque Clearing System is owned and operated by the central bank while in Brunei Darussalam, the system is owned by Brunei Association Banks (BAB) while HSBC (Brunei) was appointed as the management bank to operate the clearing house. In Brunei's case, there is some inherent risks faced by the PSS participants since the settlement accounts are held with one commercial bank and if the commercial bank faces illiquidity or insolvency, it could affect the accessibility to the settlement accounts. Nevertheless, these risks are mitigated by the overall strict supervision and regulation of the banks by the Autoriti Monetari Brunei Darussalam (AMBD) that ensure the banks are liquid and have sound operations.

It is worth noting that cheque systems which process large-value payments face special difficulties in complying with international standards (i.e., the forthcoming CPSS-IOSCO Principles for Financial Market Infrastructures 24), in particular with regard to the management of credit and liquidity risk (Principles 4 and 7), prompt final settlement and completion of timely settlement if the participant with the largest net debt fails to settle (Principle 8), and for the system to provide a means of making payments that is practical to users and efficient

for the economy (Principle 21). Thus, it becomes necessaty to give considerable attention drawn to this area, where the existing SIPS in the countries uses cheques.

- ***Other Systemically Important Payment System***

It is also important to note that SIPSs does not necessarily mean that it must be the large value payment in the country. Systemically important system also includes any low-value payments which may caused, trigger or transmit systemic disruption in the financial system because of the size or nature of the payment itself or because of the aggregate value of the payments processed. (BIS, 2000). Because of this definition, SIPS in Korea also include its several other paper based-and electronic payment (low-value) which operated by Korea Financial Telecommunication and Clearing Institute (KFTC), acompany owned by payment system participants, including BOK. Besides Korea, Sri Lanka also has another SIPSs in addition to its RTGS system. These systems are Cheque Imaging and Truncation System in Sri Lanka (CITS) and Equity and Corporate Debt Securities Settlement at Colombo Stock Exchange (CSE). In terms of its value of transactions cleared, these three systems (KFTC in Korea, CITS and CSE in Srilanka) are categorized as important payment systems.

Any disruptions to these three payment systems can result in financial system-wide impacts leading to financial system instability. These critical payment, clearing and settlement systems must be backed by a strong institutional, legal and regulatory framework. The detail explanations of SIPS in SEACEN countries are as follows:

- **Brunei Darussalam Cheque Clearing House**

Unlike other SEACEN economies , the cheque clearing system in Brunei Darussalam is owned by the association of banks – Brunei Assocation of Banks (BAB). HSBC (Brunei) act as the management bank and operates the clearing house based on cost-recovery principle whereby all the expenses incurred (provision, managament and provision) will be borne by BAB. In this case, HSBC can directly collect the expenses due from each member of BAB according to each proportion. The settlement cycle for the paper cheque normally takes four days according to the agreement between HSBC and banks. With this arrangement, all banks needs to centralise their accounts with HSBC for the efficiency of their own liquidity management and maintain credit balances with HSBC (Brunei) for fund settlements. To conduct its operation and financial activities, AMBD needs to open accounts with commercial banks and maintain credit balances in these accounts.

The cheque clearing house in Brunei Darussalam is governed by two set agreements among the relevant parties: (i) the service agreement between between HSBC (Brunei) and BAB and (ii) the bilateral service agreement between HSBC (Brunei) and individual banks that includes the service standard, interbank tariff, clearing time schedule, etc. However, whilst it is clear that BAB is the owner of the Clearing House in Brunei and HSBC (Brunei) acts as the operator, the agreement does not really state who is responsible for the delay or failure in the settlement process. The agreement also does not specify where defaulting banks can get liquidity support. In this case, neither BAB nor HSBC (Brunei) will be liable for the settlement or sub-settlement obligations for any defaulting bank to any other bank. However, with regard to payment delay or failure, AMBD can provide the following according to AMBD Order 2010:

- Develop and manage an interbank funds system and establish the requirements for its participants;
- Provide facilities, including intra-day credit, to payment, clearing and securities settlement system, and their participants, to ensure the safety, soundness and efficiency of such systems, without prejudice to the development and management of an interbank fund system; and
- Lender of Last Resort which gives AMBD the power to grant financial assistance to eligible banks and financial institutions not exceeding 90 days as long as they are solvent and can provide collaterals as set by AMBD.

AMBD is currently embarking on a project for the establishment of a national payment system to improve the efficiency of the PSS and also to mitigate the associated risks. The future plan may include the creation of an AMBD-owned system that would enable AMBD to conduct oversight on the systemically important payments as well as to provide DvP (Delivery vs Payment) of debt securities through the future implementation of a CSD (Central Securities Depositories).

- **Cambodia NBC Cheque Clearing House and Electronic Funds Transfer**

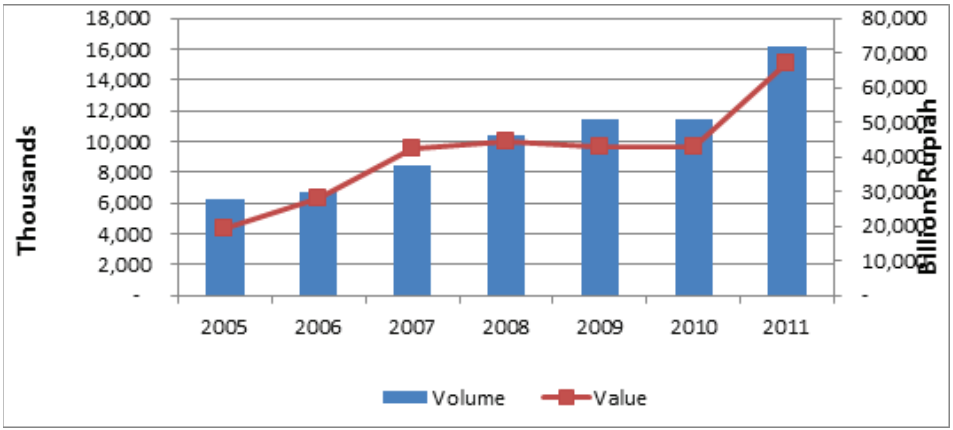
The Clearing House which is under the supervision of the NBC has played a dominant role in facilitating the settlements of the private sector, banking and financial institutions and the Royal Government. Since Cambodia's economy is highly dollarised, the clearing arrangement is catered for cheques denominated in both US dollars and Khmer riels. Settlements via the clearing house are dominated by USD denominated cheques. The total amount of US dollar-denominated check clearing at the NBC's clearing house increased gradually

from nearly US$5 billion in 2007 to about US$9.5 billion in 2011, while those denominated in

- **Indonesia - BI-RTGS**

Interbank large value payments are processed by Bank Indonesia through the BI-RTGS (Real Time Gross Settlement) system and clearing system. The BI-RTGS sytem also allows for integration with other payment system applications such as for money market and capital market transactions settled by Delivery versus Payment (DVP). Links with crossborder payments are also possible using the Payment versus Payment (PVP) application. The BI-RTGS functions as the main system for transactions settlement. Payments from other systems such as the National Clearing System (SKNBI), Securities Settlement System (BI-SSSS), capital market, banks and cross border transactions are settled through the BI-RTGS system. During 2005 until 2011, the volumes for transactions volume and value have increased, as can be seen in Chart 2.

Chart 2
BI-RTGS Transactions Data

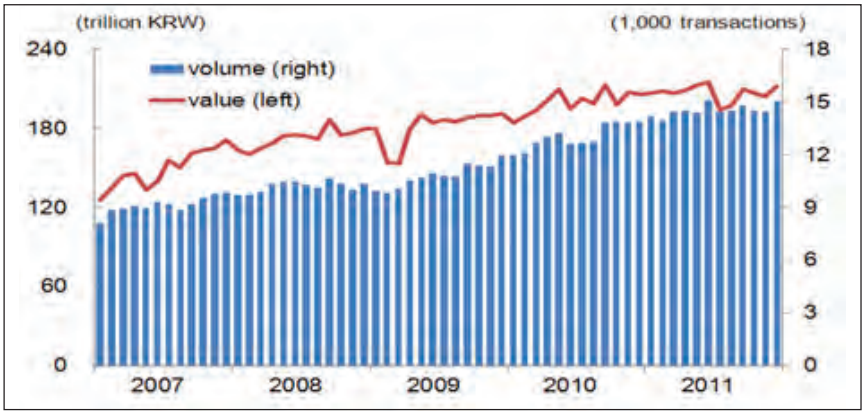


- **Korea - BOK-Wire+ and KFTC-operated Payment System**

The BOK-Wire, which was introduced in 1994, was a processed funds transfers system based on a real-time gross settlement (RTGS) mechanism. As the BOK-Wire settlement volumes surged, the liquidity burden on participants increased. In view of the increasing volumes, the BOK in 2009 completed the development of a new system (BOK-Wire+), which would use not only the RTGS

mechanism but a hybrid settlement mechanism as well. A hybrid settlement system is a payment system which combines characteristics of the RTGS system and a netting system by adding bilateral and multilateral offsetting features. The BOK Wire also showed an increase during 2007 until 2011, as can be seen in Chart 3.

Chart 3
Payments and Settlements Processed through BOK-Wire



Besides BOK-Wire, Korea also has another systemically important payment system which is the KFTC – operated systems. These systems include various electronik interbank payment systems, cheque clearing systen and paper-based giro system. Each of these systems settles on a multilateral basis through BOK-Wire at designated times. In terms of the value of transactions cleared, this system is categorized as the second most important clearing system in Korea.

- **Myanmar Cheque Clearing System**

The Myanmar Cheque Clearing System is the only clearing and settlement mechanism for large value payments in Myanmar. The CBM Cheque Clearing House is a paper-based cheque clearing house. At present, there are 3 manual clearing houses in Myanmar and the paper based cheque clearing system cannot function effectively for the whole country. All state owned banks and private banks also participate as clearing members. The Electronic Funds Transfer (EFT) system in Myanmar which is used for transferring large fund values is operated by the CBM. Like the Cheque Clearing House, all state owned banks and private banks have access to this system. All participating banks can send payment instructions rapidly and payments are settled almost in real time.

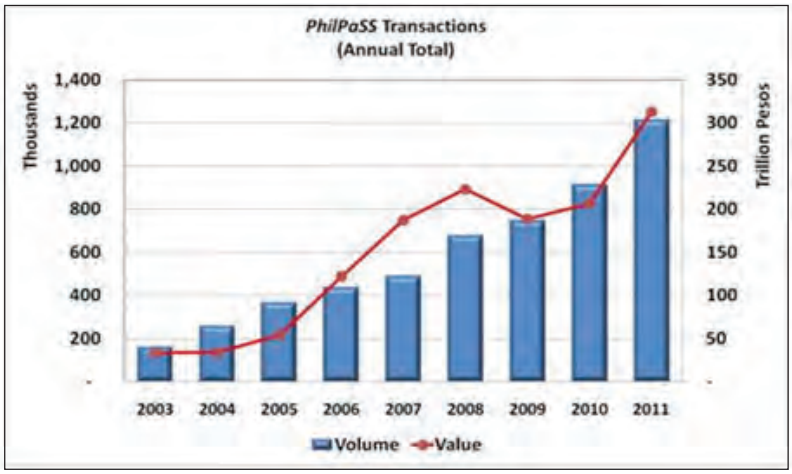
- **Nepal Clearing House Limited (NCHL)**

The Nepal Clearing House Limited (NCHL) was established with the support of NRB along with the Nepal Bankers' Association (NBA) which is involved in settling corporate level interbank payment transactions in the Kathmandu valley. Each bank and financial institution including the NRB is a member of the NCHL and pay a membership fee. At the branch level, NRB acts as a clearing house in each of its seven branches in various cities. The local branches of the banks and financial institutions are members of the NRB branches' clearing system and settlements are based on the multilateral transactions among the clearing members.

- **Philippines – Philpass RTGS**

BSP developed a real time gross settlement system (RTGS) known as the Philippine Payments and Settlements System ***(PhilPaSS)*** on 12 December 2002. In ***PhilPaSS,*** all transactions are processed and settled on a real time basis through its Central Accounting System (CAS) which prompts the accounting and recording of the settlement instructions received from SWIFT (for Swift member banks) and PPS-FES (for non-swift), into the participants DDA (demand deposits account) with the BSP. CAS debits the account of the paying bank and credits the account of the receiving bank. The volume and value of financial transactions that are settled via ***PhilPaSS*** showed an upward trend from 2003 to 2011, notwithstanding the onset of the global financial crisis in 2007 (see Chart 4).

Chart 4
***PhilPass* Upward Trend (2003 – 2011)**



- **Sri Lanka - Lanka Settle, CITS and CSE**

Lanka Settle, comprising the Real Time Gross Settlement System (RTGS) and the Scripless Securities Settlement Systems (LankaSecure) is operated by the Central Bank of Sri Lanka. The integration of the RTGS System and LankaSecure System provides the most secured securities settlement mechanism based on Delivery versus Payment for scripless securities transactions. The RTGS System settles large value and time critical rupee payments. The value of transactions settled in the RTGS System accounts for about 89 percent of the non-cash payments in Sri Lanka.The RTGS System settled an average of 1,114 transactions a day in 2011, with a daily average turnover value of Rs.241 billion.

Besides Lanka Settle, the Cheque Imaging and Truncation System in SriLanka (CITS) and Colombo Stock Exchange. CITS is the second systemically important payment system which involves cheque clearing on an island-wide basis. CITS was intoduced by LankaClear Pvt Ltd (LCPL), replacing the SriLanka ACH operated by CBSL. The introduction of CITS, had eliminated regional time disparities in cheque clearing and jad established a common clearing schedule. CITS is designed to ensure that all cheques deposited in any area of the country is cleared and settled within two days, except in cleared areas. (Jaymaha, 2007)

Furthermore, Equity and Corporate Debt Securities Settlement in Colombo Stock Exchange (CSE) is the third SIPS in SriLanka. This equity shares and corporate debt securities are traded on-line on the screen trading system operated by CSE. The CSE owns and operates the Automated Trading System (ATS) for trading of equity and corporated debt securities and the debt securities trading system (DEX) for trading of beneficial interest of government securities (Jayamaha, 2007)

- **Chinese Taipei CIFS**

The CBC-Wire, is composed of CBC's Inter-bank Funds-transfer System (CIFS) launched in 1995 and Central Government Security Settlement system (CGSS) launched in 1997. The CBC then reshaped the CIFS into an all-the-line RTGS in 2002. Through the CIFS, inter-bank fund transfers can be executed in Real Time Gross Settlement (RTGS) mode or in Deferred Net Settlement (DNS) mode across the current accounts that participating banks hold at the CBC. Since September 2002, the CIFS functions as an all-the-line RTGS only system, with a view to improve the payment float problem arising from the DNS. Under the RTGS mode, payment orders are processed in real time and on a transaction-by-transaction basis.

3.2.2 Retail Payment System

Some years ago, most economies were focused primarily on issues regarding large value payment and settlement systems not only because these systems have the potential to be the most risky but also because these systems are highly relevant for financial market operation and monetary policy. However, as the retail payment system developed further, retail payment instruments and their related systems are now a particular concern for central banks. Most central banks are now beginning to monitor developments in the retail payment system and starting on a more comprehensive review of retail PSS.

This phenomenon is also occurring in SEACEN economies. As retail payment instruments usage in SEACEN economies become increasingly popular, central banks are increasing their focus on the retail payment system. Retail payments in SEACEN economies may be classified into cash and non-cash as described in the following.

3.2.2.1 Cash

According to the project team reports, it can be concluded that SEACEN economies are still using cash as a main instrument for retail payments. Cash payments remain the most convenient method for making small-value payments. Although there is a growth in cashless transactions, all the SEACEN economies remain cash based. The high ratio of currency circulation to GDP (see Appendix I) shows that that there is still a high usage of cash instruments in SEACEN economies.

3.2.2.2 Non-cash

Non-cash transactions in SEACEN economies have been showing a notable increase in the last decade. In general, there are five main instruments for cashless transactions as follows:

- ***Cheques***

Cheques are mostly used for bill payments and small value payments. Cheques are probably the most commonly used non-cash instruments in SEACEN economies. However, it should be noted that the usage of cheques has decreased gradually over time. This decrease was mainly caused by the introduction of the RTGS system. In Brunei Darussalam, however, which do not have RTGS, the retail payment system predominantly comprises of cheques.

- ***Card Payments (Debit and Credit Cards)***

According to statistics, card payments are the most used instrument for retail payments in SEACEN economies. Most of payment cards in each economy have affiliations with domestic card network and major international card nework. With regard to domestic ATM card networks, there are two card-network schemes in SEACEN as follows:

- Partial domestic interoperability, which means that some domestic issuers are connected through domestic switches.
- Full domestic interoperability, which means that all domestic issuers are connected through national switches. This scheme was only adopted in Chinese Taipei and Korea, where the domestic issuers are all connected through the FISC (Financial Information Service) and KFTC (Fair Trade Commission Republic of Korea), respectively.
- No domestic interoperability, which means that there is no domestic switching company operating in the country. According to the project team report, Brunei Darussalam does not have domestic a ATM network yet.

- ***Direct Debit***

Direct debit is an instrument used by customers for bills such as utility payments (i.e., electricity, telephones and water etc), loan repayments and dues on credit cards. Bank customers give direct debit authorisation in advance to their banks for debiting the amounts claimed by the billing utility/financial organisation from their specific accounts. The billing organisation sends details such as preauthorised direct debit transfers in a magnetic tape or diskette to the bank and also provides details of the bills to each customer well in advance before the payment is due.

- ***Storage-value (Electronic Money)***

E-money or prepaid cards contain values that have been paid in advance by the user. The value is stored electronically in a chip card or a server. E-money users can use their e-money to purchase goods and services from merchants. When users pay using e-money, the amount will be automatically deducted from their e-money purse.

- ***Government Payroll***

According to Brunei Darussalam's report, the payment of government employees' salaries and benefits plays an important part in the retail payment services offered by banks. These payments are affected by the government providing payroll schedules to banks so that funds can be transferred from government accounts held at the banks to the employees' accounts. As the government sector accounts for about 30 percent of employment in Brunei, the payment of government employees salaries plays an important part in the retail payment services offered by banks. Government contributes to the efficiency of payment systems by providing payments to employees via electronic means to banks which are able to offer and support such services.

4. The Relationship between Payment and Settlement Systems and Financial Stability

4.1 Financial System Strength and Vulnerabilities in SEACEN Economies

The financial system plays an important role in facilitating economy transactions. The section below provides the lessons learned and and identifies the concerns arising from the recent global crisis impacting SEACEN economies:

- **Brunei Darussalam**

Being an economy with a small population, the financial system is quite basic as compared to other neighbouring economies. The banking system has about 85 percent share of the whole financial system. However, in 2011, a new banking regulatory requirement known as Asset Maintenance Ratio (AMR) was promulgated whereby banks are required to keep aside a certain portion of their assets in eligible assets, one of which is the Brunei currency. At that time, the demand for the Brunei Dollar was unusually high, causing a rapid decline in velocity (when currency in circulation is used for the calculation of velocity). The financial depth in Brunei was relatively constant during 2005-2011 except for the unusual increase in 2009 that was most likely due to the decrease in GDP as oil productions declined. The oil and gas sector accounts for almost 45 percent of Brunei' real GDP.

In the area of payment system, the systemically important payment system in Brunei is the Automated Clearing House (ACH), a process owned by the Brunei Association of Banks (BAB) and operated by HSBC (Brunei). Thus, all payments in the ACH are currently settled through the commercial bank. In this

case, there is a missing link to the risk management framework which is a comprehensive provision for managing the credit and liquidity risks of the PSS in Brunei. Although the service agreement to some extent mitigate liquidity risk since the management bank will cut off a defaulting bank from the clearing house settlement on the same day, the clearing house, however, is not in position to offer temporary liquidity support to the defaulting bank. Thus, the other banks waiting for the payment may have to bear some liquidity crunch. However, credit risk to the ACH is minimal since settlement is carried out in a settlement accounts held by HSBC for each bank. However, these accounts are not kept funded. Once the banks know their net positions, those in debit transfer funds from accounts in Singapore to HSBC in Brunei via SWIFT (or HSBC internal funds transfer) to cover the settlement. Although this process can result in late funding, there has never been a situation where the settlement was held up overnight. The final account postings are done by the paying and collecting banks on the evening of Day 3.

Nevertheless, the legal framework to support the management of credit and liquidity risks are already in place especially as provided in the AMBD Order, 2010. The next step would be to lay out a more comprehensive procedures for payment finality and making sure the availability of temporary liquidity support.

- **Cambodia**

An important feature of the Cambodian financial system is the highly dollarised economy (over 95 percent of banks assets are in foreign currency). Cambodians are using riel along with US Dollar, Vietnamese Dong and Thai Baht. Dollarisation in Cambodia is due to the loss of public confidence in the riel as a consequence of the economic collapse in 1975 during the Khmer Rouge regime (Youraden, 2011). Currently, the clearing arrangement in Cambodia caters for both US dollar and Khmer riel cheques. The USD settlement through the clearing house has shown a marked increase annually, reaching USD 9,573 million of dollar-denominated cheques in 2011. Thus, monetary and exchange rate policies are influenced by policy of the greenback.

As reported in the Cambodia project paper, the banking system consists of 13 domestic banks, 10 subsidiary banks, 9 foreign bank branches, 7 specialised banks and 33 licensed microfinance insitutions. The banking sector in Cambodia, however, is still dominant. Despite the global crisis in 2009, total assets in banking system grew 20 percent form 2008. The banking system was also able to improve their solvency ratio to 32 percent in 2009 from 28 percent in 2008.

The non-banking sector in Cambodia is the money and capital market. Cambodia has just initiated the capital market in 2012 as its own stock market opened for trade in a bid to attract foreign capital. The government is hoping the stock exchange will help bulwark the national currency, the riel, against an onslaught of US dollars. The opportunities in Cambodia - with 30 percent of its population under the age of 15 - are immense. However, the Cambodia Stock Exchange could face volatility in its early phase. The newly launched stock market in Cambodia will raise potential financial stability risks.

Households and corporate sectors in Cambodia do not engage in bank debt-financing to fund their consumption and property purchases. Therefore, a decreased demand does not necessarily affect banks' assets. Credit extension in Cambodia is quite diversified, as the key sectors (tourism, manufacturing, construction and trades) account for between 8 percent to 18 percent of the total credit of banking system. The impact of the economic downturn in the key sector on financial stabilty was unsubstantial.

- **Indonesia**

With a share of 75.2 percent, the banking industry continues to dominate the financial system in Indonesia. Looking forward, the role of non-bank financial institutions is expected to expand further as a result of financial deepening. As of June 2012, there are 120 commercial banks and 1667 rural banks operating in Indonesia. While the number of banks is relatively small, each individually has large assets and strong ties to other financial institutions like finance companies, making a high level of prudential attention necessary.

In general, the average CAR (Capital Adequacy Ratio) of Indonesian banks increased during first semester of 2012 to 18.06 percent compared to an average of 16.82 percent in the preceding semester. The upturn in average CAR during the reporting semester originated from an increase in average capital, which surpassed the average growth in risk-weighted assets. In semester I-2012, the average bank capital increased by 14.33 percent to Rp 457.54 trillion, while average risk-weighted assets only accrued by as much as 6.45 percent to Rp 2,533.13 trillion. The increase in the average CAR for the industry was contributed by an increase in capital for all bank groups, particularly regional banks (capital growth of 18.16 percent ytd). However, although bank CAR is well above the minimum threshold of 8 percent, it is crucial to maintain CAR at a safe level. Amid mounting credit risk and pressures on the stock market as a result of the ongoing global crisis, banks must continue to mitigate all factors with the potential to undermine bank resilience. Furthermore, in preparation to meet the CAR

requirements under Basel III, banks with a level of CAR approaching the minimum threshold are urged to take preparatory measures to strengthen their capital.

The financial market in Indonesia remains relatively shallow both in terms of the money market and derivatives market, as reflected by the low volume compared to other neighbouring economies. In the money market, the bid-offer spread in Indonesia is relatively high, which indicates a lack of efficiency (liquidity). Similarly, in the derivatives market, the transaction volumes for both forward and swap, are also low (Bank Indonesia, 2011). A market that is not sufficiently deep or liquid has more difficulty absorbing pressures, thereby necessitating further development/deepening.

Besides banks, money market and derivatives market, the PSS in Indonesia also plays a significant role in Indonesia's financial system. Interbank large value payments in Indonesia are processed through the BI-RTGS (Real Time Gross Settlement) system which is operated by Bank Indonesia. The RTGS system operates a settlement mechanism that is capable of minimising systemic risk and reducing the incidence of floating funds, thus supporting more effective bank supervision. The RTGS sytem also allows for integration with other payment system applications such as money market and capital market transactions settled by Delivery versus Payment (DVP) application. Links with crossborder payments are also possible using the Payment versus Payment (PVP) application. Payments from other systems such as National Clearing System (SKNBI), Securities Settlement System (BI-SSSS), capital market, banks and cross border transactions are settled through the BI-RTGS system.

- **Myanmar**

At present, the banking sector in Myanmar consists of 4 state-owned banks and 19 private banks. Foreign banks have been permitted to open their representative offices in Myanmar. As of end May 2012, 16 foreign banks have opened representative offices in Myanmar.

In the Non-bank Financial Institutions sector, there is one state owned finance company - the Myanma Small Loan Supervisory Enterprise, one private finance company - the Myanmar Oriental Leasing Co., Ltd, one state owned insurance enterprise - the Myanma Insurance, one private insurance company - the Myanmar International Insurance Company and four foreign insurance companies' representative offices.

In early 2003, Myanmar suffered a severe banking and financial crisis due to the informal finance institutions' offering of high interest rates on deposits to attract investors. The informal finance sector were involved in highly speculative investments in the real estate, construction and commodity trading. Since they were not authorised deposit-taking institutions under Myanmar Law and as such could not legally accept deposits, the eventual collapse of informal finance companies brought about direct losses for at least some of the authorised banks. However, the Central Bank of Myanmar overcame financial crisis by carrying out its lender of last resort function. It provided liquidity support to troubled banks thus preventing the collapse of the banking system.

Together with the banking system, the PSS also acts as a financial infrastructure in Myanmar. However, as late as 2012, the PSS in Myanmar has not seen much development. Only two clearing and settlement mechanisms are available for the operations of the financial institutions for the large value payment, i.e., paper based cheque clearing house and electronic fund transfer.

At present, there are 3 manual clearing houses namely, Nay Pyi Taw (Head Office), Yangon Branch and Mandalay Branch while the function of the paper based cheque clearing system is not nationwide. All state owned banks and private banks can participate as clearing members.

Myanmar is also a member of the Asian Clearing Union (ACU) which consists of Bangladesh, Bhutan, India, Iran, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka. The ACU objectives are as follows:

- to provide a facility to settle a payment for current international transactions on a mulitilateral basis;
- to promote the use of participants' curencies in current transactions between their respective territories;
- to promote monetary co-operation among the participants and closer relations among the banking systems; and
- to provide for currency swap arrangement among the participants so as to make Asian Monetary Units available to them temporarily.

The accounts of the ACU are kept in a common unit of account designated as Asian Monetary Units (AMUs). According to the approval of the 37th ACU BOD Meeting, the AMUs are denominated as ACU dollar and ACU euro which are equivalent in value to one US dollar and one Euro, respectively with effect from 1 January 2009.

- **Nepal**

The Nepalese financial system has a significant number of banks and financial institutions. There are currently 31 commercial banks, 58 development banks, 81 finance companies and 19 microfinance development banks in the Nepalese financial system. Besides this, there are also 30 insurance companies, 1 stock exchange company, 1 citizen investment trust, 1 employee's provident fund, 1 postal saving service and 1 deposit insurance and credit guarantee company. However, the Nepalese financial system is still in the evolutionary phase. Most of the banks and financial institutions and their branches are located in the urban areas while the unorganised money market exist in the rural areas. These unorganised institutions can mobilise a wide range of financial sources.

The payment system also plays a significant role in establishing a robust financial system in Nepal. Payments comprise of domestic payments and cross border payments. The payments of all the banks and most of the financial institutions are settled through the clearing house, the Nepal Clearing House Limited (NCHL) which was established to settle the corporate level interbank payment transactions in the capital city of Kathmandu, with the financial support of NRB (Nepal Rastra Bank) along with the Nepal Bankers' Association (NBA). At the branch level, NRB acts as a clearing house in its seven different branches in different cities.

The cross border payment system in Nepal can be divided into two groups - payment system for Indian currency and for other convertible currencies. The exchange regulation for the Indian currency is liberal due to the bilateral payment arrangement, open border, geographical proximity and the historical and cultural relations between Nepal and India. The trade payment between Nepal and India is settled in Indian currency. Payments for the import and export of commodities from India are effected in cash through drafts and telex transfers. A letter of credit is essential only if payment is to be made in US dollars for some specified Indian machinery and industrial raw materials to be imported from India. Nepalese commercial banks have maintained their Indian currency agency accounts in Indian banks to settle the above payments.

Like Myanmar, Nepal is also a member of the Asian Clearing Union (ACU). According to the ACU agreement, all payments for trade related transactions among member countries should be routed through the ACU payment systems. Under this system, payments arising from trade transactions with member countries are first settled by the respective commercial banks with their central

banks which are thereafter settled with the corresponding bank of the member country. In turn, the respective central banks advise the central bank of recipient member country to settle that payment with the corresponding recipient commercial bank. All the settlements are made in US dollars.

- **Philippines**

The Philippines financial system is more bank-based, rather than market-based. Banking assets account for more than 80 percent of the total resources of the financial system and gross domestic product. The banking system in the Philippines includes 37 universal and commercial banks, with 4,928 branches. Among the commercial banks, 18 are private domestic banks, 3 are government-owned banks and 16 are foreign banks and their subsidiaries. Under the BSP (Bangko Sentral ng Pilipinas) charter, all banks and NBQBs (Non-banks with Quasi-banking functions), including their subsidiaries and affiliates engage in related activities which are supervised and regulated by BSP.

There are four types of thrift banks operating in the Philippines. These are the Savings and Mortgage Banks (SMBs), Private Development Banks (PDBs) and Stock Savings and Loan Associations (SSLAs) and microfinance-thrift banks. As of end-June 2012, there are 69 thrift banks, with 1,453 branch offices. There are 606 rural and cooperative banks with 2,114 branches. In addition to the foregoing banking institutions, there are 15 non-banks financial intermediaries performing quasi-banking functions with 62 branches.

The Philippine banking system continues to exhibit resilience and fortitude during the global financial crisis in 2007-2008. For one, the sound macroeconomic policies and resulting conditions in the country have provided stability to the domestic financial markets amidst heightened uncertainties. During the period 2002 to 2011, the total resources of the Philippine banking system grew by an average of 8.5 percent. Asset quality ratios were at historic lows and at 2.8 percent in 2011, the non-performing loan ratio was even lower than their previous-1997 Asian financial crisis level of around 4 percent. Capital adequacy ratios (CARs) continued to grow and exceed the BSP's minimum ratio of 10 percent and the Basel Accord's standard ratio of 8 percent amid challenging global uncertainties, as a result of the higher growth rate of qualifying capital vis-à-vis that of risk weighted assets (RWA). The system-wide average CARs, for instance, stood at 16.7 percent on a solo basis and 17.6 percent on consolidated basis as of end-December 2011.

The financial system in the Philippines also includes the Philippine Dealing System. The institution has three operating subsidiaries: Philippine Dealing and Exchange Corporation (PDEx) which operates electronic trading platforms for securities; Philippine Depository and Trust Corporation (PDTC) which provides securities depository, registry and custody services and the Philippine Securities Settlement Corporation (PSSC) which provides electronic settlement facilities with straight through process and delivery vs. payment capabilities. The PDS Group manages electronic trading and settlement platforms in the Philippine's Debt Securities and Foreign Exchange markets, and performs key post-settlement functions for the Debt and Equity markets through its electronic Depository, Registry and Custody services. The Group actively interacts with financial market regulators and participants in its effort to build the venue where investors may have a wider array of financial instruments and issuers have an efficient medium to raise capital for their company's requirements.

- **Sri Lanka**

One of the most important functions of the financial system is to ensure the safety and efficiency of payments and securities transactions. The financial infrastructure refers to the different systems that provide for the execution of both large-value and small-value payments. PSSs enable the transfer of money in the accounts of financial institutions to settle financial obligations between individuals and institutions. The main payment, clearing and settlement systems in Sri Lanka are :

- Cheque Imaging and Truncation System (CIT), the interbank cheque clearing system operated by LankaClear Ltd.
- Sri Lanka Interbank Payment System operated by LankaClear Ltd.
- Lanka Settle, comprising the RTGS and Scripless Securities Settlement System (LankaSecure) operated by CBSL.

The financial system in Sri Lanka comprises the major financial institutions (banks, licensed financial institutions, finance companies, leasing companies, primary dealers, pension funds, insurance companies, etc), financial markets (forex market, money market, capital market, etc) and the financial infrastructure which includes the legal framework for the financial system and the PSS.

The banking sector in Sri Lanka, which comprises 24 LCBs (Licensed Commercial Banks) and 9 LSBs (Licensed Specialised Banks), dominates the financial system and accounted for 55 percent of total assets of the financial

system as at end 2011. Even though a large number of LCBs exist in the country, the stability of the financial system is primarily dependent on the performance and financial strength of the six largest LCBs, consisting of the two state banks and the four largest domestic private commercial banks. These 6 banks, which are generally referred to as the Systemically Important Banks (SIBs), represent 76 percent of the LCB sector assets and 64 percent of the banking sector assets.

In terms of the asset base and the magnitude of services provided, the LCBs are the single most important category of financial institutions within the banking sector. As at end 2011, the LCBs dominated the financial system with a market share of 46 percent of the entire financial system's assets and 84 percent of the banking sector's assets. The LSB sector represents 9 percent and 16 percent of the entire financial system's assets and banking sector's assets, respectively. The systemic importance of the LSB sector is relatively low in comparison to the LCBs, both in terms of size and their impact on the financial system, as it does not play an intermediary role in the payment cycle.

The financial market in Sri Lanka can be divided into the money market and the capital market. The money market is the market for short-term interest-bearing assets with maturities of less than one year, such as Treasury bills, commercial paper, and certificates of deposits. The major task of the money market is to facilitate liquidity management in the economy. The main issuers in the money market are the Government, banks and private companies, while the main investors are banks, insurance companies and pension and provident funds. The capital market is the market for trading in assets of maturities of greater than one year, such as Treasury bonds, private debt securities (bonds and debentures) and equities (shares). The main purpose of the capital market is to facilitate the raising of long-term funds. The main issuers in the capital market are the Government, banks and private companies, while the main investors are pension and provident funds and insurance companies.

The financial market can be also be classified according to instruments, such as the debt market and the equity market. The debt market is also known as the Fixed Income Securities Market and its segments are the Government Securities Market (Treasury bills and bonds) and the Private Debt Securities Market (commercial paper, private bonds and debentures). Another distinction can also be drawn between primary and secondary markets. The Primary Market is the market for new issues of shares and debt securities, while the Secondary Market is the market in which existing securities are traded.

The Central Bank through its conduct of monetary policy influence the different segments of the financial market in varying degrees. The Central Bank's policy interest rates have the greatest impact on a segment of the money market called the inter-bank call money market and a segment of the fixed income securities market, i.e. the Government Securities market. The Central Bank may also intervene in the inter-bank foreign exchange market, which is closely connected to the money market.

- **Chinese Taipei**

Since Chinese Taipei has a relatively small open economy, its growth and price level are greatly influenced by the global economy and business cycle. Chinese Taipei's economy grew at a decelerated pace in 2011 compared to the previous year due to a higher base effect. The WPI inflation rate in Chinese Taipei was at an increasing trend through 2011 Q1 and hit a peak of 5.82 percent in March due to the still-elevated international prices of raw materials. However, soon afterwards, the WPI inflation rate decreased significantly since the easing of international prices of raw materials and appreciation of the NT dollar exchange rate against the US dollar. In 2011, the average daily transaction value of the three systemically important payment systems (SIPSs) processing domestic interbank payments increased moderately compared to the previous year. Among them, the CBC (Central Bank, Chinese Taipei) Interbank Funds-Transfer System (CIFS), which handles large payments and the final settlement of interbank fund transfers, continued to be the most important one in 2011. Its average daily transaction value reached NT$1.43 trillion and accounted for 72 percent of the total (CBC, 2011).

The total assets of domestic banks has been growing and reached NT$35.3 trillion at the end of 2011, equivalent to 256.79 percent of annual GDP, while the annual growth rate of total assets decreased to 5.53 percent from 6.73 percent a year earlier. The main reason behind this was a decline in the outstanding amount of dues from banks and interbank borrowings. All domestic banks held sufficient capital, but faced pressures in raising their capital levels. The capital adequacy ratios of all 38 domestic banks remained above the statutory minimum requirement of 8 percent at the end of 2011. There were 17 banks with ratios above 12 percent.

In 2011, the total assets of domestic banks continued to accumulate. Asset quality remained satisfactory and credit risk concentration declined slightly. Nevertheless, credit exposure concentrated in the real estate market remained high. The estimated VaR for market risk exposures of domestic banks had a

limited influence on their capital adequacy. Meanwhile, liquidity risk was moderate as the banking system benefited from ample liquidity. The profitability of domestic banks amplified sharply with a sustained improvement in capital adequacy in 2011, strengthening the capability of domestic banks to bear risks.

Since the signing of the Cross-Straits Economic Cooperation Framework Agreement (ECFA), the amendment of the Regulations Governing the Banking Activity and the Establishment and the Investment by Financial Institution between the Chinese Taipei Area and the Mainland Area in 2010, China's financial institutions have started to establish representative offices in Chinese Taipei. Cross-strait financial interaction has become more frequent and common. In order to gradually open up cross-strait financial activities, improve the competitiveness of Chinese Taipei's banking industry and strengthen relative risk management, the regulatory authorities in Chinese Taipei, in the recent years, have actively reviewed and revised regulations related to cross-strait financial activities and relaxed investment restrictions on a step by step basis. The FSC (Financial Supervisory Commission) of Chinese Taipei and China's Banking Regulatory Agency held two meetings on the Cross-Strait Banking Supervisory Cooperation Platform with a view to reinforcing supervisory collaboration. China has already become the target market of Chinese Taipei's banks. As the opening is at an early stage, domestic banks' risk exposures to China are still limited. However, as financial business expansion in China speeds up, related exposure will magnify rapidly. Financial institutions should thus strengthen their relative risk control for their exposures in China to ensure the financial stability of Chinese Taipei. Regulatory authorities should also improve prudential supervision on these exposures.

Table 4
Financial System Characteristics in SEACEN Economies

Economy	Banking and Financial System	Payment and Settlement System	Financial Market
Brunei Darussalam	The banking system has about 85 percent share of the whole financial system.	ACH is the SIPS in Brunei Darussalam. The system was owned by Brunei Association of Banks. HSBC (Brunei) was appointed as the management bank to operate clearing house. Settlement is carried out in settlement accounts held by HSBC (Brunei) for each bank.	Brunei does not have corporate bond market or stock market, nor the securities market.
Cambodia	Highly dollarised economy (95 percent of banks assets are in foreign currency. Thus, the monetary and exchange rate policies are influenced by policy of the greenback.	The clearing arrangement in Cambodia caters for both US dollar and Khmer Riel checks.	The newly implemented stock market will raise the potential risks to financial stability.
Indonesia	The financial market in Indonesia remain relatively shallow both in terms of the money market and derivatives market. This is reflected by the low transaction volumes compared to neighbouring economies.		In the money market, the bid-offer spread is relatively high, which indicates a lack of efficiency (liquidity). A market that is not sufficiently deep or liquid has more difficulty absorbing pressures, therefore, necessitating further development/ deepening.

Economy	Banking and Financial System	Payment and Settlement System	Financial Market
Myanmar	Myanmar is a member of Asian Clearing Union (ACU).	Only two clearing and Settlement mechanisms for the large value payment: paper based cheque clearing house and electronic fund transfer.	
Nepal	There are two groups of cross boarder payment system in Nepal: - payment system for Indian currency - payment system for other convertible currencies. Nepal is also a member of Asian Clearing Union (ACU). All payments for trade related transactions among member countries are routed through the ACU payment systems and the settlements are made in US dollars.	The payment system of all the banks and most of the financial institutions is settled through the clearing house. Nepal has not implemented the RTGS system yet.	
Sri Lanka	The banking sector dominates the financial system. However, financial stability is primarily dependent on the performance and financial strength of the six largest LCBs.		The Central Bank's policy interest rates have the greatest impact on a segment of the money market. The Central Bank may also intervene in the inter-bank foreign exchange market, which is closely connected to the money market.
Chinese Taipei	Chinese Taipei which has a small open economy is greated influenced by the global economy and business cycle.All domestic banks hold sufficient capital, but faced pressure to raise their capital levels at the end of 2011.		Since the signing of the Cross-Straits Economic Cooperation Framework Agreement (ECFA), the presence of China's financial institutions have started to increase rapidly in Chinese Taipei. Related exposures will thus magnify rapidly.

4.2 Financial Data and Linkage Analysis

The impact of the financial system on economic growth has always been an important issue. Developments in the financial system depends on the transfer rate from savings to efficient areas and investments, or in other words, development depends on meeting the requirements of the financial system. If the development of the financial system affects economic growth, a high financial deepening rate will increase economic growth. When the rate is small, or in other words, the financial deepening is weak, economic growth will not be at the expected level.

One notable experience in SEACEN economies which exemplifies the importance of a developed financial system is the RTGS system in Korea, BOK Wire. As we already know, the RTGS infrastructure plays a vital role in the sound functioning of the financial system and in fulfilling the central bank's purposes — maintaining monetary and financial stability. It therefore needs to be extremely operationally reliable. In early 2005, the Bank of Korea (BOK) was working to develop a new BOK-Wire system to replace the BOK-Wire (RTGS system) with a view to accumulating liquidity for settlement, reducing settlement risk arising from the late submission of payment orders and supporting straight-through processing for the settlement of large volume customer transactions. The new BOK-Wire introduces a hybrid system to provide both liquidity saving facility in net settlement and settlement finality in gross settlement. The hybrid system will have bilateral and multilateral offsetting settlement processes in addition to the current RTGS system. Funds transfers involving BOK loans, government and public bond transactions, CLS and RPS net settlement are handled through the RTGS system, while those related to general funds transfers, call transaction settlements, and DVP settlements are processed through the hybrid system. The Bank of Korea began operation of its new BOK-Wire+ system from April 2009, adding a hybrid settlement function to the existing RTGS system in order to reduce participants' settlement liquidity burdens due to the increasing funds transfer volume. With the launch of BOK-Wire+, the intraday liquidity needs of participants were significantly reduced and liquidity risk in consequence also declined. The new function of the BOK Wire+ has enabled participants to complete intraday settlement with lower liquidity, mitigating settlement delays and gridlock as well as the accompanying systemic risks. Moreover, during 2010, the average daily volume of settlements by non-cash payment instruments stood at 36.89 million, for a total value of 267 trillion won. This represented an increase of 12.0 percent by volume and 10.5 percent by value from the previous year. The increase in the volume was ascribable to an increase in securities trading-related funds

transfers through BOK-Wire+ and a rise in fund transfers through the electronic banking system including Internet banking.

Liquidity savings have also been observed in the practice of those using BOK Wire + in its early implemetation. The launch of the Bank of Korea's BOK-Wire+ payment system is estimated to have achieved liquidity savings of about 20 percent within a month of its launch, when compared to previous liquidity requirements in the BOK-Wire RTGS system. In addition, the total securities settlement funds increased by 23.4 percent from the previous year as inter-institutional repo transactions settled through the DvP (Delivery versus Payment) system soared, influenced by a series of institutional changes related to the restructuring of the short-term financial market. Daily average inter-institutional repo transactions more than doubled from 7.6 trillion won in 2010 to 16.6 trillion won in 2011. Accordingly, the daily average settlements of inter-institutional repo transactions expanded from 3.7 trillion won to 10.4 trillion won. A series of measures to improve the money market, which is so excessively concentrated on the non-collateralised call market that is vulnerable to external shocks, was announced in July 2010, and since then various steps have been taken to galvanise repo transactions and to progressively reduce the scale of the call borrowings by financial investment companies.

5. The Relationship between Payment and Settlement Systems and Monetary Policy

It is widely known that monetary policy and the payment and settlement system has interdependencies. The primary objective of monetary policy is to maintain price stability conducive to a balanced and sustainable growth of the economy. Price stability or its equivalent, stability in the domestic purchasing power of the currency, is the one of the dominant legal objectives of central banks. Price stability is refers to the condition of low and stable inflation.

However, any payment systems disruption would affect price stability and may also have an impact on monetary policy implementation. Central banks have found ways of safeguarding price stability whilst ensuring the smooth functioning of the payment system at the same time by drawing a clear line between providing intraday liquidity for payment system purposes and providing credit for monetary policy implementation. In addition, the reserve requirement balance in central banks can be utilised for Open Market Operations and the settlement of payment transactions. Moreover, the sufficient availability of collateral is an important contribution of central banks to financial stability.

5.1 Monetary Policy in SEACEN Economies

This research study reveals that there is a set of monetary policy instruments used by SEACEN economies as listed in below:

Table 5
Monetary Policy Framework and Instruments in SEACEN Economies

Economy	Monetary Policy Frameworks and Instruments
Brunei Darussalam	- Currency board agreement with Singapore
Cambodia	- Foreign exchange invention - Statutory Reserve Ratio (SRR) - Standing facilities (fixed deposit, overdraft facility and refinancing window)
Indonesia	- Inflation Targeting Framework - Open market operations on the rupiah and forex money markets, - discount rate setting, - formulating minimum reserve requirement and - regulating credit or financing.
Korea	- Inflation Targeting Framework - Open Market Operations - Lending and Deposit facilities - Reserve Requirements
Myanmar	- Interest rate policy (main monetary policy) - Reserve requirements - Open market operations
Nepal	- Changes in reserve money - Required reserved ratio - Open market operation (OMO)
Philippines	- Policy interest rates : • overnight repurchase (lending) rate (RP) • overnight reverse repurchase (borrowing) rate (RRP) - Open market operations - Accepts fixed-term deposits - Standing facilities, such as: • rediscounting facility • requires banking institutions to hold reserves on deposits and deposit substitutes. - Inflation targeting framework
Sri Lanka	- Floating of the exchange rate - Monetary targeting framework - Open Market Operations (OMO) within a corridor of interest rates formed by its policy rates i.e. the repurchase rate and the reverse repurchase rate, to achieve the reserve money target. - Bank Rate - Statutory Reserve Ratio (SRR)
Chinese Taipei	- Interest rates - Exchange rates policies

In the analysis, it is found that unlike other monetary authorities, AMBD has limited ability to influence the interest rate due to the adoption of currency board arrangement with Singapore. The issuance of the Brunei Dollar must always be 100 percent backed by foreign assets. Therefore, the avenue for achieving price stability is done through effective anchoring of the Brunei Dollar to the Singapore Dollar at one-to-one parity which has been made possible by the signing of the Currency Interchangeability Agreement (CIA) between Brunei Darussalam and Singapore. As both countries are a very open economies which rely heavily on exports and imports, the management of currency which is the main thrust of Singapore's monetary policy has underpinned the macroeconomic stability in both countries. Since the monetary policy is quite dormant in Brunei, the connection between the monetary policy and the payment system is rather weak and it is thus believed that the payment system has a greater role for financial stability in the country.

5.2 Monetary Policy Linkage to Payment and Settlement Systems

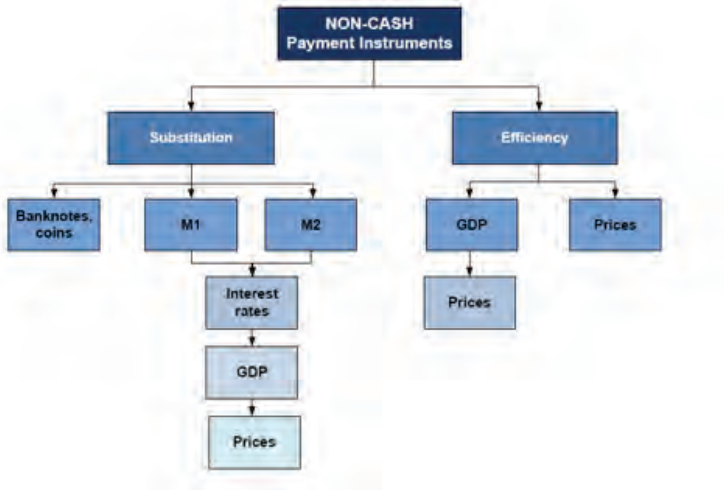
The monetary policy linkage to PSS can be explained in terms of the M and V relationship, namely that monetary policy will affect money supply policy and resultant changes will then affect the changes in velocity. This statement can be simplified by using a logarithmic equation of PQ = MV:

chgV=chgP+chgY-chgM+error.

In addition, the variables Y and P, instead of being just influenced by monetary policy, are also affected by other variables (outside the scope of analysis). It is not within the scope of this research analysis to explain the relationship between Y, P and monetary policy.

In general, the relationship between non-cash payment instruments on GDP and prices can be seen as below:

Chart 5
Relationship between Non-cash Payment Instruments on GDP and Prices



Moreover, the velocity of money is also influenced by innovations. As the usage of non-cash payment instruments in SEACEN economies is on the rise, non-cash payment instruments are playing a quite significant role in money demand and will further affect prices, GDP and monetary policy. Innovations in the payment system may increase the pass-through effect of the monetary transmission. This may happen for two reasons:

- Dissemination of information regarding the change in interest rate policy may become faster in a developed payment system. This change will affect all tenors of market interest rates.
- Innovations in the payment system mean that there are technological advances which facilitate access to payments, emergence of new payment instruments and further development of financial markets. The term innovations here refers to successful developments which reduce costs and risks and improve services to meet needs of market participants. Thus, changes in interest rate expectations (including interest rate policy) and actual interest rates will be directly transmitted to the wider area of the payment system which will eventually affect the long-term interest rate, consumption and investment.

One example of innovations in the payment system is the growth of non-cash payment instruments. Non-cash payment provides a number of benefits for the economy:

- Increase in consumer's satisfaction due to the reduction in the transaction costs. The widespread use of non-cash payments including e-money will increase the speed of financial and economic transactions, and possibly the efficiency in the use of liquid resources. Increase in transaction velocity, economic growth and wealth of economy. The large use of non-cash payments could encourage an increase in private consumption on the goods and services, resulting in the overall real sector growth in activities. Increase in transactions velocity coupled with an efficient cost of transactions will raise producer's profits generating further investments. This, in turn will have positive impact on economic growth and will create greater opportunities for banks and the non-cash payment service financial institutions.

However, innovations in the payment system area may also induce risks with regard to financial stability These innovations might alter the way central bank conduct its monetary policy because it may create the need for redefining and measuring indicators for monetary aggregates. Rapid changes in the nature of non-cash instruments will mean that monetary aggregates (M0, M1, M2) may need to be redefined. The improper definition and measurement of monetary aggregates may induce inappropriate monetary policy formulation.

6. Financial Crises and Payment and Settlement Systems

The most recent crises, namely the Asian and Global Financial Crisis have impacted the SEACEN economies via several phases (See Appendix XII for details).The first cross border crisis that hit SEACEN economies was the Asian financial crisis in 1997. At the advert of the crisis, economic growth of the SEACEN region slowed down. The crisis was caused by many factors but many studies have shown that the main cause was financial fragility involving four aspects as follows (Lane, 1999):

- Financial institutions were in a vulnerable position because they had borrowed foreign currencies without sufficient hedging;
- Illiquidity which was indicated by the ratio of short-term debts to reserves. The increase in short- term debts was caused by large capital inflows from abroad.
- Increased price in equity and real estate market before the crisis, causing a sharp deflation in assets prices
- Poorly allocated credits, contributing to a problem increase in at banks and financial institutions.

The issues of designing, overseeing, and regulating PSS have gained much attention ever since the crises, mainly because of its connection with the financial stability. Based on the crises mentioned in Appendix XII we can see that PSS has indeed contributed to the crises. However, PSS also helped SEACEN economies to recover quickly from the crises.

The relationship between PSS and financial stability can be seen from the level of financial deepening. The rapid development in the PSS technology has contributed to the deepening of the financial system. As the financial sector gets deeper, resource allocation becomes more effective. However, financial deepening may also contribute to a worsening of the impact if there are disruptions to the payment system. The stability of the payment system has a relationship with the overall stability of the financial system to some extent, while the health of the payment system depends mainly on the health of its partcipants.

In terms of maintaining financial stability, the design of PSS has important implications for the soundness of financial markets. PSS needs to be designed effectively and efficiently to help economies recover quickly from crises. If the PSS is poorly designed, it may worsen the economic condirion during the financial crises. In this case, investors can ultimately revoke their investments at anytime.

In addition, as the financial system becomes deeper, for example with the introduction of central banks' automated accounting system which enables member banks to have real time access to their potions balance and also the introduction of DvP of goverment securities which improve effectivess of central bank's monetary policy operation, the PSS will also become more transparent and dissemination of information regarding economic changes become faster. The fast flow of information which is readily spread to the entire market will aid in the recovery process and incentivise domestic investors to re-invest. Current information to monetary or fiscal authorities would also enable them to make appropriate changes on the supply side or encourage output. These policy decisions can only be made only if there is sufficient PSS data that can capture the actual situation. The PSS can adequately capture the economic conditions only if the financial market is sufficiently deep, meaning that the financial market is able to accommodate and provide sufficient room for economic authorities to implement the policies. In a deep market where market players are massively involved in economic activities, the authorities needs to inject liquidity into the market during a crisis. With the availability of adequate information in a deep financial market, liquidity injections can be applied accurately targetted. Conversely in a market that has a fairly shallow depth, PSS-related information can be used to provide an overview for the authorities in the presence of signals that indicate worsening

of the market economy. Through these signals, authorities can immediately run a front loading policy to minimise the impact of the crisis. In conclusion, the payment system can act as the first buffer in the face of potential financial instability. Thus the set-up and robustness of the payment system has an important signalling effect for overall financial stability.

7. Role of Payment and Settlement Systems in Monetary Policy in SEACEN Economies: Empirical Study

Data used in this analysis is basically to prove that there is a nexus between monetary conditions within the financial industry relevant to the payment system. There are no references stating that there is a direct relationship between the three nor theories which incorporate them all together. For the purpose of quantitative analysis, this study utilises the semi ad-hoc approach in the sense that each data cluster (economic, financial and payment system) are analysed based on the respective theories; whilst analysis across the cluster is conducted technically.

Such data analysis approach would not sufficient for decisive policy recommendations but would nonetheless fulfill the general notion in identifying variables that may be used as policy instruments.

7.1 Data

The data used in this study includes yearly data of broad money that spans from 2001 to 2011. We compile the broad money statistics from World Bank Data. In this case, World Bank defines broad money as the sum of currency outside banks, demand deposits other than those of the central government, savings and foreign currency deposits of resident sectors other than central government, bank and traveler's checks, and other securities such as certificates of deposits and commercial paper.

The study also uses yearly GDP data for the sample period and percent change in price level (inflation rate). All data can be obtained from the project team reports and data published by World Bank or the International Monetary Fund (IMF).

7.2 Importance of Velocity of Money in Monetary Analysis

Economic data used for this study are basically monetary data, comprising supply and demand of money in the economy (broad money - M2 was used for

this research), output/production (real GDP), inflation rate, price level etc. Money supply is probably still the most basic reference for monetary analysis, what is widely known as the Quantity Theory of Money, where the demand of money at a given time is influenced by the price level, output and other factors. When there is a change in the money supply, there would be a proportional adjustment on the price level to equalise the changes in money demand to reach the equilibrium with the money supply. This principle also underlies the relationship between the payment system and monetary policy. This relationship is shown by MV=PT, where M represents the quantity of money supply, V the velocity of money, P the price level and T all transactions in a money-economy where money is the medium of exchange. PT also can be referred to as the value of all transactions undertaken with money, not only for new products and services but also all second hand products, production inputs and financial market transactions. From this equation, we know that inflation may occur when the money supply exceeds the money demand causing the price level to rise in order for money supply and demand to reach the equilibrium point (Fitzgerald, 1999). In this case, an increase in money may be lead to an increase in the price level, if money is neutral for both the long-run and short-run, and the velocity (V) is time invariant/constant. However, if money is non-neutral, the rise in money supply may have dual effects, both on outputs and inflations. Moreover, if V is time variant then an increase (percent increase) in the quantity of money suppply may occur with a proportional decrease in velocity. Thus, the rise in money growth may coexist with a stable PT. In addition, the monetarist pioneer, Milton Friedman, also stated that a change in the quantity of money supply greatly affects the inflation rate in the long-run. Monetarist analysts also put forward the existence of market power and leverage resources which show that a decrease in inflation rate will encourage investment and a fall in prices will encourage consumption or Pigou Effect – a phenomenon where price level declines would eventually increase the real balances and household wealth sufficiently to restore consumption spending (Walsh, 2003).

7.3 Determinants of Velocity: Payment System Innovations and Financial Deepening

Based on many theoretical and empirical studies, velocity is influenced by multiple factors, e.g., economic development level, innovations, financial deepening, interest rate, inflation, unemployment rate, household sector's net worth and leverage and expectations towards market (optimism/pessimism). Recently, the expectations that are driven by the economic outlook and market trends have been a major source of unstable velocity, especially during the financial crisis (Pattanaik and Subhadara, 2011).

An important thing to remember here, regarding our research on the relationship between the payment system and monetary policy, is that innovations in the area payment and settlememt system and also financial deepening might influence the velocity of money. Innovations in the PSS could affect velocity by reducing transaction costs and changing financial asset liquidity. More innovations in payment system such the increased usage of payment cards (ATM/debit/credit cards) and prepaid cards may economise on the use of cash. In addition, financial deepening, which indicates the increasing role of financial services and activities in the economy, has a positive impact on the macro economy. Financial deepening means that a diverse choice of financial services are accessible to the vast majority of the population. Financial deepening may result in an increase in the ratio of money supply to GDP (e.g., the ratio of M1/GDP, M2/GDP, M3/GDP). In this case, a high growth in the economy can be achieved if there is financial deepening in the financial sector (Okuda, 1990).

However, payment system innovation and financial deepening may also create shocks on money velocity, depending on the frequency of payment. A sharp change in the interaction between funding liquidity and market liquidity may be the most importanct shock to velocity that come from financial innovations. In addition.,in a developed payment system, the frequency of financial transactions may be high and the pressure of funding liquidity could be unpretentious as long as the markets are liquid. In contrast, if the markets are illiquid as would happen in the case of a financial crisis, a sudden spurt in funding liquidity demand may occur, causing the rise in the demand of liquidity which can lead to the central bank performing as the lender of the last resort.

Innovations in the payment system and financial sector are also believed to be one of the reasons behind the unstable relationship between money and other macroeconomic indicators e.g., inflation rate and GDP (Binner et al., 1999). This weakening relationship between money and macroeconomic indicator had caused many central banks in developed economies to discontinue their monetary targeting framework and implement the inflation targeting framework (Habibullah, 1999). The developed financial system in mid-1980s had increased the competition between the banking sector. The technological advancement in the financial world also began to show a noticeable impact on the cost-related bank liabilities. It was widely believed that monetary targeting had failed because the relationship of target aggregates to other macroeconomic indicators, e.g. nominal income, had become unstable. The consensus of opinion at the end of 1980s was that it was not possible to re-establish the previous seemingly stable money demand functions, even if the broad monetary aggregates had been redefined and extended to include higher interest-bearing building society deposits (Hall, 1989). Some economies in

SEACEN have also implemented the inflation targetting framework e.g., Philippines and Indonesia, in response to the changing relationship between the quantity of money and other macroeconomic indicators. An important thing to note here is that the implementation of the inflation targeting framework has attracted more concern on the transmission rate (interest rate pass-through). In relation to the interest rate, there are several arguments which state that ***financial innovations had increased the pass-through effect***. This may happen due to two reasons:

- Dissemination of information regarding the change in interest rate policy may become faster in a developed financial system. This change will affect all tenors in market interest rates.
- Innovations means that there are technological advances which facilitate access to payment, emergence of new payment instrument and more developed financial markets, including the payment system area. The term innovation here refers to the successful developments which reduce costs and risks and improve services. Thus, changes in interest rate expectations (including interest rate policy) and actual interest rate will be directly transmitted to the wider area of the payment system which will eventually affect the long-term interest rate, consumption and investment.

7.4 Quantitative Data Analysis

By using the PQ = MV formula for the quantitative analysis, we first tested the data (GDP, M2, inflation rate, velocity) to ensure that all data are statistically acceptable. Based on the test conducted (see below), we found that all variables are statistically acceptable and can be used for further analysis. This conclusion is further demonstrated by the related R^2 coefficient as shown in the table below. Furthermore, we used the logaritmic approach of PQ=MV formula:

chgV=chgP+chgY-chgM+error.

In this approach, the variable V represents the dependent variable, while P, Q and M represent the independent variables.

The test results are as follows:

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	1.283306	0.114194	11.23790	0.0000
MONEY (M2)	-0.715690	0.067387	-10.62055	0.0000
INF (P)	-0.015517	0.015126	-1.025877	0.3080
GDP (Y)	0.796432	0.084363	9.440508	0.0000

Effects Specification
Cross-section fixed (dummy variables)

R-squared	0.983084	Mean dependent var	0.282103
Adjusted R-squared	0.980758	S.D. dependent var	0.299481
S.E. of regression	0.041543	Akaike info criterion	-3.403068
Sum squared resid	0.138066	Schwarz criterion	-3.074139
Log likelihood	168.5411	Hannan-Quinn criter.	-3.270309
F-statistic	422.6511	Durbin-Watson stat	0.747071
Prob(F-statistic)	0.000000		

From the results, we can see that variable V has a positive relationship with GDP (Y), but has a negative relationship with the variable M2 (M) and inflation (P) with a confidence level of 98 percent (R2 = 0.98). Also, from the relationship trends among variables, we can see that the coefficient of GDP and M2 shows an correlating results with the formula, while the inflation coefficients show different results. From these results, we can indicate that the velocity of money will increase as GDP increase, while the increase in M2 will reduce the velocity of money.

Chart 6
Velocity of Money

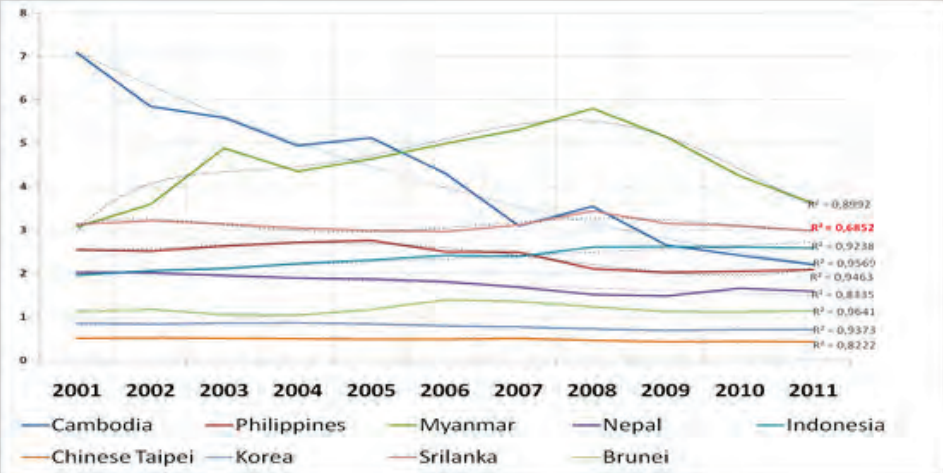


Chart 7
GDP per Capita

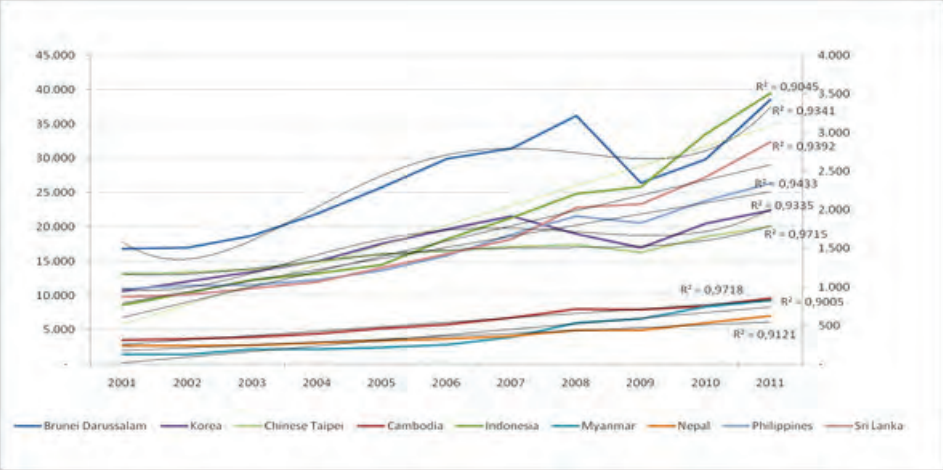


Chart 8
Inflation

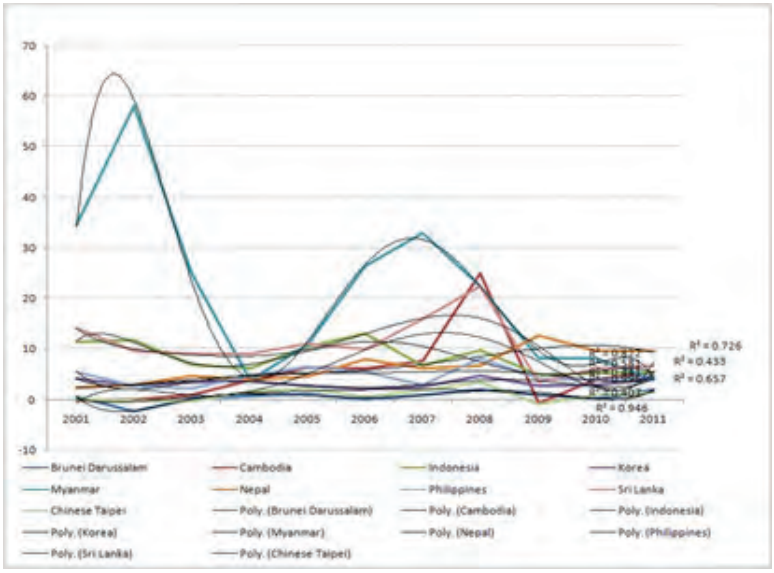
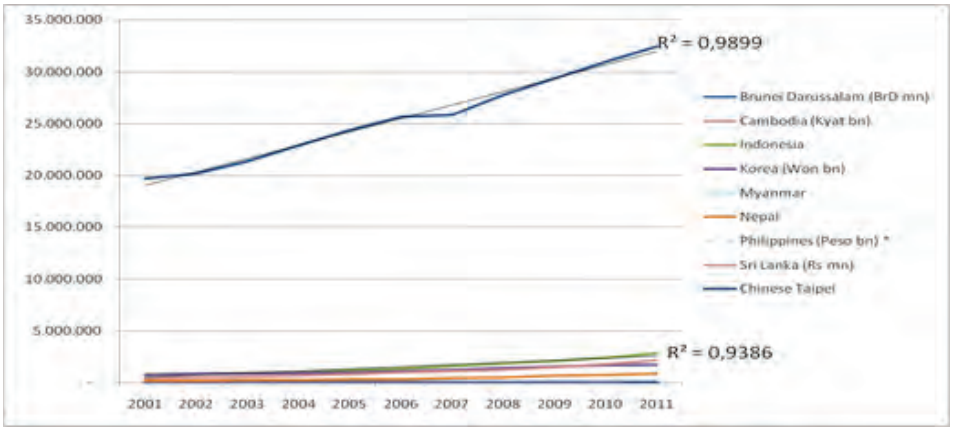


Chart 9
M2



Based on the analysis above, it can be concluded that the velocity of money (v) has a relationship with inflation, GDP and M2. The results of the analysis is the formula used to support the assumption that the change in the velocity of money (V) is affected by changes in P, Y and M.. From the results, we can see that variable V has a positive relationship with GDP (Y), but has a negative relationship with the variable M2 (M) and inflation (P) with a confidence level of 98 percent (R2 = 0.98). Thus, we can indicate that the velocity of money will increase as GDP (Y) increase, while the increase in M2 will reduce the velocity of money.

In addition, from the theory mentioned above, an increasing velocity of money could be seen as the indicator of efficient payment system. The more efficient payment system in the economy, the higher the fraction earned income available for current spending. As the substitute of money become more available, velocity may become increased and money demand decline with increase in the opportunity cost of money.

However, the results should be interpreted cautiously as this study has certain limitations than need to be taken into account. The main limitation is the lack of available and/or reliable data, particularly for broad money and GDP. Second, the study is also limited by the size of the sample which spans from the period of 2001 to 2011. However, these limitations can be taken as areas for improvement in the future research.

8. Policy Recommendation and Conclusion

The payment and settlement system has been rapidly growing in all SEACEN economies and has an important role in the attainment of financial stability and goals of monetary policy. The use of central bank money in final settlement is one element that demonstrates the implicit link of PSS with monetary and financial stability. A reliable and resilient infrastucture for payment settlement is a key requirement for stability and the effective implemention of monetary policy.

In payment systems, one bank's payment is another bank's liquidity. A failure of one participant in transfering its obligations could lead to a similar failure by other system participants who are relying on those payments. In this case, the payment system becomes a channel through which financial risks can be transmitted accross the market and financial institutions. These situations may affect the liquidity position of other participants, demand for money and loss of confidence in the payment and settlement system itself. In the worst case scenario, the payment and settlement system may expose economies, including SEACEN

economies, to contagion risks coming from other countries. Thus, ever since the financial crisis (Asian financial crisis and the recent global financial crisis) for example, the role of the payment and settlement system has been subjected to critical assessment and evaluation. The reversal in market conditions during the crisis indicated how quickly liquidity can evaporate and that illiquidity can last for an extended period of time. The banking system came under severe stress, which necessitated central bank action to support the functioning of money market and individual institutions. Thus, Basel Committee on Banking Supervision (BCBS) in 2008 suggested that banks should understand and have the capacity to manage its intraday liquidity positions and also manage the risks to meet payment and settlement obligations on a timely basis under both normal and stress condiitons in order to contribute to the smooth functioning of the payment and settlement system.

Based on the analysis on the project team reports, we can indicate that payment system innovations may influence the velocity of money by reducing the transaction costs for customers. Innovations in the payment system also make economic transactions easier for customers by providing a wide choice of payment instruments. However, financial innovations are believed to be one of the reasons behind the changing relationship between money and macroeconomic indicators such as inflation rate and GDP. This changing relationship had caused many cenral banks to change their framework from monetary targetting to inflation targetting.

However, financial innovations does not necesarrily mean that it will make monetary policy less effective. Financial innovations only mean that the formulation of monetary policy will become more complex, with additional factors to consider. Financial innovations also expand the scope of determinants which will be used in the monetary framework. Central banks, therefore, need to identify these factors and take them into consideration when formulating monetary policy. Central banks do not need to change the basic formula of monetary policy, but rather provide empirical justifications for the interdependencies of each variable on financial innovations in an economic model, especially at a deeper market level.

In the project team reports, it can be seen that central banks of the SEACEN economies play an essential role as regulator, operator and overseer of the payment and settlement system. As the PSS in many SEACEN economies are still in the development process, it is important for central banks to continually enhance their capacity for the management, forecasting, provision and absorption of liquidity of the banking system. As regulators of the payment system, central

banks need to meet challenges of the rapid developments in wholesale payments. Greater domestic and international cooperation need to be established due to the increasing interdependencies between systems.

Based on the self-assessment on the PSS using PFMIs/CPSIPs, general policy concerns should focus on the following:

8.1 Legal Framework

The legal framework for organisation of the PSS in SEACEN economies is still insufficiently robust. To overcome this problem, the legal framework should be enacted in the form of laws and regulations with clear, transparent and understandable set of rules. The legal framework should also ensure the availability of products and services provided by the system itself. It is also important to note that the legal framework should also provides risk mitigation procedures to ensure that all operations are sound, including in the state of crisis. The legal framework must also include good corporate governance and support the principle of equality for both direct and indirect participants. In addition, given the rapid developments in the PSS, the legal framework should also be able to anticipate future payment system activities.

8.2 Development of Infrastructure and Instruments

The research study shows that there is a gap in the level of infrastructure development due in part to the various stages of development in the PSS of the respective SEACEN economies. Several economies have implemented RTGS system such as the Philippines, Chinese Taipei, Korea, Indonesia and Sri Lanka while others like Brunei Darussalam, Cambodia, Myanmar and Nepal are still using the ACH. The main differences between these two systems is whether the interbank settlement takes place on a net or gross basis. In a net settlement system, the calculation is based on bilateral or multilateral netting for each participant to another partipant, and the net amounts are settled at the end of the clearing cycle. Therefore, there is a risk that participants will be unable to settle the net obligations at the end of the clearing cycle. In contrast, with gross settlement, payments are settled one by one in real time without delays. When these payments are made through the central bank, they will be final and irrevocable. Therefore, the RTGS mechanism will shorten the time lags in settlement.

The availability of a reliable payment system infrastructure is an important prerequisite for acceleration of economic development. Therefore, a country

which has a highly developed payment system will likely have a highly developed economy. In addition, the direction of development of a payment system infrastructure is also influenced by the direction of economic development. Therefore, the development of the payment system needs to be implemented not only on its infrastructure, but also on system features such as advanced technology to mitigate risks, increased security and efficiency based on the Principle of Financial Market Infrastructures. Therefore, for economies that have not implemented the RTGS system, the next step would be to set up the national payment system which has a shorter clearing cycle, or adopt the RTGS mechanism for their systemically important payment system. To this end, the modernisation of the national payment and settlement system is especially crucial to further develop the capital market.

Certain risk elements such as operational risk, credit risk and liquidity risk also need to be addressed to make the national payment system more efficient and reduce the risk of financial instability. Thus, risk mitigation is a significant factor to be considered in developing a sound and efficient payment system infrastructure. Implementing features or mechanisms based on international standards are important, considering that payment systems are becoming increasingly integrated with other infrastructures. The increasing complexity of financial products also require the support of an adequate infrastructure, both in terms of smooth implementation and the soundness and efficiency of the system itself.

Robust payment system infrastructures are also important for risk aversion, particularly in the advent of regional, domestic and international financial crisis. Payment system infrastructures which lack risk management features may potentially widen the expansion of a crisis. Since payment system infrastructures are increasingly connected cross- border, they may become very vulnerable if they are not equipped with advanced features for liquidity management, settlement optimisation and priority limit.

The research project also shows that while all participating economies of this study are still cash-dominated, they already have some non-cash payment instruments that are expected to gain popularity and reduce the use of cash in the future. Increased usage of non-cash instruments will increased the velocity of money which can result in increasing economic efficiency. Therefore policy makers should increase focus on providing and improving payment system instruments, especially non-cash payment instruments.

8.3 Human Resources

The gap in the ability and knowledge between economies also affect the development of the payment system. Economies with less-advanced development need to increase their human resource capacity in the area of the payment system, either by doing it concurrently with product development or by capacity building that can be done through learning activities and exchange of information among economies that are more advanced. Human resource development should not only be about increasing capabilities but also upgrading supervision skills to ensure the efficient implementation of the PSS. The ability to analyse the needs of future development also need to be upgraded to mitigate the risks associated with the provision of payment system services.

8.4 Cooperation between Authorities

Cooperation among economies in SEACEN region also need to be improved to effectively support advancement in the payment system, to increase the relationship not only among central banks but also among other authorities. This is becoming more important as cross-border economic activities are stepping up in lieu of cross border payment transactions. Since there various types of cross-border activities involving the PSS, many aspects need to be synchronised among economies in terms of the mechanisms for action, regulatory requirements and legal factors.

Effective coordination between the relevant authorities is also important since payment system implementation can be carried out by different authorities. Synchronity and harmony of the relationship among the relevant authorities will certainly have an impact on the effectiveness of the PSS. Coordination at regular and specific times are essential for a sound and efficient payment system. In this way, obstacles or a conflicts can be resolved by among the relevant authorities by coordination.

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Appendix I
Banknotes and Coin in Circulation
(End of Year, Unless Otherwise Stated)

Economy	Total Value (USD Millions)										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	350	377	383	408	423	482	589	640	680	795	1,299
Cambodia	nav	nav	nav	nav	311	394	497	559	718	765	930
Indonesia	7,341	9,025	11,169	13,659	14,737	19,797	23,440	24,145	29,684	35,433	41,131
Korea	16,775	20,061	20,369	23,749	25,706	29,847	31,149	24,380	31,899	37,934	42,097
Myanmar	nav	nav	nav	nav	nav	nav	567,996	581,763	742,294	967,881	1,124,087
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	7,826	10,479	11,479	12,567	13,701	nav
Srilanka	856,770	923,134	1,023,467	1,145,459	1,317,771	1,512,505	1,567,203	1,717,890	1,891,683	2,261,206	2,652,012
Chinese Taipei	15,019	15,172	17,900	20,987	22,233	23,277	23,507	25,366	28,493	32,793	36,464

Economy	Value as a Percentage of GDP										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	6	6	6	6	6	6	7	8	8	9	14
Cambodia	nav	nav	nav	nav	5	5	6	5	7	7	7
Indonesia	nav	nav	nav	nav	nav	5	5	4	4	4	nav
Korea	3	3	3	3	3	3	3	3	4	4	4
Myanmar	nav	nav	nav	nav	nav	nav	3	2	2	nav	3
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	0	0	0	0	0	nav
Srilanka	5,440	5,582	5,420	5,544	5,399	5,351	4,844	4,219	4,497	4,562	4,482
Chinese Taipei	5	5	6	6	6	6	6	6	8	8	8

Economy	Value per Inhabitant (USD)										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	1,052	1,109	1,105	1,159	1,181	1,324	1,592	1,708	1,789	2,056	3,303
Cambodia	nav	nav	nav	nav	23	29	36	42	52	54	65
Indonesia	nav	nav	nav	nav	nav	75	85	83	103	122	nav
Korea	354	421	426	494	534	617	641	498	649	768	846
Myanmar	nav	nav	nav	nav	nav	nav	0	0	0	0	0
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	90	118	127	136	146	nav
Srilanka	45,580	48,789	53,381	58,938	66,994	76,043	78,204	85,002	92,503	109,502	127,073
Chinese Taipei	670	674	792	925	976	1,017	1,024	1,101	1,232	1,416	1,570

Economy	Value as a Percentage of Narrow Money										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	23	21	20	19	20	19	22	21	18	27	40
Cambodia	nav	nav	nav	nav	97	96	97	96	96	96	95
Indonesia	nav	nav	nav	nav	nav	43	41	46	44	43	nav
Korea	9	8	8	8	8	7	9	9	10	10	11
Myanmar	nav	nav	nav	nav	nav	nav	18	16	16	16	17
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	68
Philippines	nav	nav	nav	nav	nav	1	1	1	1	0	nav
Srilanka	62,647	63,366	61,116	61,506	57,406	60,550	65,030	67,106	64,575	62,784	66,840
Chinese Taipei	10	10	9	9	9	9	9	10	9	9	9

Appendix II
Transferable Deposits Held By Non-banks
(End of Year, Unless Otherwise Stated)

Economy	Total Value (USD Millions)										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	1,601	1,839	2,197	3,017	2,421	2,569	2,864	3,403	4,155	3,521	4,719
Cambodia	nav	nav	nav	nav	963	1,402	2,479	2,521	3,320	4,313	5,193
Indonesia	nav	nav	nav	21,981	23,151	30,620	37,719	32,812	44,008	53,818	62,686
Korea	38,130	46,728	49,403	56,009	70,409	84,755	82,778	60,857	73,865	78,272	84,720
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	634	670	788	877	1,161	1,199	1,079	1,129	1,347	1,686	1,771
Chinese Taipei	113,427	126,819	156,485	188,292	195,428	206,449	208,035	201,514	274,400	315,155	323,018

Economy	Value as a Percentage of GDP										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	28	29	33	43	35	33	34	42	51	38	51
Cambodia	nav	nav	nav	nav	15	19	28	24	32	38	40
Indonesia	nav	nav	nav	9	8	8	9	6	8	8	7
Korea	8	8	8	8	8	9	8	7	9	8	8
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	4	4	4	4	5	4	3	3	3	3	3
Chinese Taipei	39	42	50	55	54	55	53	50	73	73	69

Economy	Value per Inhabitant										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	4,810	5,408	6,341	8,563	6,752	7,049	7,740	9,074	10,931	9,103	11,997
Cambodia	nav	nav	nav	nav	72	104	181	188	239	306	363
Indonesia	nav	nav	nav	102	106	138	168	144	191	227	259
Korea	805	981	1,032	1,166	1,463	1,752	1,703	1,243	1,502	1,584	1,702
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	34	35	41	45	59	60	54	56	66	82	85
Chinese Taipei	5,062	5,631	6,923	8,299	8,583	9,024	9,062	8,747	11,869	13,607	13,908

Economy	Value as a Percentage of Narrow Money (M1)										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	103	102	115	140	113	99	107	112	108	119	145
Cambodia	nav	nav	nav	nav	300	343	483	432	445	542	533
Indonesia	nav	nav	nav	83	84	80	79	79	80	80	79
Korea	20	20	20	18	21	21	25	23	22	21	22
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	46	46	47	47	51	48	45	44	46	47	45
Chinese Taipei	79	80	81	82	82	82	82	81	84	84	83

Appendix III
Settlement Media Used By Banks
(End of 2011, Unless Otherwise Stated)

Economy	Banks' reserves at central bank (USD millions)	Banks' reserves at central bank as a percentage of narrow money	Transferable deposits at other banks (USD millions)	Transferable deposits at other banks as a percentage of narrow money (USD billions)
Cambodia	1,733	2	715	73
Philippines	nav	nav	nav	nav
Myanmar	nav	nav	nav	nav
Nepal	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav
Chinese Taipei	89,601	0	112,678	0
Korea	33,191	0	Not applicable	Not applicable
Srilanka	1,487	0	nav	nav
Brunei Darussalam	nav	nav	nav	nav

Appendix IV
Institutional Framework
(End of 2011, Unless Otherwise Stated)

Economy	Number of institutions offering payment service *(per million habitat)*	Number of central bank branches *(per million habitat)*	Number of bank branches *(per million habitat)*	Number of post office branches *(per million habitat)*	Others *(per million habitat)*	Total number of branches offering payments services *(per million habitat)*
Brunei Darussalam	9	1	58	nav	nav	nav
Cambodia	11.47	1.33	11.89	nav	4.76	17.97
Indonesia (**end of 2010*)	7.70	0.20	74.70	nav	nav	74.90
Korea	77.76	0.34	156.35	56.69	170.31	383.69
Myanmar	2.38	0.04	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav
Philippines (**end of 2010*)	77.80	0.20	195.90	nav	nav	196.10
Srilanka	1.14	0.05	75.65	226.90	nap	302.60
Chinese Taipei	17	0	145	57	52	254

Appendix V
Use of Cashless Payment Instruments
(Total Number of Transactions in Millions)

Economy	Cheques										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	2.23	2.33	2.3
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	2.9	2.9	3.4	3.2	3.1	nav
Korea	1094.53	1098.27	976.38	871.69	820.29	1152.47	1186.06	1103.99	931.37	752.02	612.90
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	176.1	179.7	181	180.3	181.8	178.6
Srilanka	nav	35.49	36.48	37.69	40.07	44.34	46.15	44.55	40.64	42.79	46.01
Chinese Taipei	nav	162.79	158.35	159.64	154.54	149.20	144.50	134.66	121.54	122.51	117.70

Economy	Credit Transfers										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	28.8	38.3	42.9	42.2	49.9	nav
Korea	1239.09	1445.21	1495.26	1545.11	1646.34	1796.99	2043.30	2311.49	2428.03	2655.52	2909.78
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	1.61	2.02	2.41	3.07	4.13	5.91	7.82	9.02	12.52	12.43
Chinese Taipei	nav	71.48	78.46	93.98	107.48	132.64	173.42	186.08	192.34	228.16	259.94

Economy	Payment by Credit/ATM/Debit Cards										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	1058	1232.5	1520.5	1743.8	2011.1	nav
Korea	nav	nav	1892.28	2146.92	2692.66	3301.5	3830.01	4724.57	5784.41	7093.56	8354.4
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	6.26	7.68	9.76	12.35	16.39	18.87	21.04	19.94	21.79	26.96
Chinese Taipei	nav	313.09	385.36	466.03	529.11	537.6	490.01	497.39	505.6	554.5	597.25

Economy	Direct Debit										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Korea	704.39	859.12	929.75	1017.71	1151.60	1309.80	1428.06	1374.68	1338.14	1420.03	1492.60
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	0	0	0	0.03	0.04	0.03	0.03	0.01	0.01	0.01
Chinese Taipei	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav

Appendix VI
Use of Cashless Payment Instruments
(Total Number of Transactions per Inhabitant)

Economy	Cheques										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	5.86	6.01	5.85
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Korea	23.11	23.06	20.40	18.15	17.04	23.83	24.41	22.55	18.94	15.22	12.31
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	2	2	2	2	2	1.9	nav
Srilanka	nav	1.87	1.90	1.92	2.04	2.23	2.30	2.20	1.99	2.07	2.20
Chinese Taipei	nav	7.23	7.00	7.04	6.79	6.52	6.29	5.85	5.26	5.29	5.07
Economy	**Credit Transfers**										
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	0.1	0.2	0.2	0.2	0.2	nav
Korea	26.16	30.35	31.24	32.16	34.20	37.15	42.05	47.22	49.37	53.74	58.45
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	0.09	0.11	0.12	0.16	0.21	0.29	0.39	0.44	0.61	0.60
Chinese Taipei	av	3.17	3.47	4.14	4.72	5.80	7.55	8.08	8.32	9.85	11.19

Economy	Payment by Credit/Debit Cards										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	4.7	5.4	6.6	7.4	8.5	nav
Korea	nav	nav	39.54	44.69	55.94	68.25	78.81	96.52	117.61	143.56	167.83
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	0.33	0.50	0.63	0.63	0.82	0.94	1.04	0.98	1.06	1.29
Chinese Taipei	nav	13.90	17.05	20.54	23.24	23.50	21.34	21.59	21.87	23.94	25.72

Economy	Direct Debit										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brunei Darussalam	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Cambodia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Indonesia	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Korea	14.87	18.04	19.43	21.18	23.92	27.08	29.39	28.08	27.21	28.74	29.98
Myanmar	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Philippines	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav	nav
Srilanka	nav	0	0	0	0.001	0.002	0.002	0.001	0.001	0.001	0.001
Chinese Taipei	nav	nav	nav	nav	nav	0.35	0.24	0.14	0.20	0.32	0.46

Appendix VII
Features of Selected Interbank Funds Transfer Systems
(End of 2011, Unless Otherwise Stated)

	Type (LV or R)	Owner	No. Of participants	Processing	Settlement	Membership
Brunei Darussalam						
- Not available	nav	nav	nav	nav	nav	nav
Cambodia						
- NBC Cheque Clearing House	LV	CB	nav	ACH	bilateral	Restricted
Indonesia						
- BI-RTGS	LV	CB	155	RTT	RTGS	Restricted
- SKNBI	R	CB	143	ACH	RTGS	Restricted
South Korea						
- BOK Wire+						
- Cheque Clearing System	LV	CB	133	RTT	RTGS	Restricted
- Interbank Shared Networks	R	PA	27	M, ACH	MN	Open
Myanmar						
- Cheque Clearing House	LV	CB	93	ACH	multilateral	Restricted
- EFT	LV	CB	nav	RTT	nav	nav
Nepal						
- Nepal Clearing House Limited	LV	CB	nav	manual paper based	multilateral	Any bank can apply
Philippines						
- Philpass	LV	CB	121	RTT	RTGS	Restricted
- ECCS	LV	PCHC	76	ACH	multilateral	Restricted
- PDDTS	LV	Banks	43	RTT	RTGS	Restricted
Srilanka	R	PA	56	RTT	MN	Open
- Lanka Settle RTGS	LV	CB	34	RTT	RTGS	Any bank can apply
- CITS	R	PA (CB & Banks)	25	ACH	RTGS	Any bank can apply
- SLIPS	R	PA (CB & Banks)	27(d)	ACH	RTGS	Any bank can apply
Chinese Taipei						
- CBC CIFS	LV	CB	99	RTT	RTGS	Any bank can apply
- TCH CCS	R	CB	nav	ACH	RTGS	Restricted
- FISC NIRS	R	FISC	nav	RTT	RTGS	Restricted

	Degree of Centralization	Pricing	Closing time for same day transaction	Number of transactions (thousands)	Transaction Value (billions usd)	Ratio of transactions value to GDP
Brunei Darussalam						
- Not available	nav	nav	nav	nav	nav	nav
Cambodia						
- NBC Cheque Clearing House	Centralized	nav	nav	594	10.02	0.78
Indonesia						
- BI-RTGS	Centralized	Variable cost	18:00	16,166	nav	nav
- SKNBI	Centralized	Variable cost	16:00	99,179	nav	nav
South Korea						
- BOK Wire+						
- Cheque Clearing System	Centralized	Full cost	17:30	3,623	46,471	4,162
- Interbank Shared Networks	Decentralized, Centralized	Full cost	16:00	417,729	5,217	467
Myanmar						
- Cheque Clearing House	nav	nav	nav	348	nav	nav
- EFT	nav	nav	nav	nav	nav	nav
Nepal						
- Nepal Clearing House Limited	Decentralized	nav	nav	nav	nav	nav
Philippines						
- Philpass	Centralized	Variable cost	17:45	1,215	nav	nav
- ECCS	Decentralized	Full cost	16:00	nav	nav	nav
- PDDTS	Centralized	Full cost	16:00	nav	nav	nav
Srilanka	Centralized	Full cost	18:00, 23:55 14:00/17:00	3,478,430	11,195	1,003
- Lanka Settle RTGS	Centralized	Full cost	0.69	267	523	8.8
- CITS	Centralized	Symbolic Costs	nav	46,012	56	0.9
- SLIPS	Centralized	Variable cost	14:30	12,443	4	0.07
Chinese Taipei						
- CBC CIFS	Centralized	nav	16:50	758	11,761	25.21
- TCH CCS	Centralized	nav	nav	117,704	632	1.35
- FISC NIRS	Centralized	nav	16:50	88,453	3,575	7.66

* **Geographical access to the system**
Centralised : one processing center only
Decentralised : more than one processing center

	Gross/Net	Opening/closing time	Settlement finality	Cut-off for all third party payment orders	Cut-off for international correspondents' payment orders in local time
Brunei Darussalam					
- Not available	nav	nav	nav	nav	nav
Cambodia					
- NBC Cheque Clearing House	N	nav	nav	nav	nav
Indonesia					
- BI-RTGS	G	06:30 - 16:30	16:30	16:30	16:30
South Korea					
- BOK Wire+	-	09:00/17:30	Real time	17:30	nav
Myanmar					
- Cheque Clearing House	N	nav	nav	nav	nav
- EFT	N	nav	nav	nav	nav
Nepal					
- NA	nav	nav	nav	nav	nav
Philippines					
- Phillpass	G	09:00 - 17:45	09:00 - 17:45	16:00	nav
- ECCS	N	09:00 - 16:00	nav	17:00	nav
- EPCS	N	09:00 - 16:00	nav	nav	nav
- PDDTS	N	09:00 - 16:00	09:00 - 16:00	16:00	nav
Srilanka					
- Lanka Settle RTGS	G	08:00 - 16:30	Real Time	0.625	nav
Chinese Taipei					
- CBC CIFS	G	08:30 - 18.20	nav	15:00 for TCH 15:30 for TSEC and GTSM 16:30 for TDCC 16:50 for FISC	nav

Appendix VIII
Operating Hours of Selected Large-Value Interbank Funds Transfer Systems
(End of 2011, Unless Otherwise Stated)

	Gross/Net	Opening/closing time	Settlement finality	Cut-off for all third party payment orders	Cut-off for international correspondents' payment orders in local time
Brunei Darussalam					
- Not available	nav	nav	nav	nav	nav
Cambodia					
- NBC Cheque Clearing House	N	nav	nav	nav	nav
Indonesia					
- BI-RTGS	G	06:30 - 16:30	16:30	16:30	16:30
South Korea					
- BOK Wire+	-	09:00/17:30	Real time	17:30	nav
Myanmar					
- Cheque Clearing House	N	nav	nav	nav	nav
- EFT	N	nav	nav	nav	nav
Nepal					
- NA	nav	nav	nav	nav	nav
Philippines					
- Phillpass	G	09:00 - 17:45	09:00 - 17:45	16:00	nav
- ECCS	N	09:00 - 16:00	nav	17:00	nav
- EPCS	N	09:00 - 16:00	nav	nav	nav
- PDDTS	N	09:00 - 16:00	09:00 - 16:00	16:00	nav
Srilanka					
- Lanka Settle RTGS	G	08:00 - 16:30	Real Time	0.625	nav
Chinese Taipei					
- CBC CIFS	G	08:30 - 18.20	nav	15:00 for TCH 15:30 for TSEC and GTSM 16:30 for TDCC 16:50 for FISC	nav

Appendix IX

Features of Selected Securities Settlement Systems
(End of 2011, Unless Otherwise Stated)

	Owner	No. Of participants	Settlement of cash	Securities settlement	Delivery lag	DVP mechanism*
Brunei Darussalam						
- Not available	nav	nav	nav	nav	nav	nav
Cambodia						
- CSX	Stock Exchange	nav	nav	nav	T+2	nav
Indonesia						
- BI-SSSS	CB	176	RTGS	Gross	T+1 or T+0	Model 1
- C-BEST	Stock Exchange	420	Multilateral	Multilateral	T+3 or T+0	Model 1, Model 2
South Korea						
- Korea Securities	stock exchange, other, commercial banks	285	-	-	T, T+1, T+2	DVP1,DVP3
Myanmar						
- Myanmar Securities Settlement System	CB	nav	nav	nav	nav	nav
Nepal						
- Not available	nav	nav	nav	nav	nav	nav
Philippines						
- ROSS	O	115739	RTGS	RTGS	T+1	Model 1
- PDTC-eCS	B	nav	RTGS	RTGS	T+1	Model 1
- SCCP's settlement system	Stock Exchange	nav	Multilateral	Multilateral	T+3	Model 3
Srilanka						
- SSSS	CB	32	RTGS	Multilateral	T+0	Model 2
Chinese Taipei						
- TSEC	Stock Exchange	nav	nav	nav	T+1	Model 3
- GTSM	GTSM	1088	nav	nav	T+1	Model 3

	Intraday finality	Central Securities	Cash settlement Agent	Number of transactions	Value of transactions	Ratio of transactions to GDP
Brunei Darussalam						
- Not available	nav	nav	nav	nav	nav	nav
Cambodia						
- CSX	nav	SECC	Banks	nav	nav	nav
Indonesia						
- BI-SSSS	Yes	BI-SSSS	CB	nav	nav	nav
- C-BEST	Yes	C-BEST	Banks	nav	nav	nav
South Korea						
- Korea Securities	yes	KSD	Central Bank, Commercial Banks	9,478,814	6,509,119	583
Myanmar						
- Myanmar Securities Settlement System	nav	nav	nav	nav	nav	nav
Nepal						
- Not available	nav	nav	nav	nav	nav	nav
Philippines						
- ROSS	Yes	ROSS	CB	nav	nav	nav
- PDTC-eCS	Yes	PDTC-Ets	CB	nav	nav	nav
- SCCP's settlement system	No	No	Banks	nav	nav	nav
Srilanka						
- SSSS	Yes	SSSS	CB	624	485	8
Chinese Taipei						
- TSEC	nav	nav	nav	220104	26,996	140
- GTSM	nav	nav	nav		75,598	391

* Model 1 : Transfer instructions for both securities and funds are settled on a trade-by-trade basis
Model 2 : Securities transfer instructions are settled on a gross basis while funds transfer instructions are settled on a net basis
Model 3 : Transfer instructions for both securities and funds are settled on a net basis

Appendix X
Features of Selected Securities Settlement Systems
(End of 2011, Unless Otherwise Stated)

	Total direct participants	Deposit-taking institutions	Non-deposit taking institutions of which :				
			Central bank	*public authorities*	*postal institutions*	*securities companies*	*others*
Brunei Darussalam							
- Not available	nav	nav	nav	nav	nav	nav	nav
Cambodia							
- NBC Cheque Clearing Hous	nav	nav	nav	nav	nav	nav	nav
Indonesia							
- BI-RTGS	156	150	1	-	1	-	4
South Korea							
- BOK Wire+	134	-	-	-	-	-	-
Myanmar							
- Cheque Clearing House	93	nav	nav	nav	nav	nav	nav
- EFT	nav	nav	nav	nav	nav	nav	nav
Nepal	nav	nav	nav	nav	nav	nav	nav
- nav	nav	nav	nav	nav	nav	nav	nav
Philippines							
- Phillpass	121	121	1	1	0	Not applicable	applicable
Srilanka							
- Lanka Settle RTGS	34	24	1	1	0	7	1
Chinese Taipei							
- CBC CIFS	99	91	1	2	1	120	6

Appendix XI

Features of Selected Securities Settlement Systems
(End of 2011, Unless Otherwise Stated)

	Total	Of which:		
		Banks	*securities companies*	*Others*
Brunei Darussalam				
- Not available	nav	nav	nav	nav
Cambodia				
- CSX	nav	nav	nav	nav
Indonesia				
- BI-SSSS	176	144	16	16
- C-BEST	420	31	9	380
South Korea				
- Korea Securities	285	49	61	175
Myanmar				
- Myanmar Securities Settlement System	nav	nav	nav	nav
Nepal				
- nav	nav	nav	nav	nav
Philippines				
- ROSS	9260	6	nav	nav
- PDTC-eCS	nav	nav	nav	nav
- SCCP's settlement system	nav	nav	nav	nav
Srilanka				
- SSSS	32	23	6	3
Chinese Taipei				
- TSEC	561	66	122	373

Appendix XII

The Asian and the Global Financial Crisis in SEACEN Economies

While the Asian financial crisis caused the SEACEN region's economic growth to decelerate, there were nonetheless key lessons which could be derived. For instance, since the said crisis, the BSP has implemented initiatives to expedite the clearing of non-performing assets and strengthen bank balance sheets. BSP also pursued broad-based reforms geared toward maintaining a strong banking system such as aligning domestic prudential standards with international benchmarks and best practices, consolidating and implementing risk-based approach for sypervision and complementing on-site bank examinations with off-site surveillance functions through the introduction of new supervisory reports. Hence, the BSP has issued rules and regulations aimed at improving risk management and corporate governance of banks and strengthened its own capacity to monitor and intervene.

The lessons from the Asian financial crisis were also valuable in helping Indonesia recover quickly from the recent global crisis. This was due to the sound fundamentals of the banking industry and the positive outlook of Indonesia's economy in general (Deriantino, 2011). Moreover, the impact of the recent financial crisis on the Indonesian financial institutions was not as severe as the impact on other economies due the characteristics of Indonesian banks and financial institutions which were still concentrated on conventional investment instruments. The improving quality of surveillance in the banking sector and non- bank financial institutions as well as capital market also had helped Indonesia to minimise the impact of global financial crisis on its financial institutions. The lessons from the earlier Asian crisis had motivated BI to strengthen the the banking infrastructure (Silalahi and Chawwa, 2011).

Global Financial Crisis

The collapse of Lehman Brothers and the global sovereign debt crises also affected SEACEN economies to varying degrees during 2007-2009. The project team papers of BSP, NBC, CBC and BI all noted that their economies suffered both direct and indirect impacts from global financial crisis. Cambodia's trade and real sectors were affected by financial crises the impacts of which were subsequently reflected in the balance sheets of financial institutions. CBC also reported that the collapse of Lehman Brothers and the global soverign debt crises affected Chinese Taipei's economy, causing the growth rate to decline sharply. Chinese Taipei's growth and price level were impacted by the global economic

crisis, being a small and open economy. Its weighted average deposit rates fell sharply to below 1 percent and loan rates to 2 percent in 2009. Indonesia also experienced the impact of the global financial crisis with the world demand for its exports declining especially from the crisis-hit advanced economies, which were the main export destinations. Indonesia's export growth fell significantly to -18.73 percent y-o-y from 13.64 percent y-o-y during the same quarter of 2008. During global crisis, Philippines' economic growth also began to slow down. However, the impact was short lived due to the adoption of accomodative stances the BSP put in place such as liquidity-easing measures in 2008 and 2009 and reductions in the BSP policy rate. In so doing despite the onset of the global financial crisis, the Philippine banking system continued to exhibit resilience and fortitude. The sound macroeconomic policies and resulting conditions in the economy have provided stability for the domestic financial markets amidst heightened uncertainties. The continuous reform efforts of the BSP, combined with banks' minimal exposure to structured products, have also allowed the financial system to avoid the worst difficulties encountered by other economies.

Korea also suffered from the global financial crisis. The won/dollar exchange rate soared while market interest rates increased sharply and stock prices dropped. In particular, the turbulence in the foreign exchange and financial market was worsened by the massive outflow of foreign portfolio funds. At that time, domestic banks were exposed to the financial market turmoil due to their high loan-deposit ratio. As of the end of November 2008, their loan-deposit ratio stood at 120 percent, far higher than those of advanced economies. Bank lending had grown, driven by the household loans in line with the rise in housing prices. Korea's GDP growth rate in the 4th quarter of 2008 was -4.6 percent quarter on quarter (annualised rate of 17.2 percent).

To alleviate the rapid economic downturn, the BOK cut the "Base Rate" on 6 occasions, by 3.25 percentage points, from 5.25 percent to 2.00 percent. The scale of the policy rate reduction in Korea was similar to the average level seen in most advanced economies, where the financial unrest was most acute. Following the collapse of Lehman Brothers, the BOK expanded its provision of market liquidity dramatically, as part of its efforts to mitigate the credit crunch generated by deep concerns over credit risk. In addition, Korea also expanded the types of permissible collateral and the counterparties eligible for its open market operations, in order to provide sufficient liquidity through the diversification of supply channels.

Liquidity support to vulnerable sectors was also strengthened. To stabilise the markets for credit securities including corporate bonds, the BOK provided

16.8 trillion won through long-term RP purchases on an ad-hoc basis. To provide support to SMEs suffering from serious financial strains, the BOK raised its Aggregate Credit Ceiling by 3.5 trillion won, from 6.5 trillion won to 10 trillion won. Financial institutions' capacity to enhance credit supply was also supported. To recapitalise banks and enhance their financial soundness, the BOK contributed to the Bank Recapitalisation Fund and made a one-off payment of 500.2 billion won on banks' required reserves on 11 December 2008. For the purpose of financial market stability, the BOK provided 28 trillion won worth of liquidity - equivalent to 2.6 percent of nominal GDP.

As the global credit crunch worsened, it also actively provided foreign currency liquidity to stabilise the foreign exchange market. The availability of foreign reserves was greatly expanded through currency swap arrangements with the central banks of major economies. After signing a swap deal with the Federal Reserve at end-October 2008 (30 billion USD), the BOK entered into currency swap agreements with the Bank of Japan (around 20 billion USD) and the People's Bank of China (180 billion yuan) in December 2008. Using its foreign reserve holdings as well as the proceeds of its currency swaps, the BOK provided a total of 26.8 billion USD in foreign currency liquidity to the local market between October 2008 and February 2009.

The government also implemented active fiscal stimulus measures to ward off an overly-deep recession in the real economy. Total additional fiscal spending and tax cuts directly and indirectly related to the financial crisis amounted to 38.8 trillion won in 2009. For example, passenger car purchase taxes were temporarily cut to help prevent a prolonged contraction in private consumption. The fiscal expansion associated with crisis-related discretionary measures amounted to 3.7 percent of nominal GDP, larger than that in both the U.S. and the U.K., the epicenters of the financial crisis.

Chapter 2

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY: BRUNEI DARUSSALAM

By
Dk Sri Joedianna Pg Hj Mohammed[1]

1. Introduction

With the consent of His Majesty the Sultan and Yang Di-Pertuan Negara Brunei Darussalam, Autoriti Monetari Brunei Darussalam (AMBD) was established on 1 January 2011 as the central bank of Brunei Darussalam. The four principal objects of AMBD (Section 4 of the AMBD Order, 2010) are to:

- Achieve and maintain domestic price stability;
- Ensure the stability of the financial system, particularly by formulating financial regulation and prudential standards;
- Assist in the establishment and functioning of efficient payment systems and to oversee them; and
- Foster and develop a sound and progressive financial services sector.

The recent global financial crisis demonstrated how interconnected countries have become and how the financial sector has strong linkages to the real sector of the economy. Financial stability is becoming a very important prerequisite for a healthy economic system, and thus requiring the safety and efficiency of the payment and settlement system (PSS), as a vital part of the financial sector's infrastructure, to be reliable and dependable.

As a member of ASEAN, Brunei Darussalam is supportive of the ASEAN Central Banks' initiatives to strengthen the regional payment and settlement

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system infrastructure which include enhancing consumer protection and education in money remittance; developing an electronic payment for retail payment in ASEAN; and also identifying the feasibility of establishing an ASEAN exchange clearing house and central securities depositories. The continuous cooperation in this area will contribute not only to increasing the integration of financial system but also in helping to uplift the standard and development of the payment and settlement system of a number of ASEAN members whose payment and settlement system infrastructure is relatively less developed. Thus, if the progress of these initiatives can be sustained, the monetary policy of all the ASEAN member countries will be more effective and their financial system will be more resilient to external shocks.

This study will give an outline of the status of the payment and settlement system operating in Brunei Darussalam, the observance of Brunei's PSS in compliance with the Financial Market Infrastructure Principles issued by Committee on Payment and Settlement System (CPSS) of the Bank for International Settlements (BIS). It will also discuss how to move the PSS forward domestically and regionally in order to enhance the role of the PSS in supporting monetary policy implementation as well as in promoting financial stability.

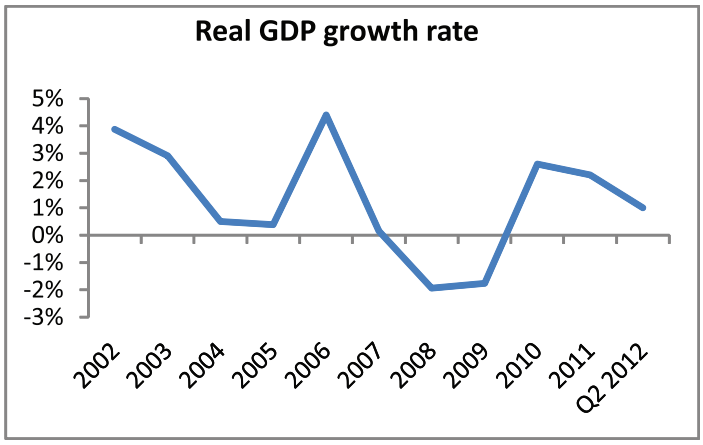
Following the introduction in this first section, Section 2 provides the description of the economy of Brunei Darussalam, brief background of the country's monetary policy and financial landscape, and the state of Brunei Darussalam's PSS. Section 3 will discuss the literature review, touching on the interconnectedness between a safe and efficient PSS, monetary policy, and financial stability. Section 4 will offer some assessment of the payment system in Brunei Darussalam with reference to the Financial Market Infrastructures Principles. Section 5 will discuss the policy implications derived from this study, and lastly Section 6, will give the conclusion of this paper.

2. Economy, Monetary Policy, Financial Landscape and PSS in Brunei Darussalam

2.1 Economy

Brunei Darussalam is a small, open economy whose major exports are crude oil and liquefied natural gas. The oil and gas sector accounts for approximately 45% of its 2011's real GDP. The global financial crisis coupled with the maturing of several oil fields in the country have led to GDP contractions of 1.9% and 1.8% for 2008 and 2009, respectively.

Figure 1



Source: Department of Economic Planning and Development.

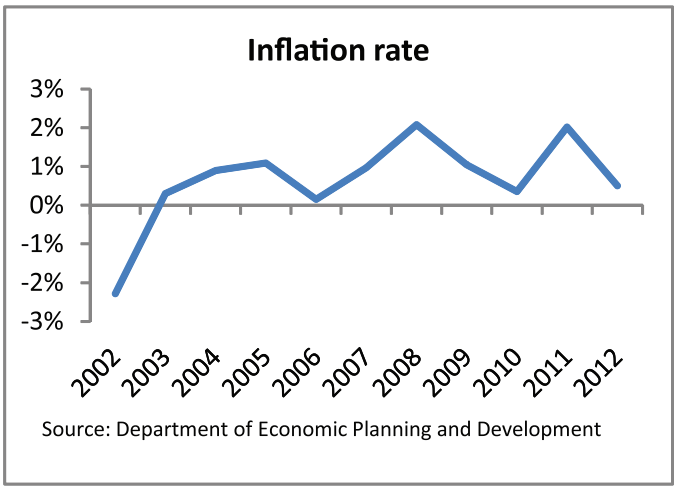
Growth in 2010 and 2011 rebounded to the levels near 2.4%, the 5-year average before the crisis. The economy was allowed to weather through the crisis with no stimulus measures from the government. Brunei's economy has proved to be resilient bouncing back after the height of the financial crisis was over. Government and private sector activities also provide stimulus to the economy in times of lower oil production in the country.

Brunei's population is 393,372 according to 2011 population census, with the per capita GDP of about US$41, 520 (2011).

2.2 Monetary Policy

The monetary policy of the Sultanate is a currency board system whereby, under the Currency Interchangeability Agreement (CIA) signed in 1967 between Brunei Darussalam and the Republic of Singapore, the Brunei dollar is at one-to-one parity with the Singapore dollar. Under the currency board system, every Brunei dollar in circulation is required to be 100% backed up by foreign assets. This system imposes strong monetary discipline contributing to the country's macroeconomic stability and low inflation rate environment.

Figure 2



Inflation generally remained within the 0 to 2% range. The government did not undertake any stimulus measures to boost the economy during the crisis. This along with Brunei government subsidies for a range of goods and services, and the appreciation of the Brunei dollar served to keep inflationary pressures low. As the currency is in parity with the Singapore dollar, any monetary policy actions taken by the Singapore authorities to combat inflation will also benefit Brunei since it is also highly dependent on imports, just like Singapore.

2.3 Financial System Landscape

Table 1
Financial System in Brunei Darussalam as at September 2012

Type	Number	Assets	
Islamic Trust Fund	1	BND20.4 Billion	
Islamic Bank	1		
Conventional Banks			
• Local	1		
• Foreign Branches	6		
• Restricted	1		
Finance Companies		BND2.1 Billion	
• Islamic	1		
• Conventional	2		
Licensed International (offshore) Bank	4	BND98.9 Million	
Insurance Companies & Takaful		BND1.2 Billion	
• Takaful	4		
• Conventional	9		
International Insurance Companies	1	BND162.8 Million	
		BUY	SALE
Money Changer Companies	24	BND94.4 Million	BND108.6 Million
Remittance Companies	21	BND508 Million (money remitted)	

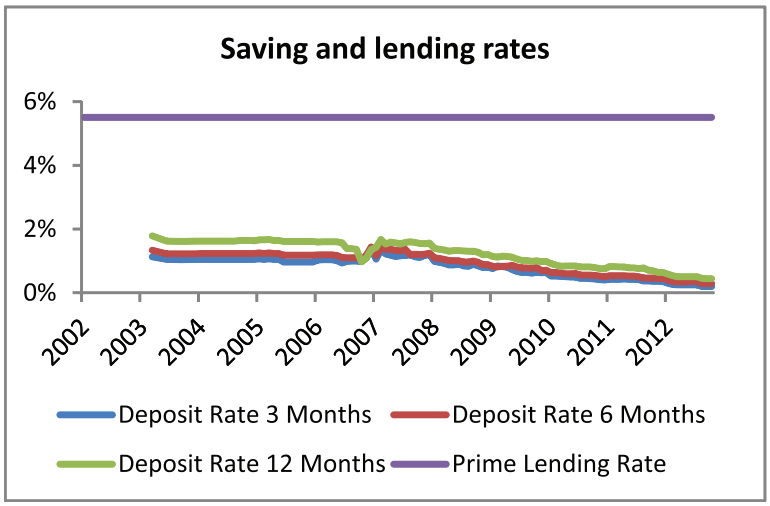
The above table shows the types of financial institutions in Brunei and their total assets. Clearly, the main financial intermediary is the banks with total assets reaching BND21 billion. The country operates a dual financial system of both conventional and Islamic finance and Islamic banks have been growing impressively with a market share of 37% since its inception in the early 1990s. Finance Companies are the second biggest financial intermediation followed by insurance activities. Finance companies are engaged in the business of car financing, the major component of consumer goods financing. Brunei currently does not have a stock exchange and the payment and settlement system operating in the Sultanate is at a basic level.

The Brunei government launched its first Sukuk[2] programme in the form of the Al-Ijarah in 2006 with the primary aim of developing the domestic capital market. The goal is to expand the volume of issues and the range of maturities over time in order to build up a yield curve and bench mark securities, as a foundation for broader money and capital. The issue programme was initiated strictly for market development purposes and not to finance government spending, given the large fiscal surpluses of the government. The issuances are of maturity of 3 and 12 months and are done in book entry form to primary dealers based on contractual arrangements with the primary dealers.

Before the establishment of the AMBD, the Brunei Currency and Monetary Board (BCMD) was the agent to the government in administering the sukuk issuances but this task is now taken over by AMBD. The primary dealers for government sukuk are all the banks in Brunei. The secondary market is yet to be developed pending the setting up of several necessary infrastructures, including Brunei's own securities payment and settlement system. In the absence of securities central depositories and clearing system in Brunei, an external service provider was appointed to carry out the above functions. The gap between trade confirmation and securities payment/deliveries is T+2. For redemption, the ABMD usually will notify the payment agent T-3 to make principal and rental payment on the maturity date.

2. Sukuk is similar to a conventional bond which means financial certificate. Sukuk Al-Ijarah is a financial certificate backed by the lease of a certain types of assets.

Figure 3



The prime lending rates have remained constant throughout the past 10 years. Savings rates however declined following the global trend especially during the aftermath of the global financial crisis. The savings rates rarely diverged with Singapore's rates as moving deposits between the two countries are considerably easy. Loan rates on the other hand are geographically inelastic as loans between the two countries are not close substitutes.

As a follow-up to the expiry of the deposit guarantee given during the global financial crisis, a deposit protection scheme was established on 1 January 2011 upon the enactment of the Deposit Protection Order, 2010. This scheme is administered by Brunei Darussalam Deposit Protection Corporation (BDPC) under the umbrella of the Ministry of Finance. All the banks and finance companies operating in Brunei are required to be members of BDPC. The scheme provides protection of up to B$50,000 per depositor per member institution. Definition of depositors includes individuals, joint accounts as well as business accounts. This deposit protection scheme serves as one of the financial safety net for the public

The establishment of the AMBD in January 2011 as the central bank of Brunei Darussalam brought the tasks of implementing monetary policy and supervising the financial institutions under one roof. As one of the principal objects of the AMBD is to ensure the stability of the financial system, the AMBD

monitors the situation in the Euro Zone closely and has identified the impact of possible contagion effects and shocks to Brunei's financial system. So far, the financial institutions in Brunei do not have direct exposure to European government debts and they remain sound, well capitalised, highly liquid and profitable.

2.4 Payment and Settlement Systems

At present, Brunei Darussalam does not have a centralised national payment system. Due to the small size of the local economy, population and low level of business volumes, the payment and settlement system in Brunei Darussalam is not highly developed and predominantly consists of retail payments using cheques and paper instruction transfers. Furthermore, the non-existence of a central bank for 26 years since Brunei's independence in 1984 has resulted in the practice of well-preserved peer responsibility in the financial markets where players individually and collectively assist each other. The commercial banks are the main providers of banking services ranging from basic payment and transfer services to remittances and serve the transactions needs of individuals and businesses in the economy.

The government sector accounts for about 30% of employment in Brunei. Consequently, the payment of government employees' salaries and benefits plays an important part in the retail payment services offered by banks. Currently, these payments are effected by the government providing payroll schedules to the banks so that funds can be transferred from government accounts held at the banks to the employees' accounts.

The government contributes to the efficiency of the payments systems by providing payments to employees and suppliers of government-issued contracts and purchases via electronic means to the banks, which are able to offer and support such services. The Brunei government has also introduced the Treasury Accounting and Financial Information System (TAFIS) on 2nd March 2002, as a progressive step towards the utilisation of automated and technologically advanced payment (TAP) channels. Another government institution overseeing the retirement benefits fund of Brunei employees is progressing towards an automated reconciliation system for transactions within their accounts held within banks that are able to support such mechanism.

A major portion of the settlement of purchasing and services transactions in Brunei Darussalam is made by cash (banknotes and coins). Cash payments

remain the most convenient method for making small-value payments when payment is made at the point of sale. However, larger transactional amounts are settled in non-cash or 'cashless' instrument – the larger the amount, the higher the tendency. This is partially attributed to the obvious risks associated with handling large amounts of cash. Technology has also contributed to the increasing ease of access to bank accounts for purposes of cash withdrawals, such as the use of automated teller machines (ATMs), debit cards and credit cards. Furthermore, cash dispensers are geographically and widely available to support the population's need to use cash for daily transactions.

The major payment system in Brunei Darussalam is the cheque clearing and settlement system owned by the Brunei Association of Banks (BAB). Hong Kong and Shanghai Banking Corporation (Brunei) was appointed as the management bank to operate the clearing house based on a cost-recovery principle whereby all the expenses incurred in the provision, management and operation of the clearing facilities will be borne by BAB. HSBC (Brunei), however, can directly collect the expenses due from each member of the BAB its proportion of the expenses.

All the banks are SWIFT members and most use it for urgent domestic payment as well as for international payments. The large international banks have regional tariffs with SWIFT, so extra usage is relatively cheap. There are no liquidity management facilities provided by HSBC (Brunei) and the settlement cycle for the paper cheque normally takes four days, which is the standard in the service agreement between HSBC (Brunei) and the banks. Due to this arrangement, all banks centralise their interbank payment activities in their accounts with HSBC (Brunei) for the efficiency of their own liquidity management and maintain credit balance with HSBC (Brunei) for fund settlements. The banks' interbank payment activities are managed through their accounts with HSBC (Brunei) and they maintain credit balance with HSBC (Brunei) for fund settlements. To conduct its operations and financial activities, the AMBD itself opens accounts with commercial banks and maintain credit balance in these accounts.

In addition to cash, most banks offer retail banking products including credit and debit cards and internet-based payment schemes. Banks maintain their own credit card processing and database system to support payments and settlement. Credit cards issued in Brunei are Visa and MasterCard and utilise the PLUS, CIRRUS and Maestro network. Transactions made through these networks are settled by the card associations and billed to either the acquiring or issuing banks.

Credit card transactions made through ATMs and credit card terminals of the issuing bank are generally settlement using in-house systems without processing by the card associations.

Internet banking transactions are settled in a similar manner. The cut-off times and types of transactions offered by banks would vary. Development of these internet-based delivery channels are performed by the head offices of the international banks that also monitor the activities and ensure that the high security levels are maintained.

The activities of the current cheque clearing house are govern by two sets of service agreements among relevant parties, including (1) the service agreement between HSBC (Brunei) and the BAB; and (2) the bilateral service agreement between HSBC (Brunei) and the individual banks, which include the service standard, interbank tariff and clearing time schedule, etc. As the management bank of the clearing house, HSBC (Brunei) is obligated to submit several standard reports, including the annual audit report on the clearing function, to the BAB's Sub-Committee of Payment System and the BAB for their information.

Section 44 of AMBD Order, 2010 provides the AMBD with the authority to have oversight and supervise the PSS. The current oversight of the system is more of prudential objective which is to ensure the soundness of the individual financial institutions. The users are basically self-regulated. Section 43 of AMBD Order, 2010 allows the AMBD to provide facilities, including intra-day credit to payment, clearing and securities settlement systems, if the need arises. This provision so far has never been activated.

In terms of ensuring financial stability, the AMBD, apart from its regular supervision of the financial institutions, can also provide a Lender of Last Resort (LOLR) facility to the financial institutions operating in Brunei Darussalam. The details of the LOLR are spelled out in Section 52 of AMBD Order, 2010. The LOLR facility may be provided for up to 90 calendar days, but must be repaid within 180 calendar days and are only extended against collateral from the borrower. The AMBD in turn may impose remedial measures to be undertaken by the financial institutions in exchange for access to this facility. In addition, under Section 52 of the AMBD Order, 2010, the AMBD may act as the agent to the Brunei government in extending emergency lending from the government to insolvent financial institutions to preserve the stability of the financial system, so long as the lending does not conflict with the objects and functions of the AMBD.

The AMBD is currently embarking on a project for the establishment of a national payment system seeking to improve the efficiency of the PSS and also to mitigate the associated risks. The future plan may include the creation of an AMBD-owned system that would enable the AMBD to conduct oversight of the systemically important payments as well as to provide Delivery vs Payment (DvP) of debt securities through the future implementation of a Central Securities Depositories (CSD).

3. Literature Review

3.1 Relations of PSS in Monetary Policy and Financial Stability

The importance of safe and efficient PSSs is widely accepted as they are needed for the efficient functioning of financial markets and the economy (CPSS, 2005). The tasks of handling both large and small transactions means transactions in PSS must be cleared on time to avoid delay which otherwise may cause instability in the financial system. Furthermore, efficient PSS enables the flow of emergency liquidity to financial institutions that are facing a financial crisis.

An efficient PSS also has a vital role for the effective transmission of monetary policy because it provides reliable transfer of funds and securities during the operation of the monetary policy in the interbank market as well as in open market operations.

The key benefits of an efficient PSS for monetary policy and financial stability can be listed as follows (World Bank and International Monetary Fund, 2002):

- The elimination of float (funds that have been debited to the payer's account, but not credited to the recipient's account);
- The effective operation of an interbank money market, in which financial institutions can efficiently manage their liquidity, and in which the central bank can conduct open market operations;
- The elimination of credit exposures between banks, and the reduction of their liquidity exposures;
- The opportunity for banks to maintain lower overnight balances with the central bank; and
- The ability to reduce or eliminate settlement risk arising from transactions in other financial markets, such as for securities or for foreign exchange.

3.2 Relations between PSS and Monetary Policy

Schmitz (2006) pointed out that the interaction between payment systems and monetary policy is a two-way street. The design of the instruments used in monetary policy affects the demand for central bank money as well as the efficiency and stability of payment systems.

The two-way relationship between PSS and monetary policy can be summarised as follows:

1) Payment system design, efficiency and safety affect the speed and predictability of the demand for money and the efficacy of some monetary policy instruments; and
2) Monetary policy influences the liquidity available in the payment system and its opportunity cost to settle payment obligations. As explained by Schmitz (2006), the opportunity cost refers to the cost of getting Central Bank (CB) money (money base), calculated as the wedge between the overnight interbank interest rate and the remuneration (if any) paid by the CB.

The efficiency of the payment system cannot be downplayed for it is an important factor to enable monetary policy decision made based on an accurate situation. Schmitz (2006) gives an example where, let say, a liquidity shortage happens as a result of an operational incident in the payment system causing banks to borrow funds in the overnight market, with the potential of increasing the overnight rates. This one-off incident can trigger uncertainty in the overnight rates. Thus, it can cause confusion to the policymakers whether the resulting rise in overnight rates is due to a systemic liquidity crunch or a temporary shock in the payment system. Therefore, Schmitz points out that a stable and smooth functioning payment system will enable a smooth conduct of monetary policy.

For a central bank to achieve a successful monetary policy through an effective intermediate target, namely, for example, through the emergence of a deep and liquid money market, the payment system also needs to be as effective and efficient.

3.3 Testing for Correlation between PSS and Monetary Policy

Humphrey (1995) proposed that the relationship between PSS and money supply can be observed through the equation MV = PT. The money supply (M) multiplied by its velocity (V) is equal to the price level (P) multiplied by the number of economic transactions (T). PT is the nominal aggregate level of

economic activity (or nominal GDP). Increase in the velocity of money to some extent reflects the efficiency of the PSS whereby higher velocity of money means faster turnover of money stock to meet transactions needed for a given level of economic activity. Thus, an increase in efficiency of PSS, for example, due to the availability of different modes of payment aside from cash-payment or payments can be settled in a much faster time, reduces cash-holding time by households.

Table 2

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (B$ million)	15864.1	18225.8	18458.4	20397.9	15611.4	16867.3	20579.2
Money supply (B$ million)	3575.6	3962.6	3851.2	4386.1	5390.5	3817.1	4233.5
Velocity	4.4	4.6	4.8	4.7	2.9	4.4	4.9

Table 3

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (B$ million)	15864.1	18225.8	18458.4	20397.9	15611.4	16867.3	20579.2
CIC (B$ million)	704.7	739.9	848.8	921.8	954.5	1,023.7	1,690.0
Velocity	22.5	24.6	21.7	22.1	16.4	16.5	12.2

As can be seen in Table 2, there is no clear trend in the velocity of money, although in the earlier years of the period studied, the velocity seemed to be increasing slightly. Overall it has been constant around 4%. It could be that the substitution between cash and non-cash payment is even out in the money supply, thus causing a constant velocity of money.

When currency in circulation is used in the calculation of the velocity, the downward trend of velocity of money is obvious due to the decline in nominal GDP in 2009 and 2010, as compared to the previous year. Meanwhile the rapid decline of the velocity in 2011 is attributed to the introduction of new banking regulatory requirement, known as Asset Maintenance Ratio (AMR) whereby banks are required to keep aside a certain portion of their assets in an eligible asset of which one of them is the Brunei currency. Thus, the demand for Brunei dollar was unusually high towards the end of 2011.

Therefore, the study finds inconclusive evidence to relate the efficiency of the PSS and to changes in the velocity of money. Furthermore, the AMBD is not actively managing money supply which causes the relationship between the PSS and velocity of money to be irrelevant.

3.4 Relations between PSS and Financial Stability

McVanel and Murray (2012) stated that the PSS is a key financial market infrastructure in which most financial transactions are cleared, settled and recorded. These activities support the efficient functioning of the financial system. However, the PSS may also be a channel where systemic risks are transmitted. The failure of one participant to meet its obligations can render other participants incapable of meeting their obligations and the knock-on effect of the failed payment can cause a liquidity crunch and loss of confidence in the financial system, leading to financial instability.

Therefore, an efficient and safe PSS enhances the stability of markets and promotes wider financial stability by reducing risks in the transaction process and allows better management of risk, e.g. through the redistribution of risk (Bank of England, 2012). For example, the securities settlement systems reduce credit risk by ensuring that securities are delivered only when payment is received with finality (delivery-versus-payment). Central counterparties (CCPs) and payment systems can reduce credit and liquidity risk by netting payment or financial exposures. These activities serve to reduce operational risks through the standardised processes they introduce.

3.5 Testing for Correlation between PSS and Financial Stability

An analysis is carried out on the relationship between financial depth and PSS transactions in Brunei Darussalam. Recent studies found that financial deepening can contribute to financial stability, helping countries to limit swings in asset prices and find alternative source of funding (IMF, 2011). In this study, the financial depth ratio may be measured as Money Supply/Nominal GDP. Money supply becomes a proxy to public trust in the financial system as whole, since people will continue to keep their money in savings and fixed deposits as long as the financial system remains stable.

PSS transactions are measured as the use of cashless payment instruments in the country which include cheques, credit transfers, payments by credit/debit cards, and direct debit. The results of the analysis are shown below:

Table 4
PSS Transactions

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (B$ million)	15864.1	18225.8	18458.4	20397.9	15611.4	16867.3	20579.2
Value of Clearing House Transactions (B$ million)	n.a.	n.a.	n.a.	n.a.	102.0	99.0	114.2
Financial depth ratio (Money supply/GDP) (%)	22.5	21.7	20.9	21.5	34.5	22.6	20.6
Use of cashless payment instruments (no. of transactions in millions)	n.a.	n.a.	n.a.	n.a.	6.9	7.2	7.4

It appears that financial depth is relatively constant except for the unusual increase in 2009 most likely due to the decrease in GDP as oil productions declined resulting from plant refurbishment. The value of clearing house transactions as well as use of cashless payment instruments showed an upward trend since 2009. However, it seems that the data available does not support the theory regarding the positive relationship between an efficient PSS and financial stability. The possible explanation is that it might be due to the break in GDP growth in 2009 and 2010 causing the results for financial depth ratio to be out of the normal range.

4. Assessment of Current PSS Framework

The systemically important payment and settlement system in Brunei Darussalam is the Automated Cheque Clearing House (ACH) that mainly processes cheque payments. Since the country currently does not have corporate bond market or stock market or securities market, the assessment on the observance of Financial Market Infrastructure Principles will be done based on the ACH features and operations.

Therefore, the following assessments will only cover the FMI principles that relate to the PSS:

Principle 1: Legal Basis

The legal basis should provide a high degree of certainty for each material aspect of an FMI's activities in all relevant jurisdictions. An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.

As described in the PFMI report, legal risk is the risk of the unexpected application of a law or regulation, usually resulting in a loss, and it can also arise if the application of relevant laws and regulations is uncertain. It also includes the risk of loss resulting from a delay in the recovery of financial assets, or a freezing of positions resulting from a legal procedure.

The two basic pieces of legislation relevant to the PSS are the AMBD Order, 2010 and the Banking Order, 2006.

The AMBD Order Clauses 4 (1) c, 36 (1) (a), 36 (1) (g), 36 (2), 38, 43, 44, 52 (3) and (4) and 55 give explicit authority to the AMBD to, inter alia, (AMBD, 2013):

- Assist in the establishment and functioning of efficient payment systems;
- Develop and manage an inter-bank funds system;
- Provide for the development and maintenance of necessary infrastructure;
- Provide, at cost, custodial and registry facilities and set the conditions for their operations;
- Provide facilities for payment clearing and settlement;
- Ensure the safety soundness and efficiency of payment systems;
- Be exclusively responsible for the regulation, licensing, and oversight of payment, clearing and securities settlement systems;
- Require any payment system operator to be licensed and to adhere to conditions set;
- Regulate and oversee the issue and quality of payment instruments;
- Conduct inspections of premises of payment systems operators and participants;

- Require information from payment systems operators and participants;
- Require collateral to support liquidity facilities provided to a bank; and\
- Specify how a bank or financial institution shall clear and settle its balances.

The relevant clauses of the Banking Order, 2006 include:

- Sections 59-63 regarding actions of the AMBD when a bank becomes insolvent;
- Section 99 "Clearing House and Settlement of Balances between Banks", which (under the amendments caused by the AMBD Order) gives the AMBD the mandate to establish, oversee and control the activities of a national clearing house; and
- Section 101 gives direction on the priority of liabilities in an insolvent bank, which can affect finality.

Other Legal Framework Components

Other significant pieces of legislation already exist, making the framework of Laws relevant to the payment systems in Brunei relatively complete. These include (AMBD, 2013):

- Electronic Transactions Act (Revised, 2008)
- Criminal Asset Recovery Order (2012) which replaces the AML Act (2000)
- Consumer Protection Order (2011) which excludes financial services
- Securities and Market Order (due to be enacted by 2013 and which replaces the Securities Order of 2001)
- Money-Changing and Remittance Businesses Act (1995).

There is currently no legislation on Data Protection and Privacy, but this has been discussed, and for the Credit Bureau a special notice under the Banking Order was issued by the AMBD to assure suitable Data Protection measures are observed.

The Companies Act (1984), and as amended, contains provisions relating to bankruptcy and liquidation which may have an impact on finality of payment. There does not appear to be any clear statement about payment finality or netting in the banking legislation. This is the one major gap that needs to be filled. Clauses 59 and 62 of the Banking Order, 2006 may enable the AMBD to impose

finality conditions on payments made by a bank which is in the insolvency process. Article 168 of the Companies Act implies that transactions (which can be interpreted to include payments) may not be executed after a winding-up order has been made, but does not seem to imply claw back of payments. The powers of Liquidators under the Act do not appear to permit claw back of payments already made, other than as a result of a court order. However, there is no explicit statement about this and it would be worthwhile to ensure that, in the context of the RTGS, there is no uncertainty about the irrevocable nature of settlements made in the CB money.

Furthermore, although the ACH has service contract clearly stating the procedure but there is no clear rules on delay or failure of payment. Thus, the area of the PSS legislation and regulatory framework that needs to be addressed is on the legal settlement finality to reduce legal risk and avoid the potential conflict of laws such as the insolvency law.

Principle 2: Governance

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

A formal clearing house agreement was signed between the BAB and HSBC in 2011 to formalise the governance arrangements. Whilst it is clear who is the owner of the ACH system, the service agreement does not really state who will be responsible in times of delay or failure of the settlement or where the defaulting banks can get liquidity support. The clearing house rules clearly specify that neither the management bank nor the BAB will be liable for the settlement or sub-settlement obligations for any defaulting bank to any other bank.

With regards to payment delay or failure, it is however clear what the AMBD can do if an ACH participant runs into short-term liquidity difficulty. The AMBD Order, 2010 provides the following provisions:

- Provision 36(1) (g) says that the ABMD may ‘develop and manage an interbank funds system and establish the requirements for its participants.’
- Provision 43 – Payment System Facilities. The provision says that the ‘Authority may provide facilities, including intra-day credit, to payment, clearing and securities settlement system, and their participants, to ensure the safety, soundness and efficiency of such system, without prejudice to

the development and management of an interbank fund system under Section 36(1)(g).

- Provision 52 – Lender of Last Resort. It gives the AMBD the power to grant financial assistance to eligible banks and financial institutions not exceeding 90 days as long as they are solvent and can provide collaterals as set by the AMBD.

The role of the BAB Sub-Committee on payment and settlement system should be made more transparent and laid out more clearly so that the regulator and payment participants are aware of the extent of their responsibilities. Furthermore, it will also ensure that the operation and business of the ACH runs smoothly and there are people who look after the development of the ACH in terms of innovating system, expanding its capacities, and ensuring adequate risk management are in place.

Principle 3: Framework for Comprehensive Management of Risks

An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operations, and other risks.

The operating agreement signed between the BAB and HSBC (Brunei) and subsequently the service agreement between HSBC (Brunei) and the ACH participants stipulates a clear framework to especially manage the legal and operation risks of the PSS. For one, it enables the BAB to manage its risks as owner of the payment system by setting the powers and responsibilities of the management bank of the ACH, i.e. HSBC (Brunei). To manage the operations risks, the agreement clearly specifies the HSBC (Brunei)'s roles in terms of providing the clearing house equipment, software, personnel, operating procedures, procuring insurance in connection with the management of the clearing facilities as well as lays out what functions still remain with the BAB. The latter encompasses setting the clearing house rules, deciding the improvement to the clearing house equipment and software as recommended by HSBC (Brunei), and reimbursing HSBC (Brunei) of all expenses incurred by HSBC (Brunei) in the provision, management, and operation of the clearing facilities.

In terms of managing the legal risk, the 'confidentiality' clause in both agreements plays a critical role to negate the perception that the management bank has a market advantage over the other banks due to its knowledge of the liquidity position and the customer profiles of those banks whose payments go

through the ACH. For this purpose, the agreements stipulates that a strict Chinese wall is established in the management bank's operations whereby any information pertaining to the clearing facilities are only known to the staff operating the facilities and these staff are required to sign a declaration of confidentiality so that they are aware of the confidentiality obligations.

The corresponding service agreement between HSBC (Brunei) and other banks, on the other hand, provides a comprehensive framework to manage the legal and operation risks in terms of clearly stipulating the responsibilities of the management bank with respect to operating the clearing facilities, providing the rules of the clearing house as set by the BAB, establishing the operating procedures, service levels and charges, and dispute settlement.

The current missing link in the risk management framework is a comprehensive provision for managing the credit and liquidity risks of the PSS in Brunei. Although the service agreement to some extent mitigates liquidity risk since the management bank will cut off a defaulting bank from the clearing house settlement on the same day, the clearing house, however, is not in a position to offer temporary liquidity support to the defaulting bank. Thus, the other banks waiting for the payment may have to bear some liquidity crunch. Nevertheless, as mentioned before, the legal framework to support the management of credit and liquidity risks is already in place, especially as provided in the AMBD Order, 2010. The next step is laying out more comprehensive procedures for payment finality and making sure the availability of temporary liquidity support.

Principle 4: Credit Risk

An FMI should clearly measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence.

Credit risk to the ACH is minimal since settlement is carried out in settlement accounts held by HSBC (Brunei) for each bank. However, these accounts are not kept funded. Once the banks know their net positions, those in debit transfer funds from accounts in Singapore to HSBC in Brunei via SWIFT (or HSBC internal funds transfer) to cover the settlement. Although this process can result in late funding, there has never been a situation where the settlement was held up overnight.

The final account postings are done by the paying and collecting banks on the evening of Day 3.

Principle 5: Collateral

An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risks.

This principle is not yet practiced in Brunei's PSS since liquidity lending for the PSS is yet to be established. However, provisions for accepting collateral against short-term credit facility provided by the AMBD is already in place, namely in Provision 39 of the AMBD Order, 2010 on 'Open Market and Credit Operations' and also Provision 52 on 'Lender of Last Resort'.

Principle 7: Liquidity Risk

An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities. An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.

The current set up of the ACH does not impose liquidity risk to the operator because the risk is only faced by the creditors.

Further enhancement to the PSS can be carried out in the future to activate the inter-bank markets as well as payment system facilities as provided for in 36(1)(g) and 43 in the AMBD Order, 2010. Subsequently, more active liquidity management will be forthcoming, and thus the need to follow Principle 7 closely.

Principle 8: Settlement Finality

A FMI's rules and procedures should clearly define the point at which settlement is final. A FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk.

Settlement positions are calculated by the Clearing House by 3 pm. Settlement is carried out in settlement accounts held by HSBC (Brunei) for each bank. However, these accounts are not kept funded. Once the banks

know their net positions, those in debit transfer funds from accounts in Singapore to HSBC in Brunei via SWIFT (or HSBC internal funds transfer) to cover the settlement. Although this process can result in late funding, there has never been a situation where the settlement was held up overnight. The final account postings are done by the paying and collecting banks on the evening of Day 3 of presenting the cheques.

The Companies Act, 1984, and as amended, contains provisions relating to bankruptcy and liquidation which may have an impact on the finality of payment. There does not appear to be any clear statement about payment finality or netting in the banking legislation. This is the one major gap that needs to be filled. Clauses 59 and 62 of the Banking Order, 2006 may enable the AMBD to impose finality conditions on payments made by a bank which is in the insolvency process. Article 168 of the Companies Act implies that transactions (which could be interpreted to include payments) may not be executed after a winding-up order has been made, but does not seem to imply claw back of payments. The powers of Liquidators under the Act do not appear to permit claw back of payments already made, other than as a result of a court order. However, there is no explicit statement about this and it would be worthwhile to ensure that, in the context of the RTGS, there is no uncertainty about the irrevocable nature of settlements made in CB money.

Principle 9: Money Settlements

A FMI should conduct its money settlements in CB money, where practical and available, to avoid credit and liquidity risks.

All payments in the ACH are currently settled in commercial bank money since the AMBD does not provide intra-bank settlement service. Credit risk to the ACH is minimal since settlement is carried out in the settlement accounts held by HSBC (Brunei) for each bank. The current set up of the ACH does not impose liquidity risk to the operator of the ACH, i.e. HSBC (Brunei) because the risk is only faced by the creditors of the settlement.

Further enhancement to the PSS can be carried out in the future to activate the inter-bank markets as well as the payment system facilities as provided for in 36(1)(g) and 43 in the AMBD Order, 2010. Subsequently, more active liquidity management will be forthcoming, and thus the need to follow Principle 7 closely.

However, there can still be some inherent risks faced by the PSS participants since the settlement accounts are held with one commercial bank, and if the

commercial bank faces illiquidity or insolvency, it can affect the accessibility to the settlement accounts. Nevertheless, these risks are mitigated with overall strict supervision and regulation of the banks by the AMBD which ensures the banks are liquid and practise sound operations.

Principle 10: Physical Deliveries

A FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.

There is a clear rule stated in the service agreement regarding the delivery of inward cheques and CD file for each Paying Bank after the cheques are sorted.

Principle 13: Participant-default Rules and Procedures

A FMI should have default rules and procedures that enable the FMI to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default.

The default rule of the ACH is clearly stated in the service agreement between the management bank, HSBC and the other banks. If any bank does not have sufficient funds in its settlement account on any given day and cannot, at once, make arrangements to cover the deficit, all banks will be notified of the defaulting case. The defaulting bank's clearing for the day will be deleted from the clearing house settlements and its clearing figure adjusted with all other banks interested.

Meanwhile, if the defaulting bank remains in default of its settlement obligation, the ACH may refuse clearing facilities for this bank and it may be suspended from the clearing facilities upon agreement by the Chairman of the BAB. Once the suspension is in effect, the management bank will notify all the other banks regarding the suspension so that the other banks will not receive further articles drawn upon or negotiated through the bank. Clearing facilities may be restored to the bank under suspension once approved by the Chairman of the BAB and upon payment of all its settlement obligations.

Principle 15: General Business Risk

A FMI should have robust management and control systems to identify, monitor, and manage general business risks, including losses from poor execution of business strategy, negative cash flows, or unexpected and excessively large operating expenses.

There is no clear indication whether the BAB has performed any assessment on the current business model of the ACH although there have been anecdotal evidence that the Sub-Committee of Payment System under the BAB discussed payment-related proposals, initiatives for efficiency enhancement, technical problem and interbank payment transaction tariff; and approval from the BAB is required for their implementation.

Principle 17: Operational Risk

A FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.

To manage the operations risks, the agreement between the BAB and HSBC (Brunei) as well as the service agreement between HSBC (Brunei) and the other banks spell out clearly the responsibilities of all parties in the agreements, and the procedures for clearing. At the same time, HSBC (Brunei) as the management bank can consult the BAB, as the owner of the ACH, to clear up any operational problem or to improve certain procedures, thus mitigating the losses from operational risks. HSBC (Brunei) is also required under the agreement with the BAB to prepare a contingency plan in the event of inaccessibility of the clearing facilities either the physical building or the system.

Principle 18: Access and Participation Requirements

A FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.

The ACH is fairly open since all members of the BAB can join the ACH as stated in the Clearing House Rules whereby “each member of the Association shall be entitled to the use of the Clearing Facilities.”

Principle 21: Efficiency and Effectiveness

A FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement arrangement; operating structure; scope of products cleared, settled, or recorded; and use of technology and procedures.

It is yet to be ascertained whether regular review of the effectiveness and efficiency of the ACH have been done by the BAB but its seems that they are thinking about having an independent ACH with a view of the AMBD taking a more central role in terms of co-owning the clearing house as well as being involved in the settlement process. The ACH has been in operation for 10 years and so far there has been no major issue or any failure reported to the AMBD or Ministry of Finance (the authority responsible for regulating and supervising the banks before the establishment of the AMBD). Therefore, the current arrangement of the clearing house can be considered as broadly efficient and effective in terms of laying out the rules and procedures in meeting the requirements of its participants and in response to the current market demands.

However, there is room for improvement in the ACH that includes shortening of the cheque clearing cycle of currently 4 days, and also further use of cheque truncation to reduce collection time from bank branches and the need to return rejected cheques.

Principle 23: Disclosure of Rules, Key Procedures and Market Data

A FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants. The relevant rules and key procedures should also be publicly disclosed. A FMI should disclose clear description of the system design and operation, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they incur by participating in the FMI.

The rules and procedures are fully disclosed to the participants in the service agreement of the ACH, including members' rights and obligations. Upon request, the clearing house provides the clearing house data, such as value and volume of cheques cleared to the AMBD.

5. Policy Implications

Since Brunei Darussalam adopts a currency board arrangement, there is no active implementation of monetary policy. Unlike other central banks, Brunei has limited ability to influence the interest rate since the issuance of currency must always be 100% backed up with foreign assets. Therefore, the avenue for achieving price stability is done through effective anchoring of the Brunei dollar to the Singapore dollar at one-to-one parity which has been made possible by the signing of the CIA between Brunei Darussalam and Singapore. As both countries are very open economies and rely heavily on exports and imports, the management of currency as the main thrust of Singapore's monetary policy has underpinned the macroeconomic stability in both countries. Since monetary policy is quite dormant in Brunei, the connection between the monetary policy and the payment system is rather weak, and thus it is believed that the payment system has a greater role for financial stability in the country.

The current PSS arrangement operates like a self-regulatory organisation and, despite the smooth operation of the system, it does not capture other large value payments that are being transmitted by paper instructions through SWIFT as well as government payments that are being handled by Ministry of Finance. Furthermore, the clearing cycle of 4 days can be made shorter and certain risks elements such as operational, credit and liquidity risks need to be addressed to make the ACH more efficient and to reduce the risks of financial instability.

With the establishment of the AMBD, the legislation on the PSS becomes more comprehensive. The next step is to set up an independent oversight department to oversee the payment system currently operated by HSBC (Brunei) and the national payment system in the future. A comprehensive oversight legislation similar to what the neighbouring countries already have in place, can reduce uncertainty as provisions from the different legislations are brought together to give the AMBD complete oversight functions. In the meantime, while waiting for the enactment of relevant laws, the urgent aspect that can be addressed by the AMBD is to advise the ACH on the stipulation of the settlement finality which will enhance trust in the financial system.

As stated in the AMBD's Monetary Policy Statement in 2012, "high on the AMBD's agenda will be the enhancement and further strengthening of the financial sector infrastructure. To this end, the modernisation of the national payment and settlement system is especially crucial in the AMBD's efforts to further develop the capital market." Hence, the AMBD is determined to launch its Payment and Settlement Payments Blueprint in the coming months, not only

as a positive step towards building a safe, efficient and modern PSS, but also to bridge the financial infrastructure gap which will facilitate the development of other financial markets and instruments, such as Islamic finance instruments, bond market, re-insurance, and stock exchange.

6. Conclusions

Being a country with small population, Brunei's financial system is quite basic as compared to other neighbouring countries. The banking system has about 85% share of the whole financial system. Therefore the most important payment system in the country is still payment by cheques which are cleared through the ACH owned by the BAB. The ACH thus can be categorised as the main FMI in Brunei. Apart from the issuance of government Sukuk and some private bond issuance, the capital market is still underdeveloped, thus explaining for the absence of a securities settlement system and central securities depositories in Brunei.

Having a currency board system as the monetary policy thrust in Brunei limits the connection between the payment system and the monetary policy. The strict discipline of having to at least have 100% foreign assets back-up to every currency issued prevents the AMBD from actively influencing the interest rate. Nevertheless, an efficient PSS is still vital to the AMBD when it starts to manage liquidity in the banking system actively together with its need to fulfill its objectives of ensuring the stability of the financial system as well of assisting in the establishment and functioning of efficient payment systems and overseeing them.

The assessment of the ACH against the FMI principles issued by the CPSS found that the ACH, at the current form and operating environment, can satisfactorily fulfill many of the established principles, but with differing degree of observance. The principles generally observed are those relating to general organisation (Principle 1-3), default management (Principle 13), general business and operational risk management (Principle 15 and 17), access (Principle 18 and 19), and transparency (Principle 23). Meanwhile, the areas that need attention are in meeting credit and liquidity risk management (Principle 4 to 7) due to the absence of clear payment finality and liquidity support arrangements. Given that the law allows the AMBD to provide the PSS with liquidity support, if needed, the next step is to lay out the operational guideline to activate these provisions.

The AMBD is pressing on with its agenda to modernise the PSS and the move cannot be more timely given the continuing financial uncertainties in certain part of the world. This entails enhancement of the PSS where, firstly safety of

the PSS in Brunei must be strong enough to overcome the negative spillovers from the global financial difficulties; and secondly, the PSS needs to be more efficient if Brunei is to develop a deeper and wider financial system, enabling it to tap into the vast investment capital which are shifting away from the troubled regions.

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Chapter 3

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY IN CAMBODIA

By
Phan Pijeivibol[1]

1. Introduction

One of the central bank functions is to oversee payment and settlement system (PSS) and ensure it operates in a safe and efficient manner. Safety and efficiency of PSS are fundamental to the smooth functioning of financial markets. A core role of central banks has always been to provide a safe settlement facility for many systems. This is not an easy task for a developing economy like Cambodia.

The recent history of Cambodia about the way people make payment is worth highlighting. Back in 1979, the Cambodian people were exchanging goods in a barter economy. Banknotes were reintroduced in Cambodia in March 1980, to be a means of facilitating the exchange of goods between producers and consumers in the different compartments of the socialist economy. Since the creation of bank deposit money was nil at that time, the main way of getting the riel into circulation was through the payment of civil servants' salaries. In the early 1990s, the economy was transformed from a centrally planned to a market economy. A two-tier banking system came to replace a mono-banking system, only then did the central bank release its commercial activities to the private sector and retain its supervisory and regulatory roles in the financial system. Starting from the second half of 1990s, the government worked on establishing the legal framework for the National Bank of Cambodia (NBC) to oversee, among other things, the payment and settlement systems.

A dramatic change in Cambodia's payment systems and instruments was observed in the late 1980s and early 1990s when the economy was transformed from a centrally planned to a free market economy. In a free

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market economy we need money in different forms (cash and non-cash) to ensure smooth and effective operation of the financial system (Geva, 2009).

The NBC started in the second half of the 1990s with a limited capacity in its task of modernising the payment systems in Cambodia. The situation at that time was very challenging for the NBC, and it faced a long road in designing a well functioning PSS to support the new market economy. By definition, a well functioning modern payment system can be described as a complex set of arrangements involving such diverse institutions as currency, the banking system, clearing houses, the central banks and possibly a government deposit insurance scheme (Goodfriend, 1991). Payment systems are the basic infrastructure of a market economy (Sheng, 1995).

With a number of Laws related to payment systems having been put into place in Cambodia, the authorities moved forward in upgrading the country's payment system in response to the market needs. The current payment systems in Cambodia consist of the large-value payment systems which is the NBC's clearing house, securities and cash settlement system of the Cambodia Securities Exchange (CSX), and the retail payment systems. It is important to note that Cambodia's payment and settlement systems still lag behind other countries in the region.

1.1 Payment Systems in Cambodia

The NBC has statutory responsibility for the oversight of the payment system under the Article 7 of the Law on Organisation and Conduct of NBC, adopted in January 1996. In accordance with this law, the NBC has continuously introduced new Prakas and regulations in order to develop and enhance a safe and sound payment system in Cambodia. Cambodia's payment system is at a very early stage of development. Cash is being widely used in the economy since the payments tools are very limited and are not easily accessible.

Cheques are the most commonly used non-cash payment instrument in Cambodia. Over the course of time, the use of other means for effecting transfers other than cash is gaining ground. Tax payments equivalent to or exceeding 4 million riels (US$1,000) must be paid by cheque, contributing to the increasing use of cheques in business transactions. The total amount of US dollar-denominated cheque clearing at the NBC's clearing house increased subsequently from nearly US$5 billion in 2007 to about US$9.5 billion in 2011, while those denominated in riel increased from about KHR860 billion

to about KHR1,820 billion in the same period. However, the growth of the total amount of cheque clearance was negative (-23% for dollar-denominated cheques and -4% for riel-denominated cheques) in 2009.

Figure 1
USD Chequess cleared and GDP Growth

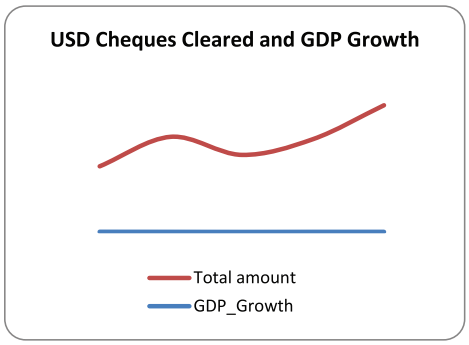
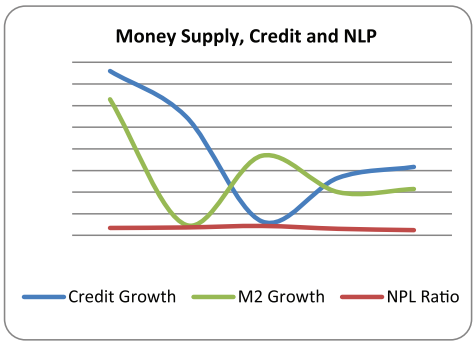


Figure 2
Money Supply, Credit and NPL



This is consistent with the movement in the GDP growth, which registered sharp contractions in late-2008 and in 2009, and the property bubble burst under the weight of weaker economic activity and foreign currency inflows (Cambodia Article IV, 2009). As a result, the growth was 6.7% in 2008 and 0.1% in 2009, but picked up quickly in 2010 at 6.0% (see Figure 1). Similarly, Figure 2 shows the developments on the monetary and financial fronts. Growth of credit to the private sector dropped from 55% in 2008 to only 6% in 2009. Non-performing loans ratio picked up slightly in 2009. Conversely, growth of broad money (M2) was lower in 2008 and 2010 than in 2009; this was due to the effects of monetary policy tightening which increased the statutory reserve ratio from 8 to 16% in 2008, and then which lowered the same to 12% in 2009.

Debit and credit cards (including ATMs) are becoming increasingly popular within the society, though the amount transacted via these channels is still not significantly visible. Debit and credit cards have been introduced and over 600 ATMs installed throughout the urban areas. Nearly one million debit cards and 18,000 credit cards have been issued by banks in Cambodia as of March 2012. In the meantime, some commercial banks have set up a clearing arrangement for their ATM transactions called “Easy Cash”. On the other hand, several institutions introduced mobile phone banking or m-banking in Cambodia. Currently, there are three approved payment service providers, WING, ACLEDA Unity and CellCard Cash. M-banking has

extended fund transfer services to rural and remote areas where formal services are not available.

Work on the fully centralised national clearing and settlement systems referred to as the "Full Solution", including all PSSs in Cambodia, developed inside and outside of the central bank with the purpose to provide both local cheque clearing and same-day intercity electronic payments, has yet to be completed. It is expected to be completed by the end of 2012. Currently, an interim centralised clearing and settlement systems referred to as the "Interim Solution" has been introduced, which covers the NBC's clearing house operation only. The Real Time Gross Settlement (RTGS) will be considered after the completion of "Full Solution" and in response to increasing market developments (FSDS, 2012). SWIFT is used for fund transfers from banks in Cambodia to other parties overseas. Currently, there are 36 banks using SWIFT. Western Union and Money Gram are available at a number of banks in Cambodia.

The National Payment System (NPS) is not yet established. Thus, the clearing house which is under the supervision of the NBC plays a dominant role in facilitating the settlements of the private sector, banking and financial institutions and the Royal Government. Since Cambodia's economy is highly dollarised, the clearing arrangement caters for both US dollar and Khmer riel cheques. Settlements via the clearing house are dominated by dollar-denominated cheques. As shown in Table 1, the amount of riel-denominated cheques cleared was merely US$45 million in 2001 (equal to only 7% of the total clearing transactions); while the transaction in dollar-denominated cheques was US$643 million or 93% of the total (see Table 1). The settlement through the clearing house shows a remarkable increase from year to year, and reached US$9,573 million for dollar-denominated cheques in 2011 and US$447 million for riel-denominated cheques. Table 1 also shows that the percentage of the total transactions of cheques cleared to nominal GDP (measured in current prices) had increased significantly from 17% in 2001 to nearly 80% in 2011.

Table 1
Transactions through Clearing House at NBC

(USD million)

Year	USD Transaction	KHR Transaction	Total Transaction	Nominal GDP	Total Transaction to GDP
2001	643	45	688	4006	17%
2002	859	47	906	4260	21%
2003	931	64	996	4656	21%
2004	1,296	77	1,373	5,313	26%
2005	1,818	123	1,941	6,256	31%
2006	2,894	166	3,060	7,356	42%
2007	4,957	212	5,169	8,761	59%
2008	7,189	338	7,527	10,216	74%
2009	5,821	318	6,140	10,298	60%
2010	7,009	388	7,397	11,623	64%
2011	9,573	447	10,020	12,834	78%

Source: Banking Operation Department.

The CSX is regulated by the Securities and Exchange Commission of Cambodia (SECC) under the Law on the Issuance and Trading of Non-government Securities and other related rules and laws. In this regard, the CSX is to function as the operator of the securities market, clearing and settlement facility, and securities depository. Besides, the parties involved in the settlements and payment include three Cash Settlement Agents (commercial bank accreditation by the SECC), and there are also three Securities Registrar and Transfer Agents. Trading days are from Mondays to Fridays (except public holidays), so the closing days do not impact the settlement day, because the settlement and payment cycle is T+2 (business day). On a daily basis, the price of stock could fluctuate between $\pm$ 5%, while the fluctuation gap can be between 90-150% in the primary market (first session). As of November 6, 2012, the market capitalisation remained at KHR 539,234 million, decreasing from the highest point of KHR 887,126 million in April 23, 2012.[2]

2. All securities issued by firms listed in the CSX, price quotations in the CSX's trading system and cash settlement must be in local currency. However, under the SECC's guideline on the Procedure of Cash Settlement in the Securities Market, USD settlement are permitted for the first three (3) years of the establishment of the CSX.

1.2 Condition of Monetary Policy and Financial Stability

Cambodia's economy is very highly dollarised (over 95% of banks assets are in foreign currency) with a managed float exchange rate regime. Therefore, the monetary and exchange rate policies are influenced by policy of the greenback. The NBC's monetary policy is limited to determining the statutory reserve requirement (SRR) to adjust liquidity, intervening in the foreign exchange market to smoothen the exchange rate movements, and, to a lesser extent, making available other standing facilities to the banks and microfinance institutions. The SRR has been maintained at 12% for foreign currency deposits and 8% of riel deposits. Banks tend to maintain surplus liquidity in excess reserves at the NBC to buffer against liquidity risk.

Unfortunately, the financial stability function in Cambodia remains to be clarified. No mandate has been assigned to any institution to look after financial stability as a whole. The Bank Supervision Department (BSC) of the NBC monitors the stability of individual banks on a micro level. Currently, the NBC has established an internal financial stability team to acquire training and build capacity in this regard.

1.3 Role of Central Bank in Payment and Settlement Systems

In pursuit of their policy objectives with respect to monetary and financial stability, central banks as users and operators of payment systems have sought to influence the design and functioning of PSSs. Well designed and managed systems help maintain financial stability by preventing or containing financial crises and help reduce the cost and uncertainty of settlement, which could otherwise act as an impediment to economic activity. PSS thus plays a crucial role in a market economy and central banks have always had a close interest in them as part of their responsibilities for monetary and financial stability (CPSS, 2005).

Currently, the NBC's clearing house is considered as a systemically important PSS in Cambodia. The legal basis for the NBC's involvement in the PSS is covered by explicit provisions for the central bank's role. The Law on the Organisation and Conduct of the National Bank of Cambodia promulgated in 1996 entrusts the NBC with the role as payment system overseer. The NBC plays its oversight role not only to ensure safe and efficient operations of the PSSs but also to identify the potential risks of the PSSs and manage those risks. In addition, the NBC also plays the role as

operator and regulator of the clearing house by providing net cheque clearing services as well as initiating and issuing Prakas and policies on the clearing house operations.

The legal framework that governs the overall payment, clearance and securities settlement systems consists of a number of statutes and Prakas issued over the past one and a half decades. A number of regulations/Prakas have been issued to participants in order to clarify the regulatory requirements arising from each statute, taking into consideration the development of the economy and the system.

A weak payment system can become a fertile ground for systemic crises and hamper economic development. Similarly, activities in the securities market usually entail large transaction values that are transmitted and settled through the payment system. However, the payment and securities settlement systems in Cambodia, which are a key component in the development of more inclusive financial systems, are operated under the SECC. To date, the newly launched CSX and one other company – the Phnom Penh Water Supply Authority – are listed so far, and their market capitalisation is still small in relation to GDP (about 1%). In addition, the securities settlement and cash settlement of securities trading are done by separate entities. However, at the end of the day, the NBC's clearing house remains the final cash settlement service provider for all cash settlement agents in the country.

1.4 Objectives of Study

Due to the important roles PSS plays in contributing to macroeconomic stability and growth, its roles in monetary policy and financial stability in Cambodia need to be looked at. This paper explains why effective PSSs are crucial for central banks and other authorities in their design and implementation of monetary policy and financial stability. On the basis of the analysis in the paper, in Section 2 we review the existing literatures for identifying vulnerabilities and risks of Cambodia's PSS in relation to monetary policy and financial stability, and analyse the correlation between PSS and monetary policy and financial stability with additional empirical evidence. We provide our assessment of the current PSS framework against the BIS Committee on Payment and Settlement System (CPSS)'s key principles for financial market infrastructures (FMIs) in Section 3. In Section 4 we present our findings and policy implications, and in Section 5 we provide our conclusion.

2. Literature Review

Central banks have always had a close interest in the safety and efficiency of payment and settlement systems. One of the principal functions of central banks is to be the guardian of public confidence in money, and this confidence depends crucially on the ability of economic agents to transmit money and financial instruments smoothly and securely through the PSSs. The systems must therefore be strong and reliable, available even when the markets around them are in crisis and never themselves the source of such crisis (CPSS, 2005).

Developing a sound PSS has been a burden and a tough job for central banks. With the modernisation of information technology and the continuous introduction of new financial products to the world financial market, PSSs need to be simultaneously developed. Efficient payment systems help promote the development of commerce, enhance economic policy oversight, control the risk inherent in moving large values, and reduce the financial, capital, and human resource devoted to the transfer of payment (Robert Listfield, 1994). In this sense, a sound PSS plays a significant role in the conduct of an effective monetary policy and maintenance of financial stability in the financial system via the effective and efficient measures of liquidity management. Realising and acknowledging this importance, not different from other emerging and developing countries, Cambodia is making best efforts to set up and develop a better payment system.

2.1 Monetary Policy Framework

One of the most important roles of the NBC is to determine the objective, formulate, implement and monitor Cambodia's monetary policy in consultation with the Royal Government and in consideration of the economic and financial policy framework of the Kingdom. The objective of its monetary policy is to maintain price stability, and a managed floating exchange rate policy has been adopted to meet this end.

To ensure effective conduct of monetary policy, a policy committee has been officially established within the organisation. This body is responsible for the enhancement of monetary policy capacity in managing reserve requirements, monitoring of liquidity, and improvement of the monetary decision-making process. It is chaired by the Governor and the membership comprises the NBC's senior officials at directorate level. The Committee meets once every two months to review the progress of the national economic

and financial situations. The decision to use monetary tools to fight inflation or to stabilise exchange rate will be made, if necessary. To support the decision making process of the Committee, the Economic Research and International Cooperation Department (ERICD) of the NBC closely monitors and analyses the performance of the various key economic variables and makes assessment of their impact on inflation and on the country's international reserves and, then, submits its reports to the Committee. The department is currently reviewing the reporting standard to improve its analysis and policy recommendations for the Committee.

However, with very high degree of dollarisation, absence of Open Market Operations (OMOs), and the cash-based economy, Cambodia's monetary policy instruments are very limited and it poses huge barriers for the NBC's capability to implement effective monetary policy. In general, the monetary policy instruments are limited to three tools: foreign exchange invention, SRR, and standing facilities which consist of fixed deposit, overdraft facility and refinancing window. Among the three tools, foreign exchange intervention has been actively utilised to smoothen foreign exchange volatility and to promote price stability while the other two tools have been used occasionally. The NBC intervenes in the foreign exchange market to smoothen foreign exchange movements through foreign exchange auctions to avoid market sentiments and psychological factors from causing disorder in the foreign exchange market (Bonnang, 2009).

2.2 Financial Stability Framework

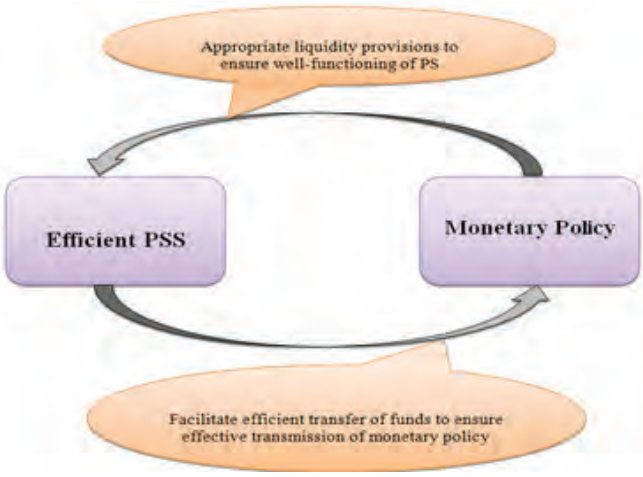
Financial stability is a brand new concept for Cambodia. In accordance with a recommendation of the Financial Sector Assessment Programme (FSAP), which was jointly conducted by the IMF and the World Bank in 2010, the NBC, with assistance from the IMF TA, has established a working group on financial stability called the Financial Stability Team (FST). This is an inter-departmental group consisting of senior staff from the various departments, including Banking Supervision, ERICD, Foreign Exchange, Banking Operation, and Statistics. The team was trained by the resident IMF TA. However, the formal structure of the financial stability framework does not exist as yet. The group meets weekly and reviews the current situation pertaining to Cambodia's economy and financial system, focusing on the banking system by selecting some prudential ratios to analyse and give comments.

2.3 Relations of PSS in Monetary Policy and Financial Stability

2.3.1 Relations of PSS in Monetary Policy

There are many empirical researches on the causality link between payment system and monetary policy. Overall, it is recognised that the payment system design, efficiency and safety have played a significant role in the conduct of monetary policy since they facilitate the speed and predictability of the demand for money and the efficacy of some monetary policy tools. On the other hand, monetary policy influences the liquidity available in the payment system and its opportunity cost to settle payment obligations (see Figure 2).

Figure 2
Relations between PSS and Monetary Policy



Similarly, the relationship between the payment system and monetary policy can be explained by the reserve variable in the banking system. Reserves are the means of interbank payment and reserves itself is also an important element of the monetary base of the central bank. Therefore, the change in reserves would affect both the payment system and monetary policy stance (Schmitz, S., 2006). By the same token, the payment system can be a very useful tool for the conduct of monetary policy via the interest rate channel.

An efficient payment system provides the central bank adequate capacity to control, predict and arrange liquidity provision to the banking system. In this connection, the central bank will take an interest in the payment systems employed by the banking system to exercise its own credit intermediation, and thereby transmit policy more widely throughout the economy (ECB, 2007). However, in Cambodia, the payment system has not yet played a significant role in monetary policy. The interbank market is not yet established. The PSSs are almost entirely centered at the NBC's clearing house. The demand of liquidity is based wholly on the amount of cheques transacted each day. The NBC, in this case, plays a role as the intermediary to facilitate payments and settlements of the banking and financial institutions by matching the surplus and deficit amounts needed via the accounts of the banking and financial institutions held with the NBC. In short, to date the payment system and monetary policy in Cambodia have no direct linkage. The stance of monetary policy does not negatively influence the liquidity in the payment system. Although an indirect link can be observed, for example, any attempts by the central bank to squeeze liquidity in the system may result in a shortage of liquidity in some banks, and thus affect their ability to meet their daily obligations on cheque clearance.

2.3.2 Testing for Correlation between PSS and Monetary Policy

We identify above the relation of PSS and monetary policy. While PSS helps ensure effective transmission of monetary policy implementation by facilitating efficient transfers of funds, monetary policy helps provide appropriate liquidity to ensure a well functioning PSS. In this section, we use historical data associated with the clearing house transactions and banks' liquidity to assess how one is correlated with another.

In an analysis by Humphrey (1995), the principle underlying the relationship between payment systems and money supply (hence monetary policy), is shown by the equality of MV = PT or the money supply (M) times its velocity (V) is equal to the price level (P) times of the number of economic transaction (T). PT represents the aggregate level of economic activities (or GDP). Since velocity represents the efficiency of the payment systems, which is reflected in the money turnover rate indicating how many time the money supply has to be reused in order to meet the transaction and payment demands associated with the given level of aggregate economic activities.

Velocity (V) would have a positive relationship with the aggregate level of economic activities (PT) and a negative relationship with the money supply (M). Using GDP and broad money data of the country from 2005 to 2001 to derive for velocity, Table 2 below shows the results of downward trend of velocity.

Table 2
Velocity in a Downward Trend

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (in million USD using FX Rate End)	6,256	7,356	8,761	10,216	10,298	11,623	12,834
Money supply (M)	1,221	1,711	2,828	2,887	3,881	4,811	5,831
Velocity (V)	5.13	4.30	3.10	3.54	2.65	2.42	2.20

Some obvious reasons can be adduced to explain the downward trend of velocity over time. The rates of growth of money supply are greater than economic growth, the economy remains mainly cash-based, and the payment systems remain to be developed. We will discuss more about this in the policy implication section.

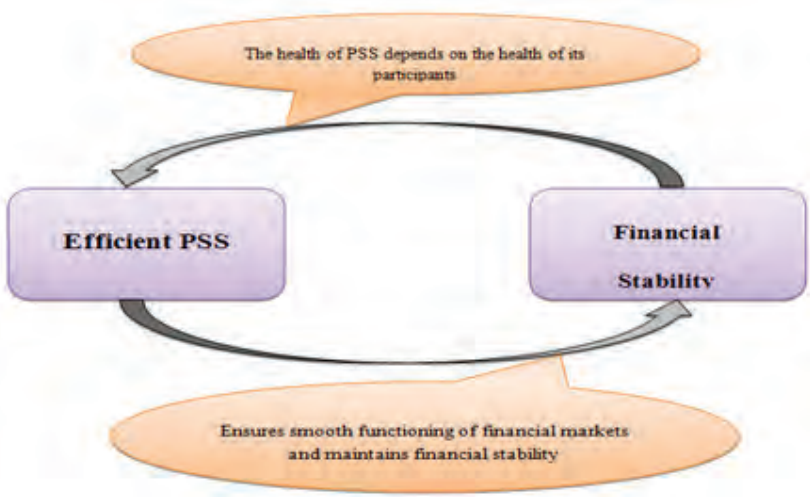
2.3.3 Relations of PSS in Financial Stability

The role of payment system in financial stability is a new concept and becomes an increasingly popular topic, especially for central bankers, over the past few years. As the development of the financial system gradually emerges, there have been some implications for payment system and financial stability. Financial instruments and products have been introduced to the world financial markets so as to address market risk and credit risk for the sake of enhancing liquidity of the financial asset while simultaneously the size of financial sector in relation to the real economy has significantly grown. Hence, it is suggested that stability of the financial system is becoming more crucial (ECB, 2007).

A payment system is vitally important in the sense that the flow of money in the economy or big commercial settlement of private firms, and banking and financial institutions are heavily dependent on it. An efficient PSS helps ensure the smooth functioning of the financial markets and maintenance of financial stability, while the health of PSS depends on the health of its participants (see Figure 4 below). In this connection, if the payment system

is disrupted, money transferred and settled is also delayed or cancelled. Hence, risk of liquidity shortage or constraint may result for a certain time period for beneficiaries. This can cause a systemic risk on payment in banking system and it may lead to financial instability in the financial system of a country, possibly spreading to other countries if the level of financial and economic integration is significantly inter-correlated.

Figure 3
Relations between PSS and Financial Stability



2.3.4 Testing for Correlation between PSS and Financial Stability

We identified the relation between the PSS and financial stability in the above section. While PSS helps to ensure the smooth functioning of financial markets, the health of individual banks is fundamental in maintaining the health of the PSS. In this section, we analyse the relationship between financial stability and the clearing house transaction.

The stability of the payment system has empirical links to the quality of the overall financial system – in this case, the depth of the financial system (M2/GDP). We use data of the clearing house transaction to represent the country's PSS transaction assuming that other payment systems' transactions other than those of the clearing house are in the same increasing trend. We measure the clearing house turnover in terms of number of days by which the value of the clearing house transaction is equal to the country's GDP.

Table 3 below shows that the clearing house turnover has negative relationships with the financial depth ratios. In other words, the total value processed by the clearing house has strong positive relationship with the financial depth ratios.

Table 3
Clearing House Turnover Has Negative Relationship with Financial Depth Ratio

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (in million USD using FX Rate End)	6,256	7,356	8,761	10,216	10,298	11,623	12,834
Value of Clearing House Transactions	1,940	3,062	4,958	7,189	5,822	7,009	9,573
Financial Depth Ratios (in percent)	19.51	23.26	32.28	28.26	37.69	41.40	45.43
Clearing House Turnovers	1,177	877	645	519	646	605	489

It is a fact that an unstable and unsafe payment system can itself represent a source of financial instability. It is evident that if a payment system fails, it can destroy a healthy financial system. On the other hand, it is obvious that financial instability can influence healthy payment systems and eventually destroy all the positive externalities related to the existence of a well functioning payment system.

Even though an efficient payment system helps reduce the cost of business transaction and provide uninterrupted flows of liquidity to facilitate the development and growth of the economy, it can be subject to some major risks such as:

- Systemic risk: the risk where counterparty risk increases so much that it causes a domino effect in the payment system. Even those participants who were originally assumed to be healthy, run into serious problems due to these second-run effects, and the survival of the whole payment system is threatened.
- Credit risk: the risk that a party within the system will be unable to meet fully its financial obligations within the system currently 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 errors will cause or exacerbate credit or liquidity risks.

All of these types of risk, whether in isolation or in conjunction with each other, can have systemic consequences – that is 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 financial system stability.

Box 1: Monetary Hyperinflation in Cambodia – 1989 to 1993

Cambodia had gone through a tough period of hyperinflation during the early 1990s. With the socialist disengagement in 1989 and absence of international fund support, the government went to the central bank for budget financing. Government financing through inflation (GFI) kept climbing from 1989 until 1991 and the central bank cranked up money-printing machine to monetise the budget deficits, resulted in oversupply of money, sky-rocketed inflation, and slump in riel's value (see Table 4 below). In addition, during the period, with poor use of chequeing accounts, no clearing services and no electronic tools, cash was the only means of payment and liquidity provision.

Action by the NBC to finance the government's fiscal balance affected inflation expectation and raised concern on the central bank's independence in formulating monetary policy. Monetisation of the budget deficits during the period resulted in money imbalances. While the money supply increased by four times in 1990 and by three times in 1992, the GDP increased only slightly above 5% on average from 1990-1992. Continued over-supply of the local currency coupled with rapid inflows of UNTAC's US dollars kept injecting more liquidity to the system and jeopardised price stability and the exchange rates. Three-digit inflations during the period consistently followed the over-supply of money in the markets.

Table 4
Money Supply and Exchange Rates during the Period of Hyperinflation

Year	1989	1990	1991	1992	1993
Nominal GDP (in million KHR)*	1,678,107	1,698,245	1,827,311	1,955,223	2,035,387
GFI (in million KHR)**	5,900	14,900	12,300	5,000	-
Inflation rates**	63%	141%	197%	75%	114%
Increase in money supply (M2)**	-	4 times	-	3 times	-
Exchange rates (riel/dollar)**	-	-	625	1,165	2,400

* Data extracted from the IMF's World Economic Outlook database.
** Data cited from the book "Money and Sovereignty: An Exploration of the Economic, Political and Monetary History of Cambodia", by Jean-Daniel Gardere[3].

Furthermore, in the hyperinflation periods, inflationary expectations strongly influenced the nominal exchange rate. The riel lost its value against the US dollar; the confidence in riel began to erode; the foreign exchange markets were unstable; and the sudden and simultaneous inflow of US dollars caused the economy without brake to become highly dollarised since.

However, there was a lack of reliable databases and insight with regard to the economic and financial policy during the period, aggravated by two important factors of uncertainty: first, dollarisation of the economy, which makes it impossible to know precisely the real money supply; and, second, instability of foreign exchange rates introduces great uncertainty regarding the real value of the money supply when translated entirely into riel.

3. Assessment of Large-value Payment Systems in Cambodia

The central bank law mandates the NBC to oversee payment systems in the Kingdom of Cambodia to ensure they operate in a safe and efficient manner. The NBC has set up a Payment Policy Unit (PPU) with a key task

3. Jean-Daniel Gardere is a former minister-counselor for economic affairs in Washington and director general of the French Oversea Trade Center. The original version of the book is in French and was released in October 2009. The English version was printed in August 2010.

of developing and modernising the payment systems in Cambodia. The development of a transparent, comprehensive and sound PSS is specifically endorsed by the Bank for International Settlements (BIS) as a guideline for the development of a national payment system. Oversight is an important component of the BIS- CPSS' Core Principles for Systemically Important Payment Systems (BIS-CPSS, 2005). The PPU of the NBC depends on data collected from banks through bank supervisors. The General Directorate of Bank Supervision of the NBC collects data from banks on a periodical basis. Liquidity challenges faced by a clearing bank are most likely to become apparent to the overseer through the daily settlement arrangements.

We assess the systemically important large-value payment system, in this case the NBC's clearing house, against 14 key principles for efficient FMI of the CPSS. However, the Cambodia's securities and securities cash settlement systems, which belong to the CSX, will not be assessed as part of the study. More specifically, the legal framework governing the issuance and holding of intermediated securities will not be reviewed.

Principle 1: Legal Basis

The NBC's clearing house should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities as defined by CPSS**.** The legal framework that governs the overall payment, clearance and settlement systems consists of a number of statutes and Prakas issued over the past one and a half decades.

The Law on the Organisation and Conduct (LOC) of the NBC was enacted on 26 January 1996, and amended on 29 December 2006. It details the central bank's role in the financial markets, its overall mission and duties, including the duty of overseeing payment systems in the Kingdom of Cambodia and of enhancing interbank payments.

The Law on Foreign Exchange (LFE) was enacted on 22 August 1997. It establishes the rules for foreign exchange operations related to payments for commercial transactions, transfers, or capital flows, including investment.

The Law on Banking and Financial Institutions (LBFI) was ratified in October 1999. It sets forth the acceptable activities of banks and specialised banks, among other items, revolving around bank operations and activities that banks perform on behalf of their customers, and securities-related activities.

The Law on Negotiable Instruments and Payment Transactions (LNIPT) was enacted on 19 September 2005. It recognises payment transactions in various forms and makes the most explicit pronouncement on the NBC's role in payment systems. It gives the NBC powers to "determine, formulate, adopt, publicly disclosed and oversee the implementation of a payment system policy, which shall be consistent with best international practice and standards and promote competition in the market for payment services consistent with overall stability of the financial system." It spells out clearly the drawing, form, presentment and payment of a cheque.

The LNIPT covers payment mechanisms and credit instruments. The bulk of the Law consisting of Chapters II to V is composed of two distinct main parts. One consists of Chapters II, III and IV that deal with negotiable instruments, namely, cheques, bills of exchange, and promissory notes. The second main part consists of Chapter V and covers payment transactions. Chapter I, containing general provisions, deals with the scope of the Law and provides the definitions applicable throughout the Law. Chapter VI spells out the administrative and criminal sanctions required to fight abuses in connection with negotiable instruments and payment instructions. Chapter VII contains final provisions, such as relating to the regulatory powers of the NBC and the relationship between this law and other laws.

The regulatory powers assigned to the NBC in Chapter VII are quite wide; they address all aspects required for the implementation of the Law and include powers in relation to consumer protection measures, the determination of standards for the performance of duties, the determination and modification of statutory time limits, rights and obligations in case of computer breakdown, and all matters relating to format of payment orders and instruments as well as communication, and account identification. This is on the top of the regulatory and licensing powers specifically assigned to the NBC in Articles 226 and 227 in relation to payment system policy and the operation of the payment system.

A number of regulations/Prakas have been issued to participants in order to clarify the regulatory requirements arising from each statute. In particular, the following Prakas have been issued by the NBC to clarify various statutory requirements:

- The Prakas on the Licensing of Microfinance Institutions, as amended by the Prakas B7-07-133, dated 27 August 2007, stipulates the acceptable banking operations for microfinance institutions. Similar to commercial

banks, microfinance institutions can conduct banking operations as defined in Article 2 of the LBFI.

- The Prakas on the Clearing Systems, dated 2006, describes the NBC's role in regulating and overseeing payment clearing systems as well as setting the rules for governing the PSSs.

- The Prakas on the Control of Systemic Risk of Payment Systems, enacted on 8 November 2006, authorises the NBC to designate clearing and settlement systems as systemically important, assess whether the risk controls of such systems are adequate, and instruct the operators of those systems to take certain actions to adjust their levels of controls.

- The Prakas on Money Changer Licenses lays out licensing requirements for operators in the money changing business.

The NBC issued in 2009 the rules and procedures to guide participants in implementing the interim solution of the clearing house. This guidance of rules and procedures is being revised by the NBC in conjunction with the introduction of the full solution, which will provide guidance regarding the rights and obligations of each member and enable the members to understand the operations and functionalities of the clearing house.

Principle 2: Governance

The NBC's clearing house should have governance arrangements that are clear and transparent, promote its safety and efficiency, and support the stability of the broader financial system as well as other relevant public interest considerations and the objectives of relevant stakeholders, as defined by CPSS. The business of the clearing house may be augmented by an Operations Committee. Article 7 of the Prakas on Khmer Riel Denominated Clearing House provides a definition of the Operations Committee (OC) as consisting of one representative from each participating bank, and presided over by a Chair selected by the participants. The Chair shall serve a term of one year. Subsequent leaders will be nominated and elected by the participants in the Clearing house. The general provisions of the Prakas also stipulate functions and meeting regularity of the OC.

The Chairman of the clearing house in charge of its operations shall be designated by the NBC. The Chairman may delegate the supervision and control of the daily function to a Clearing House Leader. Both the Chairman

and the Leader will be employees of the NBC. In the event of any dispute arising between the representatives of participating banks, when delivering or accepting payments or in connection with settlement amounts due to or from participants, the decision of the clearing house leader shall be accepted temporarily, subject to ratification by the chairman. In the event of the dispute continuing after settlement, it shall be resolved directly between the banks concerned.

The clearing house under the full solution still requires clear guidance stipulating the rules and procedures governing a wide variety of legal, business and operational issues and include the information required for the activity of participants in the clearing house. The new guidance on clearing house rules and procedures is being revised by the NBC. The guidance may include:

- General introduction of purposes, obligations, services, currencies, payment value limit and clearing facilities
- Membership of the clearing house
- Roles and responsibilities of the clearing house, management, members, and the operation committee
- Standard of cheques and payment orders
- Clearing house operation
- NBC account management
- Settlement process
- Financial balance
- Record keeping and reporting
- Fees, charges and penalties

Principle 3: Framework for Comprehensive Management of Risks

The NBC's clearing house should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks. The NBC issued a Prakas on the Control of Systemic Risk of Payment System in 2006. Article 2 of the Prakas provides NBC with full power to designate the clearing and settlement system as systemically important. Article 3 of the Prakas states that the NBC may enter into an

agreement with, or issue instructions to, a clearing house or a participant of a designated clearing and settlement system, or both, in respect of:

- Netting arrangements;
- Risk sharing and risk control mechanisms;
- Certainty of settlement and finality of payment;
- The nature of financial arrangements among participants;
- The operational systems and financial soundness of the clearing house; and
- Such other matters that in the view of the NBC pertain to systemic risk.

Article 4 and 5 of the Prakas entitle the NBC with the right to issue instruction to the clearing house and its participants with regards to their operations that the NBC deems necessary pertaining to systemic risk and the ability to provide a secured or unsecured guarantee of settlement by participants; make liquidity loans to the clearing house; and act as the central counter-party to the participants.

While Article 11 of the Prakas stipulates the need for participants to comply with the obligations imposed under the Prakas and instructions issued by the NBC, Article 12 empowers NBC with the authority to enforce compliance through application to a court of competent jurisdiction for an order directing compliance with the provision, rule, instruction or request.

Principle 4: Credit Risk

A payment system may face credit risk from its participants, its payment and settlement processes, or both. The clearing house may carry credit risk when extending overdraft facility to its participants whose account balance held at the NBC falls short to meet its daily payment and settlement obligations. In this case, the NBC requires the borrowing bank to provide collateral to secure the borrowing.

The clearing house should effectively measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes**.** Normally, the NBC requires collateral for its exposure to banks in the form of certificate of deposits (CDs) placed in their other account held at the NBC. The clearing house needs timely information on the collateral valuation to frequently and regularly measure

and monitor its credit risk. Requiring CDs as collateral could help ensure the clearing house have adequate information on the value of the collateral.

Settlements in the NBC's clearing house are on net basis. Representatives from each participating banks meet at the clearing house twice a day – first at 9:30 am and second at 3:30 pm – to clear their cheques. This practice provides participants with information to measure and monitor their current exposure. However, some forms of modeling or estimation are needed for measuring and monitoring future exposure.

Principle 5: Collateral

The NBC's clearing house that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks as defined by CPSS. All members of the clearing house are required to maintain balance in their account at the NBC for daily settlement of their position. The NBC provides overdraft facility to any banks whose account balance fall short for settlement. In this case, the NBC requires collateral from the banks for providing overdraft. This collateral can be in the form of CDs placed in their other account held with the NBC. Such collateral is considered low credit, liquidity, and market risks.

The clearing house should also set and enforce appropriately conservative haircuts and concentration limits. The PPU of the NBC is considering applying haircuts and concentration limits on this collateral and this consideration may be incorporated in the new revised rules and procedures of the clearing house.

Principle 7: Liquidity Risk

According to the CPSS, an FMI should effectively measure, monitor, and manage its liquidity risk. It should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions. Given the net settlement arrangement effective at end of day, the liquidity risk that could occur to the NBC's clearing house is considered limited. Plus, the NBC can provide sufficient

liquid resources to the clearing house in both US dollar and Khmer riel to affect same-day net settlement of payment obligations.

However, the clearing house in Cambodia is divided into two – KHR cheque clearing service and USD cheque clearing service. In the case of KHR clearance it is considered as no apparent risk on liquidity since the NBC as the sole operator and facilitator of the clearing house is the ultimate supplier of KHR liquidity to the system. The issue of liquidity risk might arise on the USD clearance side should the settlement volume of USD cheque cleared get larger and larger in the future.

Principle 8: Settlement Finality

The NBC's clearing house should provide clear and certain final settlement, at a minimum by the end of the value date and, where necessary or preferable, it should provide final settlement intraday, as defined by CPSS. Net settlement arrangements of the NBC's clearing house are to be done through the transfers between accounts of members held at the NBC and settlement finality is to be done on the same day.

Principle 13: Participant-default Rules and Procedures

According to FMI principle, the NBC's clearing house should have effective and clearly defined rules and procedures for managing a participant default. The NBC's guidance of rules and procedures of the clearing house states that if a full member does not provide sufficient fund for its net debit settlement obligations arising from the clearing house operation within the time nominated for closure of the business day, then the NBC Settlement Accounting will inform the relevant senior management within the NBC who should authorise and coordinate remedial action, which may comprise one or more of the following options:

- Extension of settlement closing: the NBC may elect to delay the closure of the business day to provide additional time for the clearing member to arrange for settlement liquidity from another bank through the purchase and sale of qualifying financial instruments.
- Use of reserve assets: at its discretion, the NBC may agree to provide certain repurchase facilities for financial assets held as a component of the reserve asset requirement for a bank to enable that bank to meet its daily net settlement obligations.

- Provision of Overnight Overdraft Facilities: the NBC may make available certain limited overnight liquidity overdraft facilities with consequent disincentive fees and prices for such facilities to enable a full clearing member to meet its daily net settlement commitment.
- Unwinding of clearing: as a last resort, the NBC may order that the daily net settlement clearing is unwound with the effect that all items in the net clearing activity are reprocessed except that the items to or from (debit or credit) in respect of the failing full clearing member are excluded from the clearing for that day and from the resulting calculation of net settlement obligations.

Principle 17: Operational Risk

The clearing house should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.

Principle 18: Access and Participation Requirements

The clearing house should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access as defined by the CPSS. The Clearing System Membership regulation promulgated by the NBC states that banks who have intention to be participants of the clearing house may submit applications for participation. Such banks, if qualified, will be approved for participation by the NBC on the first business day of the subsequent month. Banks who are not participants may be represented in the clearing house on their behalf by approved participants for purposes of clearing and settlement cheques. This relationship shall be announced and approved by letter of the NBC.

The clearing house rules and procedures determine the qualifications for participation in the system and departure from participation.

Principle 19: Tiered Participation Agreements

The clearing house can identify, monitor, and manage the material risks arising from tiered participation arrangements. Almost all banks and

microfinance institutions are participants of the clearing house. There are no indirect participants. Therefore, the concern on any material risks that may arise from tiered participation arrangements can be eased.

Principle 21: Efficiency and Effectiveness

The current arrangement of the clearing house can be considered as broadly efficient and effective in terms of specification of the rules and procedures in meeting the requirements of its participants and in response to the current market demands.

Principle 22: Communication Procedures and Standards

The clearing house should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording. Representatives of participating banks send report of the list of cheque input by the presenting banks and report of the list of cheques received from the paying banks. Reports are provided in electronic format with a selection of these reports being printed for use at the NBC's clearing house.

Principle 23: Disclosure of Rules, Key Procedures and Market Data

The current rules and procedures of the clearing house are clear and comprehensive providing sufficient information enabling participants to have an accurate understanding of the risks, fees, and other material costs they incur by participating in the clearing house.

4. Policy Implications

Despite the substantial progress made, Cambodia is still running behind countries in the region and lagging even further behind the developed countries in terms of payment system development. Clearly, there is a need to further develop the payment system in the country. Many lessons can be learned from the planning and design of payment systems in the developed and developing countries. In his paper, Andrew Sheng (1995) lists out a number of factors what to do and what not to do in the design of payment systems for a developing country. In addition, policy formulation should take into consideration market development and should balance between moving toward regional integration and readiness of the authorities in terms of capacity.

Furthermore, it was evident that Cambodia may have suffered indirect impacts of the global financial crisis in 2009. By indirect impact, I mean, the trade and real sector were affected that translated their effect on the financial institution balance sheet, but no direct impact on the financial system was identified. This may be due to the relatively less developed financial system and payment systems of the country. When payment systems become more developed in the future with better technology, faster settlement arrangement, and higher settlement volume and value, there will be stronger need in policy design to take into account its interconnection with monetary policy and financial stability of the country.

Cambodia's latest Financial Sector Development Strategy (FSDS), 2011-2020, incorporates steps to upgrade payment system in Cambodia. For instance, the introduction of the RTGS will be considered in the medium term after putting the "Full Solution" into operation enhancing the increased operations and settlements of high-value transactions in the market. The full solution phase of the clearing that incorporates the whole national payment systems, including electronic transfers to effect "delivery vs payment", ACH implementation, centralised settlement, defining settlement cash, introduction of direct credit operation, development of money market operations for US dollar/riel traders cash settlement, shared switch implementation, intraday settlement, and introduction of direct debit operation, has been commissioned. The law on the national payment system should be enacted.

The NBC has subsequently updated the road map for national payment system development. In terms of regulatory framework, the NBC's involvement in particular in the clearing house as operator and overseer is legally provided for by law. However, there is a need to further strengthen the operational rules and procedures to fully implement the full solution of the clearing house.

Policy should aim to address the immediate needs in the marketplace by considering the implementation of specific regulations for certain innovations, while working on a new, overarching national payment systems law. Once enacted, the national payment systems law can reduce or eliminate the need for the individual regulation. This is a very positive step toward a more comprehensive, broad-based approach to payment system regulation. A methodical step-by-step payment system development action plan provided for in the FSDS 2011-2020 takes care of the evolution of payment systems and addresses a number of components necessary for legal soundness – including clarity in terms of finality of settlement, especially in the case of

insolvency. The law must ensure that the transactions are finalised and that there is no unwinding in the event of insolvency by a participant in the system.

Limitation of reliable data on other payment transactions other than the NBC's *Domain Name System* (*DNS)* clearing house makes it difficult to identify any direct linkages between the payment systems and monetary policy. The downward trend of velocity indicates that the rate of broad money growth is greater than the economic growth rates – reflecting the popularity of cash used in economic activities and the need to further develop the payment systems. Using velocity to reflect the efficiency of the payment systems in Cambodia can explain this linkage with qualification because it does not allow us to assess the efficiency of a relatively large-value payment system versus other retail payment systems separately. Future study can build from this to assess how efficient each payment system is. In addition, the current clearing house arrangement, which includes payment and settlement transactions of the other financial markets, will provide a better source for future study as well. Moving forward, as the new markets and their PSS develop, there will be stronger demands for further improving oversight capacity to capture the link between the PSS and monetary policy.

In conducting the test for correlation between Cambodia's PSS and financial stability, we assume that other payment systems' transactions other than those transacted at the clearing house have increased in the same manner as the clearing house's transactions. The result shows significant negative relationship between the clearing house turnover and the financial depth ratios. The relationship implies that risks of any disruption to the PSS could trigger financial instability. Therefore, it is important to review existing policies to mitigate risks. However, this interpretation is based on data of the clearing house only. The result and interpretation may, or may not, be different if future analysts attempt to use data of the country's payment systems as a whole. We leave it to future study when data become more available.

5. Conclusion

Cambodia's payment system is at an early stage of development lagging far behind other countries in the region. Cash remains widely used in the economy. There is increasing but limited use of cheques in business transactions. There are increasing uses of other payments tools such as credit cards, debit cards and electronic transfers from a very low base. The NBC's cheque clearing house is a DNS-type of PSS. It is considered as the most important PSS in the Kingdom. Its system is being enhanced in terms of

technology and rules and procedures, and is upgraded from NBC's system only to a system that incorporates other payment systems developed outside of NBC.

The central bank plays an important role as operator, facilitator and overseer of the clearing house. The PSS in Cambodia are important building blocks in the establishment of a solid legal framework designed to underpin commercial activities and financial transactions. They set the grid for the development and enhancement of a market economy based on the rule of law. They are also building blocks in the development of statutory models for payment laws which others ought to be encouraged to consider for use elsewhere.

The payment system has interconnection with monetary policy and financial stability. This interconnection has gained more interests among policy makers. On top of the above- mentioned importance of the PSS, it is crystal clear that the payment system in Cambodia is well underway to be further developed to meet the future demand arising from new market development of the financial markets, such as money/interbank markets, stock markets, insurance markets, and pensions. When these markets are developed, there will be significant demand for a rapid and more efficient payment and settlement arrangement. It is necessary for the NBC to enhance its capacity in controlling, forecasting, and arranging liquidity provision to, or absorption from, the banking system, although it is very difficult at this stage to identify any direct linkage between payment system and monetary policy in Cambodia.

While developing this crucial aspect of macro-financial landscape, rigorous consideration and attention should also be paid to the stability of the financial system as a whole, for any incipient risk which can emerge from the Kingdom's payment system may trigger off financial instability through either visible or invisible propagation channels.

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Appendix

Data and Statistics

Table 5: Basic Statistical Data

	2005	2006	2007	2008	2009	2010	2011
Nominal GDP (in million USD using FX Rate End)	6,256	7,356	8,761	10,216	10,298	11,623	12,834
Population (in millions)	13.4	13.5	13.7	13.4	13.9	14.1	14.3
GDP per capita (in USD)	468.2	544.1	640.9	762.4	740.9	822.0	896.9
Exchange rate (End period)	4117	4058	4000	4108	4181	4048	4057
Exchange rate (Average)	4113	4055	4001	4063	4166	4056	4036

Table 6: Settlement Media Used by Non-bank

	2005	2006	2007	2008	2009	2010	2011
Currency in circulation (in millions riel)	1,282,144	1,599,550	1,989,737	2,294,775	3,001,602	3,098,628	3,771,652
USD in circulation *·**	2,803	3,548	4,477	5,028	6,461	6,889	8,367
Deposit by non-banks (Excluding bank to bank)**	963	1,402	2,479	2,521	3,320	4,313	5,193
Narrow Money (M1) (in millions riel)	1,322,788	1,657,686	2,052,008	2,399,567	3,120,191	3,220,917	3,956,210
Broad money (M2) (in millions riel)	5,024,914	6,942,262	11,310,681	11,858,907	16,228,311	19,476,806	23,654,675

* Amount of USD in circulation about 90% of total currency in circulation estimated by IMF cited in ADB working paper series 2008

** In million of USD.

Table 7: Settlement Media Used by Banks

	2005	2006	2007	2008	2009	2010	2011
Total Bank's reserve at NBC (in millions USD)	321	428	742	898	1,344	1,724	1,733
of which:							
required reserves	73	105	194	397	401	527	649
free reserves	248	322	548	500	943	1,197	1,084
Bank's deposits held at other banks (in million USD)	7	10	21	86	218	420	715
Bank's borrowing from central bank	0	0	51,794,156	107,773,692	22,511,613	0	548,916

Table 8: Institutional Framework

Categories	Institutions	Branches
Central bank	1	19
Banks	39	170
Domestic banks	13	100
Subsidiary banks	10	67
Foreign bank branches	9	3
Specialized banks	7	0
Microfinance institutions		
Licensed MFIs	33	68
deposit-taking MFIs	7	68
non-deposit-taking MFIs	26	0
Registered MFIs	31	0
Unregister micro credit operators*	60	

* Estimated number

Table 9: Volume & Value of Payment Instructions Handled by Selected Interbank Settlement Systems

	2005	2006	2007	2008	2009	2010	2011
Large-value payment system							
NBC's clearing house							
Volume of KHR checks transactions	18,078	20,050	23,646	32,116	31,287	32,854	34,742
Value of KHR checks transactions (in billion KHR)	502,833	682,416	859	1,371	1,319	1,627	1,821
Volume of USD checks transactions	199,847	260,327	331,568	413,367	420,440	485,189	558,894
Value of USD checks transactions (in million USD)	1,818	2,894	4,957	7,189	5,821	7,009	9,573
Retail payment systems	NA	NA	NA	NA	NA	NA	NA

Chapter 4

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY IN INDONESIA

By
Putu Paulus[1]

1. Introduction

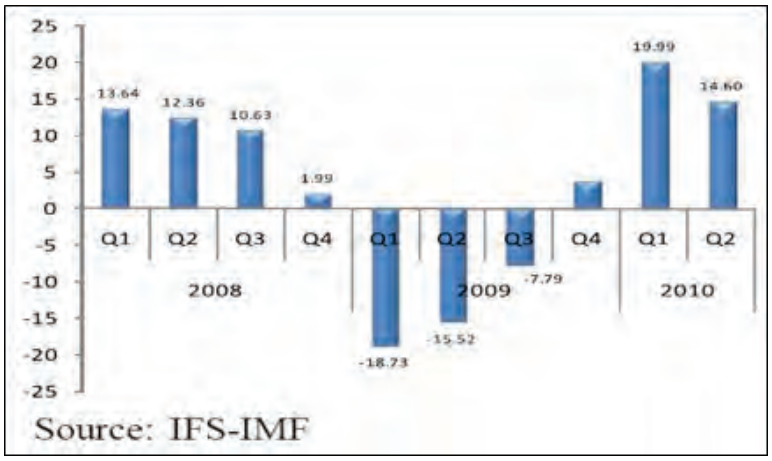
According to Edwin M. Truman (2009), the recent global crisis, which first began in US in mid-2007 and soon spread to all the other countries - reaching its peak point in September 2008 - was due to failures in macroeconomic policies and in financial supervision and regulation. The macroeconomic policies in the US and in the other developed countries were responsible for this crisis. The emerging and developing economies, as a matter of fact, could not be blamed for the crisis, but they were impacted considerably by it. When the world was struck by the crisis, the Indonesian economy was still dealing with the significant increase in food and oil prices. Soaring global prices for oil and food commodities affected CPI inflation in Indonesia which mounted to 11.06% in 2008. This rise in CPI inflation was boosted mainly by the increase in the administered pieces. With the spread of the the contagion, Indonesia's economy was confronted with large outflows of short term capital investment, causing a major reduction in international reserves, exerting pressure on exchange rates and thereby creating imbalance in the external sector. Indonesia's exports also, were affected by a decline in the world demand as the advanced economies, which were the main export destinations of most of the Asian economies, fell into recession. The growth of exports in Q1:2009 dropped significantly to -18,73% y-o-y from 13.64% y-o-y in the same quarter of 2008 (Figure 1). In fact, Indonesia's export has a higher degree of vulnerability to external shock because it was concentrated in a select group of countries and lack diversification.

Bank Indonesia (BI)'s as a central bank has main objectives which are to establish and to maintain rupiah stability. This objective contains two key aspects: a stable rupiah for goods and services; and exchange rate stability against other foreign currencies.

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Figure 1
Export Growth (y-o-)



The first aspect is reflected by the inflation rate, and the second aspect can be reflected by the rupiah's performance against the foreign currencies. In order to achieve its goals, BI is supported by three pillars, which represent its three sectors of task. These three pillars are: formulating and implementing monetary policy, regulating and ensuring smooth payment system, and regulating and supervising the national banking system. The latter will be transferred soon to the Indonesian Financial Service Authority [Otoritas Jasa Keuangan – (OJK)]. The OJK is a new independent financial institution, which will take over BI's regulatory and supervisory authorities over the banking sector. All of these pillars are mutually dependent and can lead to the risk of contagion if one is experiencing problems. Therefore, these three pillars have to be integrated to assure the objective of achieving and maintaining rupiah stability. As a result, BI has to protect the transmission channel of monetary policy, maintain systemic stability, ensure efficiency of the Payment and Settlement System (PSS) and maintain public confidence in the PSS.

In general, BI has five major roles to play in maintaining rupiah stability:

1. BI safeguards monetary stability through the use of interest rates in open market operations, while also employing other instruments. BI is required to establish an appropriate, well-balanced monetary policy.

2. BI has a vital role in building the sound performance of financial institutions, particularly in the banking sector. The performance of banking institutions is promoted through the supervisory and regulatory mechanism.

3. BI also has a role in maintaining a sound and reliable payment system. Failure to settle by any one participant may lead to serious risk of disruption in the payment system and can trigger contagion and systemic risk in return. To mitigate this risk in the payment system, BI has developed a specific regulatory framework and launched a Real Time Gross Settlement (RTGS) system, which offers vastly improved security and speed of payment system transactions. In its position as payment system authority, BI also has access to the necessary information and expertise to identify potential risks in the payment system.

4. BI is to monitor and access information on threats to financial stability.

5. BI operates the financial system safety net under the central bank's lender-of-last-resort (LoLR) function. The LoLR function is a traditional role exercised by BI as the central bank in crisis management with the primary objective of preventing financial system instability. This support is extended only to banks that are faced with liquidity problems that may potentially trigger a systemic crisis. Under normal conditions, the LoLR function may operate for banks experiencing temporary liquidity mismatch, which must still possess adequate repayment capability. In operating the LoLR function, BI must steer clear of moral hazard. For this reason, liquidity can only be provided under strict requirements and subject to assessment of systemic risk.

1.1 Role of Bank Indonesia in PSS

As mentioned before, BI has one main objective which is to attain and maintain the stability of Indonesian rupiah (IDR). To reach its goals, BI has taken a leading function in developing Indonesia's PSS in order to increase the smooth operation, efficiency, safety and trustwothiness of its PSS. The more efficient and reliable the PSS, the more effective and efficient time-critical monetary policy transmission can operate. Moreover, the smooth and efficient operation of the payment system will contribute to the stability of the financial system.

BI is responsible for regulating and safeguarding the smooth and efficient operation of the PSS. To do so, BI plays the roles as the regulator, overseer,

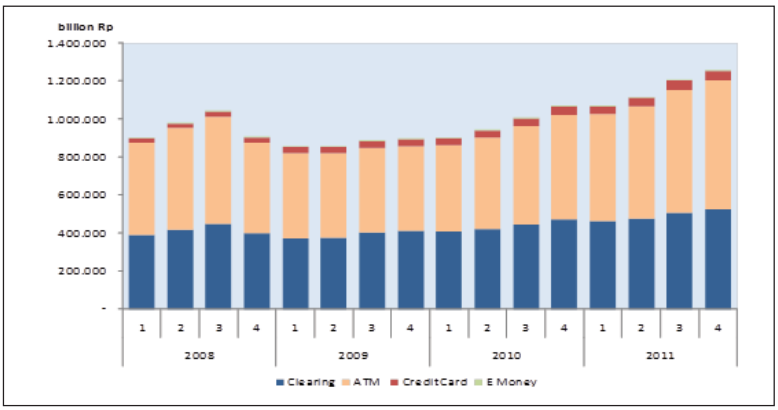
facilitator and operator. BI also has powers to establish and implement policies for the payments system and also has authority to issue approvals and licences and conduct the oversight of the PSS. With these powers, BI established a range of policies for the payments system, including the types of payment instruments that may be used in Indonesia. BI determines the standards for these payment instruments and decides which parties may handle their issue and/or processing. The powers of BI extend to the appointment of institutions for operating the payment system, e.g. the clearing or fund transfer system. The appointment may be for the entire system, or only part. The central bank may appoint an institution to operate a settlement system.

In conclusion, BI has an important role in improving the efficiency of the PSS which is related to monetary policy and financial stability. The payment system will affect the daily demand for liquidity of commercial banks and financial institutions and may therefore affect the level of money market interest rate. Disturbances in the PSS will spread quickly among the participants and may cause them to stop their trading activities and to stock up their liquidity. The hoardings may caused an imbalance in the demand and supply of funds and may aggravate the situation and affect the interest rates. Therefore, the robustness, efficiency, resilience of, and confidence in, the PSSs are crucial both for monetary policy and financial stability.

1.2 Current Condition of PSS

Indonesia has two types of PSSs, which are retail payment system and interbank large value payment system. Most of the retail payment services in Indonesia are operated by commercial banks through some payment instruments. These retail payment instruments have been significantly advanced from cash-based instruments to non-cash payment instruments, such as paper-based instruments (cheques and bilyet giro) and paperless instruments like electronic funds transfer and card-based instruments (ATM cards, credit cards, debit cards and prepaid cards). Nowadays, non-cash instruments have gained popularity in Indonesia. Their increasing popularity proves us that the non-cash payment services that are provided by banks or non-bank fincancial institutions are available and flourishing in Indonesia. Figure 2 presents the trend of retail PS which indicates that the use of ATM is growing significantly compared to the clearing and credit card, and is expected grow continously in the future.

Figure 2
Trend of Retail Payment System



Source: Bank Indonesia Statistic Data.

For retail and micro payment system, the settlement for the interbank card-based payment instruments (credit and debit/ATM cards) is conducted on multilateral net basis using the central bank money (through BI-RTGS system) or commercial bank money (through the accounts at commercial banks appointed as the settlement banks). As for interbank payment with cheques and bilyet giros, the settlement are processed through Sistem Kliring Nasional Bank Indonesia (SKNBI) or Bank Indonesia National Clearing System. SKNBI is a deferred multilateral net system, in which settlement of net figures from SKNBI is conducted at the designated time in the same day through BI-RTGS system.

Interbank large-value payments are processed by BI through the BI-RTGS and the clearing system. The RTGS system operates a settlement mechanism that is seen as capable of minimising systemic risk and also of reducing the incidence of floating funds, and thus support more effective bank supervision. The RTGS sytem also allows for integration with other payment system applications such as for money market and capital market transactions settled by Delivery versus Payment (DvP). Links with cross-border payments are also possible using the Payment versus Payment (PvP) application. Therefore, the RTGS system functions as the main system for transaction settlement. The central role of the BI-RTGS system in the payment system infrastructure in Indonesia is captured in the Figure 3. Payments from other system such as the SKNBI, Securities Settlement System (BI-SSSS), capital market, banks and cross-border transactions are settled through the BI-RTGS system.

Figure 3
Payment System Infrastructure in Indonesia

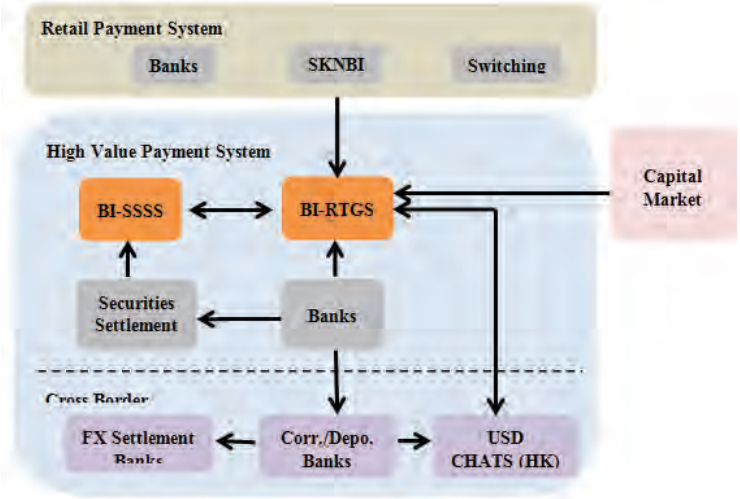


Table 1 describes the composition of group transactions using the RTGS system as agent of settlement. In 2012, the settlement of transactions in respect of monetary operation is predominant (61.8%) compared to others group such as government (1.7%) and interbank transaction (4.7%). It is noted that there has been a significant increase (30%) in the use of BI-RTGS for monetary operations since 2005 until now. This fact indicates that the integrity of large value payment system is crucial to BI's ability as the central bank to conduct its monetary operations.

Table 1
Percentage of BI-RTGS Nominal Transaction Per Type of Group Transaction

Year	Customer	Interbank	Government	Moneter	Others
2005	23,1%	14,9%	3,7%	31,4%	26,9%
2006	17,5%	14,5%	3,4%	35,0%	29,6%
2007	16,7%	13,9%	2,8%	36,5%	30,1%
2008	21,4%	10,5%	3,9%	32,3%	32,0%
2009	23,9%	13,0%	3,9%	25,0%	34,2%
2010	19,5%	8,7%	2,4%	42,3%	27,2%
2011	19,7%	8,1%	2,5%	45,2%	24,5%
2012 *	14,5%	4,7%	1,7%	61,8%	17,3%

Source: Statistic data of BI-PS.
*) until October 2012.

A queuing system is implemented in the BI-RTGS. Transactions will be queued once they are sent if the participants are not yet in funds. This condition occurs partly because the participants are still waiting for incoming transactions from the other participants. The settlement of BI-RTGS transactions can only be processed when the participants have sufficient funds (principle “no money no game”). Transactions in the queuing can be settled immediately after the participants receive incoming transactions or deposit additional funds on their accounts. The implementation of the queuing system requires the participants to manage their liquidity prudently to ensure all transactions can be settled promptly at the end of the day. The implementation of BI-RTGS in 2000 came as a result of increasing need for risk management in the area of interbank large-value funds transfer. The BI-RTGS is designed to reduce the systemic risk by limiting settlement in the settlement process of interbank large-value funds transfers through its settlement mechanism that take a place on a gross basis and in real time.

As mentioned above, the BI-RTGS system is an essential means for BI to maintain systemic stability in the payment system because it has allowed BI to monitor the liquidity condition of all the commercial banks in the country, in real-time. If an event that a technical difficulty or system breakdown should occur in the BI-RTGS, there will be a major impact on the operation and the stability

of domestic financial system. Accordingly, BI pays very close attention to the performance of the BI-RTGS system in maintaining its stability. The BI-RTGS is categorised as a Systemically Important Payment System (SIPS) because of its important role in the payment system. Thus, BI has every reason to take great care in safeguarding the stability of the existing SIPS.

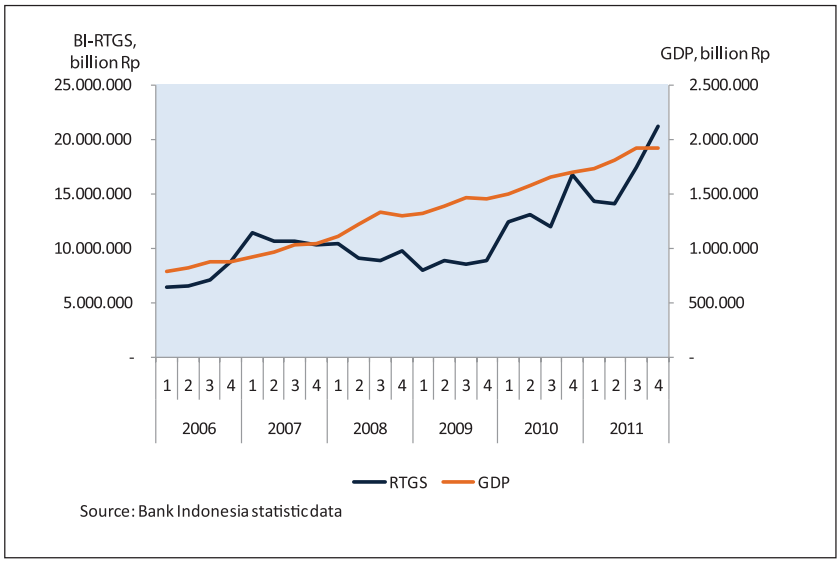
1.3 Importance of PSS in Supporting Economic Development

The development in the area of telecommunication and information technology in Indonesia has a considerable influence in the growth of financial activities, and it influences changes in the way of payments are made within the community. The implementation of these technologies offers a variety of payment transaction processing and encourages the innovation of technology-based banking services. The increasing variety can be seen from the growing usage of non-cash payment instruments such as credit cards, debit cards, electronic money, the usage of which are now becoming rife in the Indonesian community. Payment instruments nowadays are developed not only by banks but also by institutions other than banks. The availability and wide range of electronic payment services have made it convenient for the populace to perform non-cash payment transactions, anytime and anywhere, through an electronic network. These rapid technological changes have also led to the increased involvement of BI in the PSS. BI has initiated reforms and introduced changes in this area, such as RTGS system that is operated directly by BI, and other payment systems (even those operated by privates sector) are under the supervision and direction of BI.

As a part of the economic system, the payment system allocates funds according to each parcipant's rights and obligations. If the allocation of funds is inefficient, the financial system will be unstable, thus hampering economic growth. An unreliable PSS also can expose its participants to risks and transmit that risks from one system to another causing systemic risk, and can lead to a crisis in the economy. If the crisis happens, the costs of recovery from the unstable financial system are immense. For instance, when the financial crisis of 1998 hit Indonesia, the costs of recovery were incredibly significant. Furthermore, it took a long time to regain public confidence in the financial and payments system. It proved that financial system stability is an extremely important aspect of building and safeguarding a sustainable economy. An unstable financial system may be vulnerable to shocks and disturbances and will certainly slow the pace of economic activities. Therefore, PSSs are a vital component of the economic and financial infrastructure of modern economies.

The safety and efficiency of the PSS contribute to economy development and financial stability. An efficient payment system is important to the proper functioning of the entire economy because it facilitates the exchange of goods, assets, and services. The speed and convenience with which payment transactions are made will have the potential to affect economic activities. Figure 4 shows that the trend of BI-RTGS' transactions is relatively in line with the growth of the Indonesian GDP. This fact supports the statement that well functioning payment infrastructures facilitate economic interaction and trade both in goods and services. But the type of correlation between the RTGS system with GDP growth is subject to further research.

Figure 4
BI-RTGS Nominal Transaction and GDP Data



Although the BI-RTGS plays a dominant role in economic development, the trend of transactions in the low value payment system shows that infrastructures in the low value payment system have made a significant contribution as well. The relationship between the retail payment market and overall economic growth has been analysed. (See Box 1).

Box 1
Retail Payments and Economc Growth

The fundamental relationship between retail payment markets and overall economic growth is examined in the study conduct by Hasan, et al. (2012). The study analyses the linkage between the country level infrastructure of retail payment markets and its effects on the real economic side, specifically, GDP, trade and household csumption.

By using data from across 27 European markets over the period 1995-2009, the findings confirm that migration to efficient electronic retail payment stimulates overall economic growth, consumption and trade. The use of card payments, credit transfers and direct debits shows the strongest relationship to the economic growth. Meanwhile, cheque payments are found to have a relatively low macroeconomic impact. Retail payment transaction technology is found associated positively to real economic agregates. The study shows that initiatives to integrate and harmonise retail payment markets foster trade and consumption, and thereby have a beneficial effect for whole economy.

In a conclusion, the instability of the financial system may result in adverse effects such as:

1. Monetary policy will be less effective due to poor transmission.
2. Impaired intermediary function due to improper allocation of funds, thus slowing the pace of economic growth.
3. Loss of public confidence in the financial system, commonly followed by investor panic and massive funds withdrawals leading to liquidity shortages.
4. Extremely high costs for rescuing the financial system in the event of a systemic crisis.

For these reasons, prevention and mitigation of risks is essential, particularly to avoid any repetition of such heavy losses.

1.4 Objective and Expected Result of Study

As noted above, BI plays a critical role in maintaining rupiah stability and efficient PSSs in order to achieve financial stability. A safe and efficient PSS contributes to the maintenance of financial stability and promotion of economic growth. However, the PSS concentrates risk and, if it is not properly managed, the PSS can be a source of shocks or a major channel through which shocks are transmitted across the domestic and international financial markets.

This research focuses on the role of BI in the PSSs in relation to monetary policy and financial stability. This study makes an assessment of the PSS in Indonesia based on the Principles for Financial Market Infrastructures (PFMIs), a system standard for financial market infractures (FMIs) published by the Bank for International Settlements (BIS,2012) that provides guidance for addressing risks and efficiency for FMIs. Specifically, the objectives of this study are as follows:

1. Assess PSSs both at the retail and wholesale levels:
2. Identify the risks, key challenges and issues to improve the efficiency of the PSS in Indonesia;
3. Identify areas where the PSS can directly influence domestic and monetary policy and financial stability; and
4. Assess efforts to further develop and improve PSSs in Indonesia.

2. Literature Review

2.1 Theory of Payment System, Financial Stability and Monetary Policy

A payment system is a system that covers the legal and regulatory framework, institutions, and mechanisms used to transfer funds in order to settle liabilities arising from economic activities. The components of a payment system include payment instruments, clearing and settlement mechanisms and the participants who are involved in the operation of the payments system, such as banks, non-bank institutions, non-bank funds transfer providers, switching companies and the central bank.

According to the Core Principles for Systemically Important Payment System (CPSIPS) by the BIS, payments system are the means by which funds are transferred between banks. This system is a major channel by which shocks can be transmitted across domestic and international financial system and markets. A poorly designed system may cause systemic crisis if the risks are not adequately contained, with the result that financial shocks are passed from one participant to another. Thus, robust and efficient payment systems is a key requirement in maintaining and promoting financial stability.

Schinasi (2006) defined financial stability as a condition where the financial system is able to do the folllowing:

a. Facilitates the resource allocation efficiently from depositors to investors and allocates overall the economic resources;

b. Assesses, identifies and manages all the financial risks; and

c. Performs well in absorbing the turmoil in the financial and economic sector.

In general, financial system stability is robustness of the financial system against economic downturns, providing for the intermediation function, payment system and risk-spreading to run properly (BI, 2007). Four factors underpin financial stability. They are (i) a stable macroeconomic environment, (ii) well-managed financial institutions, (iii) effective supervision of financial institutions, and (iv) safe and reliable payment systems.

A stable financial system is a key ingredient for a healthy and successfull economy. People need to have confidence that the system is safe, robust and is able to function properly for economic activities to be carried out. It is important that problems arising in particular areas do not lead to disruption across the financial system.

Financial instability can be attributed to a number of contributory causes (BI, 2010):

1. Slow Global Recovery from Global Financial Crisis

The Indonesian economy still suffer from the global financial crisis though the country had benefited from some improvement related to the economic recovery in the US and from positive developments in the handling of the debt

and financial crisis in Europe. The domino effects are still creating vulnerabilities in the domestic financial sector and in the economy. Thus, preservation and surveillance are higly important to minimise the effect of the global instability.

2. Flagging Credit Growth

Credit growth, in particular foreign exchange credit, experienced a notable slowdown during the global economic recovery. According to the Financial Stability Review No. 14, published by BI, in 2010, the total credit grew by just 10% (y-o-y) and it requires high attention as sluggish credit disbursements have the potential of spreading the instability. The declining credit growth have negative effects from both micro and macro perspectives. From the micro perspective, the decline in credit growth causes difficulties for both the corporate and household sectors in obtaining funds for financing their business and economic activities. These difficulties potentially undermine the debt repayment capacity of the corporate and household sectors which in general are bank debtors. On a macro perspective, this decline is creating additional pressures limiting future economic growth. Thus, the flagging credit growth, from a micro and macro perspective, has the potential of raising non-performing loans (NPL).

3. Increases in Short Term Capital Inflows

The rise in short term capital inflows requires close vigilance as it is vulnerable to sudden reversals which can disrupt financial stability.

4. Possibility of Greater Operational Risk

Operational risk can increase due to things like fraud or natural disasater. Natural disasters like earthquakes and floods have become more frequent in Indonesia. A contingency plan is required that can sustain the functioning of the financial infrastructure under any conditions to minimise losses. Moreover, the dependence of financial system on technology, for example ATM and internet technology, also dictates a high requirement for all-encompassing security and risk mitigation against fraud.

5. Real Sector and Infrastructure

A number of new challenges in the real sector continue to emerge, including the inauguration of the ASEAN China Free Trade Area (ACFTA) at the beginning of 2010. Furthermore, the national infrastructure remains at an unsatisfactory level and is reflected by disruptions in the distribution network that create a

high-cost economy. If the problem persists and no resolution is sought, financial sector instability will materialise in the long term.

6. Inadequate Legal Protection

Ineadequate legal protection will render public officials in the financial sector unwilling to make immediate decisions to stem the spread of financial contagion. This issue requires the attention of all the stakeholders to ensure that financial system stability is under control.

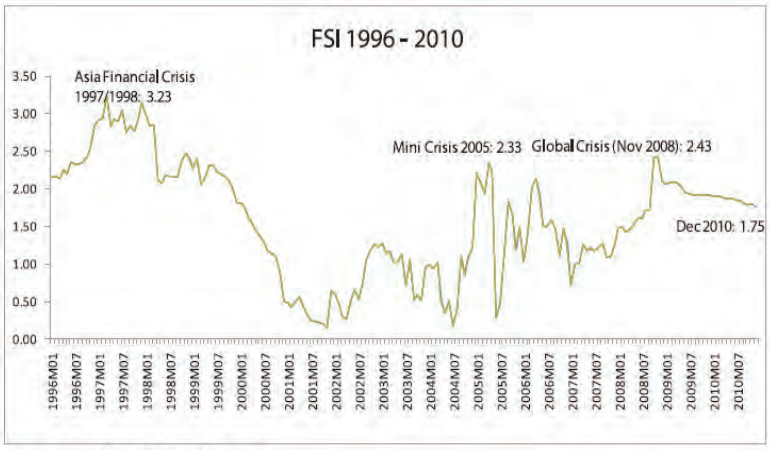
2.2 Condition of Monetary Policy and Financial Stability in Indonesia

2.2.1 Financial Stability

A financial system will become unstable when economic activity is obstructed and the system is threatening the economy itself. Financial system instability can be triggered by turmoil and many other causes. As for Indonesia, financial stability is influenced by heterogeneous uncertainties, both internal and external. From the home side, upward movement in world oil prices may interfere with financial stability. The escalation in international oil prices can lead to a rise in the administered prices for strategic goods or services, such as subsidised fuels. The soaring oil prices that are followed by surge in other commodity prices will increase inflationary pressure which will drive up the production costs. Moreover, if the soaring oil prices prompts the government to limit the consumption of subsidised fuels, inflationary pressure will also be expected to rise. The increase in inflationary pressure may cause economic growth to fall below the expected level because of declining public purchasing power and rising production costs (BI, 2012). In most cases, instability also resulted from a combination of market failures caused by structural factors or behaviour of market players. Market failure itself can be brought about by external and domestic conditions. In a financial system built on markets, institutions and infrastructure, the predominant risks include credit risk, liquidity risk, market risk and operational risk.

In general, Indonesia's financial system condition can be summarised by the Financial Stability Index by Figure 5, which shows that Indonesia had experienced

Figure 5
Indonesia Financial Stability Index



Source: Bank Indonesia.

three crisis periods that affected its financial stability condition during the past two decades. The first crisis, impacted by the Asian financial crisis in 1997/ 1998, hit Indonesia and caused the economy to enter into recession. The period of 2000-2004 saw a brief recovery when Indonesia's economic performance improved significantly. Unfortunately, at the end of 2005, Indonesia faced a mini-crisis as a consequence of the government's decision to remove the oil price subsidy. This decision led to a steep increase in inflation from 6.4% in 2004 to 17.11% in 2005. The crisis this time was triggered from the home side, and the economy subsequently recovered from 2007 to 2008 However, the latest global crisis of 2008 impacted Indonesia's financial system in Q3:2008. At that time, stock prices decreased by around 60% against the level in early 2008. The government bond rate hit the lowest price since the first issuance in 2005, leading to capital outflows and caused the IDR exchange rate to fall dramatically.

Nevertheless, the Indonesian economy recovered quickly from this latest crisis episode. This was due to the sound fundamentals of the banking industry and the positive outlook of Indonesia's economy in general (Deriantino, 2011). Moreover, the impact of this financial crisis on the Indonesian financial institutions was not as severe as the impact on other countries' financial institutions. This

was because of the characteristic of Indonesian banks and financial institutions, which still leaned to conventional instruments of investment. The improved surveillance of the banking sector and non-bank financial institutions as well as of the capital market also helped Indonesia in minimising the impact of the global financial crisis on its financial institutions. The lessons learned from the Asian crisis of 1997 had caused BI to strengthen the Indonesian banking infrastructure (Silalahi and Chawwa, 2011).

2.2.2 Monetary Policy

In its capacity as the central bank of Republic of Indonesia, BI has one main purpose which is to attain and maintain the stability of the IDR. To achieve this goal, BI adopted a full-fledged inflation targeting framework known as the Inflation Targeting Framework (ITF), in which inflation is the primary monetary policy objective. Is is in line with the view of Bofinger (2001) who stated that "***monetary policy is the manipulating of monetary instruments in order to achieve price stability, low unemployment and sustainable economic growth***". The ITF has been implemented in most of the developed countries since the last 17 years, but was implemented in Indonesia only since July 2005.

Indonesia's monetary policies are conducted through the establishment of monetary targets and with the prime objective of keeping the inflation level at the government-prescribed level. These monetary objectives adhere to the use of instruments, including Open Market Operations (OMOs) on the rupiah and forex money markets, discount rate setting, formulation of minimum reserve requirement and regulation of credit and financing. Also, under this framework, monetary policy is conducted with transparency and accountability to the public. At the operational level, the monetary policy is reflected in the setting of the policy rate (BI Rate) with the expectation of influencing money market rates and, in turn, the deposit rates and lending rates in the banking system. Changes in these rates will ultimately influence output and inflation.

2.3 Relation/Position of PSS in Monetary Policy and Financial Stability

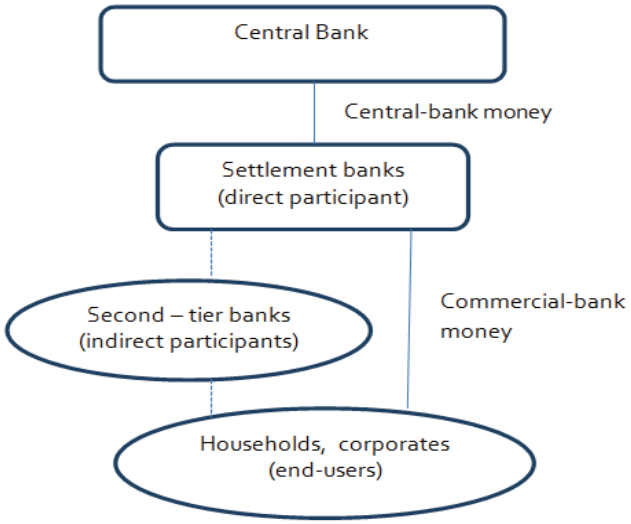
2.3.1 Central Bank Money as Ultimate Settlement Asset

The Great Depression demonstrates the loss of inside money as a medium of exchange during the 1930s in the US. The value of payment processed by the major US dollar settlement systems fell by more than 60% as confidence in the banking system disappeared. Gerali and Passacaantando (cited in Manning, 2009) argue that the lack of confidence in banks led to decreased

appetite for bank money and an increased demand for alternative payment instruments.

Based on the failures experienced in the payment system, nowadays central bank liabilities are typically used to settle claims between the payment system participants. Central banks provide the final settlement asset (Manning, 2009), as shown on the hierarchy of settlement relationship or payment pyramid (Figure 6). The end-users typically settle in commercial bank money at their own bank based on their deposits since the commercial banks have promised to convert the customers' deposit into central bank money (typically cash). Therefore, central bank and commercial bank money settlement co-exist. The use of central bank money strengthens the role of central banks in the functional areas of ownership, operation and oversight.

Figure 6
Hierarchy of Settlement Relationships



2.3.2 Relation to Financial System

The emergence of financial stability analysis appeared simultaneously with the emergence of more sophisticated payment systems. The stability of the payment system has empirical links to the quality of the overall financial system (to some extent it is true that the health of the payment system depends mainly on the health of its participants). The disruption in the payment system may lead

to delays or failure of payment obligation. If amount involved is significant, the delay or failure in the payment obligation can affect the confidence in liquidity and financial system stability. Disruption in the financial system, such as the financial crisis that affects one or more bank payment system participants, will inevitably have an impact on the liquidity of the payment system. The most feared impact of the crisis will largely affect the large scale banks which have a systemic role. This crisis will affect the ability of the large scale banks' payment obligations to other member banks and, in return, will spread to and affect the ability of participants to pay the bank in the next layer, causing congestion in the settlement or payment system, known as gridlock. Therefore, the robustness of PSS has an important effect on overall financial stability because of this reason (Racocha, 2004):

1. Unstable and unsafe payment system represents a source of financial instability.
2. Financial instability can influence otherwise healthy payment system and disrupt all the positive externalities related to the existence of a well-functioning payment system.
3. Payment system also plays the role of first buffer to potential financial instability.

2.3.3 Relation to Monetary Policy

Central bank money as the ultimate settlement asset offered by the central bank should be controlled in order to fullfill the ability (the quantity and the price) to settle interbank payments. Monetary policy objective is usually cast in terms of price stability which is achieved by implementing an inflation target. Therefore, monetary stability is important for the acceptance of central bank money.

In general, the direct relationship between the payment system and monetary policy is because the payment system can affect the money usage in the community. Payment transactions between economic actors often use the funds in their bank account. The result of the clearing and settlement process for these transactions is the increase of one account at the expense of the others. Therefore, the payment system acts as a bridge between money and economic activities. The efficiency of money usage really depends on payment system efficiency. For instance, the highly variable time lag that occurs between the timing of payment instructions and settlement will affect the bank account balance and the ability of participants to perform other transactions. The effect

of this time lag to the account balance is known as float and it is an important factor in the balance of money supply and demand. In relation to the function of BI in controlling the monetary policy, the main concern is the settlement at the central bank, considering that settlement process is the first for every financial transactions. Through the same day settlement, the bank can quickly estimate the liquidity need, and the central bank may find the real money supply and demand.

The automation of interbank money transfers, particularly the automated large value interbank fund transfers, is an important infrastructure component in modern financial markets. Its main functions are accelerating the communication, processing and execution of the payment settlement system. From the macroeconomic point of view, automated large value interbank fund transfers can act as bridge for financial markets' needs. These fund transfers also affect the country's monetary condition. From the microeconomic point of view, the implementation of automated large value interbank transfer system will enhance the participants' liquidity situation. Moreover, liquid markets can reduce the dependency of banks on the central bank and increase the market-oriented reserve requirement. The liquid interbank money market also may increase the flexibility of the monetary policy implementation and may allow the central bank to implement the monetary policy directly and accurately.

2.4 Risk Involved in PSS and Specific Risk Related to Monetary Policy and Financial Stability

There is a potential trade-off between the safety and efficiency of payment system, or is a trade-off between the objective of minimising the risk of payment system and the objective of maximising the speed of transactions and minimising the cost associated with the payment system. Cost reduction, at some point, may result in a slower or inaccurate services. Lower risk is much more preferred than higher risk, but it also cost more. Therefore, an equal balance between risk and efficiency is highly required. Therefore payment systems can be subject to a range of risk, which are similar to those of the banking sector although they are not exactly the same. According to CPSIPS by the BIS Committee for Payment and Settlement Systems (CPSS-BIS), payment systems can be subject to a range of risks, including credit risk, liquidity risk, legal risk, operational risk, and systemic risk.

1. Credit risk is the risk that occurs when a party within the system is unable to fully meet its financial obligations within the system currently or at any time in the future.

2. Liquidity risk is the risk when a participant will 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. It can be decreased by sufficient collateral.

3. Legal risk is the risk that a poor legal framework or legal uncertainties will cause or exacerbate credit or liquidity risks.

4. Operational risk is the risk that operational factors such as technical malfunctions, operational mistakes will cause or exacerbate credit and liquidity risks.

5. Systemic risk, in the context of payment system, is the risk that the inability of one of the system participants to meet its obligations, or a disruption in the system itself, can result in 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 can cause widespread liquidity or credit problems, and can, as a result, threaten the stability of the system or of the financial markets.

2.5 Recent Developments of PSS to Mitigate Risk

In the last five years, non-cash payment instruments have been gaining popularity in Indonesia. According to recent the data, credit transfers using BI's National Clearing System (SKNBI) has showed a significant increase with 20% average usage growth. Transfers the using BI-RTGS and card-based payment instruments usage also increased to the tune of 5% and 16%, respectively. In the terms of transaction value, SKNBI also showed an increase with 10% average growth. Transaction value using BI-RTGS and card-based payment instrument also increased with 21% and 15% growth, respectively.

From the information mentioned above, it can be seen that the payment system performs a crucial role, especially with the growing trend of the need for speed and ease in conducting transactions. For BI as a regulator of the payment system to maintain a smoothly functioning payment system as mandated in the BI Act, there are four basic principles that must be met both in the administration, development and supervision of payment systems. The four principles are risk control, efficiency, equality of access and consumer protection. All of these principles are the foundation of any policy issued by BI. Throughout 2011, several policy and development measures made in respect of the PSS were grounded on these four principles.

In recent years, the PSS in Indonesia has seen some major developments with regard to risk mitigation as well as safety and efficiency improvement of the PSS. These developments are listed below.

2.5.1 BI-RTGS and BI-SSSS Generation II

From the standpoint of system development, the aim is to increase efficiency and reliability in risk mitigation by continuing the development of BI-RTGS and BI-SSSS Generation II. The second generation BI-RTGS System will incorporate the offsetting features of bilateral and multilateral netting with the purpose of economising on the use of liquidity for settlement. This sytem will replace the old system that has been runnning for 11 years and has started slowing down in the speed of its performance in order to accomodate the increase in transactions.

The new system will be equipped with liquidity-saving features that will mitigate the liquidity risk for the partipants. Moreover, the new system will be designed to use international standard platform which will increase the efficiency of participants who have exposure in cross-border transactions.

2.5.2 SKNBI Processing

SKNBI, which was launched in 2005, is a deferred multilateral net settlement system for retail interbank credit fund transfers, and payment by cheques and other debit instruments. Since the end of 2010, SKNBI has linked 109 local clearing houses throughout the country. In 2011, there was no alteration that affected the structural development. The focus of 2011 was to increase the efficiency of SKNBI transaction settlement through the addition of the settlement cycle from two times to four times during operating hours.

2.5.3 National Standard of Chip Card Specification for Indonesia's ATM/Debit Cards

BI and the ATM/debit card industry in Indonesia have agreed to implement the use of chip instead of magnetic cards for ATM/debit cards that issued in Indonesia. Also, BI has required the industry to implement at least 6 digits PIN by the ATM and debit card industry. This agreement was reached to provide for safer and more secure use of ATM/debit cards for electronic payments. BI and the industries then issued the National Standard of Chip Card Specification (NSICCS) for ATM/debit cards in 2009. The NSICCS will support technical inter-operability among ATM/debit cards in the country, and therefore will facilitate

implementation of interlinking the infrastructures (i.e., ATM and POS networks) of the issuers of ATM/debit cards and the providers or acquirers of shared ATM/POS networks.

2.5.4 Inter-operability of E-money

Since 2009, BI has been facilitating the initiative to promote inter-operability of operations of e-money services that are provided by the various service providers. The industry will set up the inter-operability schemes for both the chip-based and server-based e-money. The inter-operability scheme initiative came about in order to improve the efficiency in e-money services and to increase the usage of e-money instruments to promote a cashless society.

2.5.5 National Payment Gateway

BI and the payment system industry are currently collaborating to improve the efficiency of the payment system, especially the retail payment system. The approach to efficiency improvement is by way of an integrated retail payment system by integrating the process of clearing and settlement, including provision of switching/routing between the participants as well as provision of an access point to the national payment system. This system is referred to the National Payment Gateway (NPG). The goal of the NPG is derived from the existing condition of the various front-end delivery channels (e.g., ATMs and POS devices) offered by the industry players and no centralisation in the use a shared infrastructure for switching retail and micro payments (e.g., card-based, internet and mobile payments).

Through the NPG, reduction in duplicative investments on the delivery channels and efficient operation of switching services for retail and micro payments in the country can be achieved. The NPG will require inter-operability of delivery channels and instruments of retail and micro payments in the country, common and scalable standards for payment messaging exchange, protocol as well as system/network security and reliability, and financial and operational risk management tools.

3. Assessment of PSS

3.1 Core Principles of Systemically Important Payment Systems

The BIS in January 2001 established the CPSIPS. The principles are intended for use as universal guidelines to encourage the design and operation of safer

and more efficient systemically important payment systems worldwide. Moreover, the core principles are intended to be sufficiently broad in scope as to apply to a wide range of circumstances and to be useful over time.

The principle consists of 10 core principles (see Table 2) which apply to payment systems, specifically systems which involve only fund transfers. They can also apply to the payment aspects of systemically important systems in which transfers of other financial assets such as securities, and related transfers of funds are both settled. Each of the payment systems that is categorised as a systemically important payment system is encouraged to comply with all the core principles.

Table 2
Comparison of CPSS and PFMIs

Core Principles of Systemically Inportant Payment System	Principles for Financial Market Iinfrastructures
CP I. Legal basis	1. Legal Basis
CP II. Understanding Financial Risks	23. Disclosure of Rules and Key Procedures
CP III. Management of Financial Risks	3. Framework for Comprehensive Management of Risks
CP IV. Prompt Final Settlement	8. Settlement Finality
CP V. Settlement in Multilateral Netting Systems	4. Credit Risk 5. Collateral 7. Liquidity Risk

Core Principles of Systemically Inportant Payment System	Principles for Financial Market Iinfrastructures
CP VI. Settlement Assets	9. Money Settlements
CP VII. Security and Operational Reliability	17. Operational Risk
CP VIII. Efficiency	21. Efficiency and Effectiveness
CP IX. Access Criteria	18. Access and Participation Requirements
CP X. Governance	2. Governance
	New Principles: 12. Exchange-of-value Settlement Systems 13. Participant-default Rules and Procedures 15. General Business Risk 16. Custody and Investment Risks 19. Tiered Participation Arrangements 21. Efficiency and Effectiveness 22. Communication Procedures and Standards

3.2 Principle for Financial Market Infrastructures

The new standard for financial market infrastructures has been acknowledged by the CPSS and the Technical Committee of the International Organisation of Securities Commissions (IOSCO). The new standard was established in April 2012 and is known as the PFMIs. Referring to the document (BIS, 2012), the FMIs is defined as a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions. A FMI includes five key types of FMIs: payment systems (PS), central securities depositories (CSDs), securities settlement systems (SSSs), central counterparties (CCPs), and trade repositories (TRs). Therefore, the previous established standards such as CPSIPS, Recommendations for Securities Settlement Systems (RSSS) and Recommendation for Central Counterparties (RCCP) are replaced with this PFMIs. All of FMIs are encouraged to observe these principles.

The PFMIs consists of 24 principles which provide guidance for addressing risks and efficiency in FMIs (for elaboration of the principles, see Appendix 2). The overall organisation of the principles entails nine elements, specifically: general organisation, credit and liquidity risk management, settlement, central securities depositories and exchange-of-value settlement systems, default management, general business and operational risk management, access, efficiency and transparency. Some of co-related principles are categorised into one element as shown in Table 3.

Table 3
Overall Organisation of Principles

Elements	Principles	PS	CSD	SSS	CCP	TRs
General Organisation	1. Legal basis	x	x	x	x	x
	2. Governance	x	x	x	x	x
	3. Framework for Comprehensive Management of Risks	x	x	x	x	x
Credit and Liquidity Risk Management	4. Credit risk	x		x	x	
	5. Collateral	x		x	x	
	6. Margin				x	
	7. Liquidity Risk	x		x	x	
Settlement	8. Settlement Finality	x		x	x	
	9. Money Settlements	x		x	x	
	10. Physical Deliveries		x	x	x	
Central Securities Depositories and Exchange-of-value Settlement Systems	11. Central Securities Depositories		x			
	12. Exchange-of-value Settlement Systems	x		x	x	
Default Management	13. Participant-default Rules and Procedures	x	x	x	x	
	14. Segregation and Portability				x	
General Business and Operational Risk Management	15. General Business Risk	x	x	x	x	x
	16. Custody and Investment Risks	x	x	x	x	
	17. Operational Risk	x	x	x	x	x
Access	18. Access and Participation Requirements	x	x	x	x	x

Elements	Principles	PS	CSD	SSS	CCP	TRs
	19. Tiered Participation Arrangements	x	x	x	x	x
	20. FMI links	x	x	x	x	x
Efficiency	21. Efficiency and Effectiveness	x	x	x	x	x
	22. Communication Procedures and Standards	x	x	x	x	x
Transparency	23. Disclosure of Rules, Key Procedures, and Market Data	x	x	x	x	x
	24. Disclosure of Market Data by Trade Repositories					x

As mentioned previously, the PFMIs is considered as a new standard for the five key types of FMIs, but FMI types can adopt different standard principles. As can be seen in Table 3, the PS incorporates 19 principles while the CSD is considered to comply with 15 principles.

In the construction of the PFMIs, the previous standard for PS (i.e., CPSIPs) still apply, but it has been accomodated in the new PFMIs, with some of its elements taken into consideration and incorporated as additional new principles concerning the mitigation of risk, access and participation requirements.

3.3 Current PSS Assessment

The BI-RTGS is the main system for handling payments and is considered to be the only systemically important payment system in Indonesia although there are several payment systems in operation in Indonesia. The assessment of this system was conducted in 2009 by the IMF and the World Bank in collaboration with the CPSS. The tools used to assist and guide the assessors in achieving the objectives of this assessment were the CP-SIPS. The information for the assessment was derived from numerous sources and included interviews held with the relevant BI officials, participants (bank and non-bank), bankers' association representatives, and telecommunication service providers. Other information was gathered from documents like the BI Act, various rules and regulations, and circulation letters relevant to the operation of the BI-RTGS system.

Some consideration had been taken into account in the assessment regarding the BI-RTGS system of handling payments and transactions in real time using central bank money and which is also used for the settlement of obligations arising from the other payment streams. The system also provides a collateralised intraday credit facility to all bank participants to facilitate settlement as well as ensure a smooth flow within the system. The utilisation of this facility is executed if the settlement account is not adequately funded and payment of participant transactions is held in the queue. The BI-RTGS links 148 participants to the central bank by using a designated network. Throughput guidelines were provided to encourage the participants to process their payments and it is related to the designed pricing scheme which consists of two windows, with the first window being the cheapest to encourage early payments.

By using the assessment criteria - that are observed (O), broadly obseved (BO), partly observed (PO), not observed (NO), and not applicable (N/A) - the result of the assessment based on the 10 CP-SIPS concludes that the existing BI-RTGS system generally complies with the core principles, with three of the principles assessed as BO and one principle concerning multilateral system categorised as not applicable. The detailed assessment result is presented in Appendix 1.

3.4 Assessment Using PFMIs

The objectives of the PFMIs are to enhance safety and efficiency in payment, clearing, settlement, and recording arrangements, and more broadly to limit systemic risk and foster transparency and financial stability. The development of the second generation BI-RTGS will be based on the PFMIs while maintaining the gains achieved from compliance with the previous CPSIPS.

The implementation of DvP and PvP concerns the observance of the principle concerning exchange-of-value settlement systems. However, the mechanism of PvP should be given attention because of the infrastructure for settlement partly is partly linked to the infrastructure of USD CHATS (US Dollar Clearing House Automated Transfer System) of Hongkong.

Regarding the principle of communication procedures and standards, the second generation BI-RTGS is designed to implement the SWIFT message standard that has been acknowledged and implemented worldwide as the internationally accepted standard in the area of financial system.

The provision of membership participation in the system as well as the risk involved from the arrangement are matters to be considered by the authorities in order to achieve the efficiency and effectiveness of the system. Moreover, to give assurance to the participants who are engaged in the system, participant-default rules and procedures are considered and will be covered in the provisions. The promulgation of the Payment System Act which is still work in progress will strengthen the operation of the PSS in Indonesia.

High attention to the wide range of risks that can occur in the system has brought about improvements in anticipatory mechanisms and efficiency and effectiveness of the BI-RTGS system in order to ensure that the 2nd generation of BI-RTGS system is able to comply to the PFMIs.

4. Policy Implications

Based on the facts described in the previous section, the payment system in Indonesia plays an important role in economic development and financial stability. The development of the payment system in Indonesia for high-value and for low-value payments has been rapid lately. The emerge of the economic landscape across borders imply that the fundamental changes in the infrastructure landscape and interdependencies between systems have intensified. These developments pose challenges, especially dealing with the risk imposed by the systems, such as the attainment of safe and efficient payment systems for the participants as well as for the overseers of the PSSs in Indonesia. Hence, the use of PFMIs as the standard for the development of payment system infrastructures is highly recommended.

The potential implications need to be well understood by the overseers, in order that they can prioritise their efforts and respond appropriately as the landscape evolves. BI as the central bank needs to decide which parts of the changing infrastucture landscape need to be supervised and to what degree. It is important setting the right scope for oversight for all systemically important payment and settlement systems (SIPSS) besides developing an approriate regulatory and oversight framework to accomodate financial innovation.

Payment system infrastructure is emerging and is operating across borders establishing interlinkages and interdependencies (domestically and internationally) among infrastructures. BI as central bank may need to work closely, sharing risk assessment and cooperating in oversight with the other regulators and authorities of those systems.

The financial infrastructure and also the financial transaction mechanism have become broader and deeper. They entail consequences that the central bank should provide for effective arrangements that support the settlement of payment and securities transactions. The central bank should put strong interest in the smooth functioning of the financial infrastructure as a whole by identification and mitigation of risks that may disrupt settlement. Moreover, a number of factors that include the declining cost of storing, processing and transmitting information and the development of new software application that increase processing speed, have fuelled financial innovation and have played an important role in facilitating the global integration of financial markets.

The innovation of the banking system in offering settlement services in their own (commercial-bank) money gives rise to a decline in the demand for central-bank money. This can affect the central bank's ability to implement monetary policy. Thus, the policy and the development of the PSS should retain the use of central bank money as the ultimate settlement.

5. Conclusion

The PSS in Indonesia has a crucial role to perform in attaining the objective of monetary and financial stability. The use of central bank money for final settlement in the BI-RTGS system is one element that can demonstrate the implicit link of the PSS and monetary and financial stability. A reliable and resilient infrastucture for distributing the ultimate settlement asset is a key requirement for stability and for implementing monetary policy effectively.

The increasing number of transactions settled via the BI-RTGS proves the contribution of the payment system to the rapid economic development. To assure the smooth operation of the payment system, BI as the owner and operator of the BI-RTGS has been maintaining and developing the infrastructures to provide a high degree of safety and minimum risk in the operation of the payment system.

The assessment result of previous CPSIPS assessment and the new standard for financial market infrastructures, i.e., PFMIs, should be the basis for the development of the second generation BI-RTGS system in providing for the safety and effectiveness of payment systems and other financial market infrastructures in Indonesia.

BI as the central bank and regulator of the payment system will continue to face challenges with rapid developments in the area of wholesale payments. Greater domestic and international cooperation are needed due to the growing interdependencies between the systems.

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Appendix 1

Result of BI-RTGS Assessment Based on CPSIPS

Core Principles for Systemically Important PS		Assessment Result
CP I	The system should have a well-founded legal basis under all relevant jurisdictions.	Broadly Observed
CP II	The system's rules and procedures should enable participants to have a clear understanding of the system impact on each of the financial risks they incur through participation in it.	Observed
CP 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.	Observed
CP 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.	Observed
CP 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.	Not Applicable
CP 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.	Observed
CP VII	The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.	Observed
CP VIII	The system should provide a means of making payments, which is practical for its users and efficient for the economy.	Observed
CP IX	The system should have objective and publicly disclosed criteria for participation, which permit fair and open access	Broadly Observed
CP X	The system's governance arrangements should b effective, accountable and transparent.	Broadly Observed

Appendix 2

Principles for Financial Market Infrastructures

I. Principles for Financial Market Infrastructures (PFMIs)

A. General Organisation

Principle 1: Legal Basis

A FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

Principle 2: Governance

A FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

Principle 3: Framework for the Comprehensive Management of Risks

A FMI should have a sound risk management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

B. Credit and Liquidity Risk Management

Principle 4: Credit Risk

A FMI should effectively measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. A FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its

affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions.

Principle 5: Collateral

A FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks. A FMI should also set and enforce appropriately conservative haircuts and concentration limits.

Principle 6: Margin

A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.

Principle 7: Liquidity Risk

A FMI should effectively measure, monitor, and manage its liquidity risk. A FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.

C. Settlement

Principle 8: Settlement Finality

A FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, a FMI should provide final settlement intraday or in real time.

Principle 9: Money Settlements

A FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, a FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

Principle 10: Physical Deliveries

A FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

D. Central Securities Depositories and Exchange-of-value Settlement Systems

Principle 11: Central Securities Depositories

A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimise and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry.

Principle 12: Exchange-of-value Settlement Systems

If a FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

E. Default Management

Principle 13: Participant-default Rules and Procedures

A FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

Principle 14: Segregation and Portability

A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the CCP with respect to those positions.

F. General Business and Operational Risk Management

Principle 15: General Business Risk

A FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

Principle 16: Custody and Investment Risks

A FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. A FMI's investments should be in instruments with minimal credit, market, and liquidity risks.

Principle 17: Operational Risk

A FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.

G. Access

Principle 18: Access and Participation Requirements

A FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.

Principle 19: Tiered Participation Arrangements

A FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.

Principle 20: FMI Links

A FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.

H. Efficiency

Principle 21: Efficiency and Effectiveness

A FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

Principle 22: Communication Procedures and Standards

A FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.

I. Transparency

Principle 23: Disclosure of Rules, Key Procedures, and Market Data

A FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees, and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.

Principle 24: Disclosure of Market Data by Trade Repositories

A TR should provide timely and accurate data to relevant authorities and the public in line with their respective needs.

II. Responsibilities of Central Banks, Market Regulators, and Other Relevant Authorities for Financial Market Infrastructures

Responsibility A: Regulation, Supervision, and Oversight of FMIs
FMIs should be subject to appropriate and effective regulation, supervision, and oversight by a central bank, market regulator, or other relevant authority.

Responsibility B: Regulatory, Supervisory, and Oversight Powers and Resources
Central banks, market regulators, and other relevant authorities should have the powers and resources to carry out effectively their responsibilities in regulating, supervising, and overseeing FMIs.

Responsibility C: Disclosure of Policies with Respect to FMIs
Central banks, market regulators, and other relevant authorities should clearly define and disclose their regulatory, supervisory, and oversight policies with respect to FMIs.

Responsibility D: Application of the Principles for FMIs
Central banks, market regulators, and other relevant authorities should adopt the CPSS-IOSCO Principles for financial market infrastructures and apply them consistently.

Responsibility E: Cooperation with Other Authorities
Central banks, market regulators, and other relevant authorities should cooperate with each other, both domestically and internationally, as appropriate, in promoting the safety and efficiency of FMIs.

Chapter 5

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY IN KOREA

By
Jongwook Kim[1]

1. Introduction

The Korean payment and settlement systems (PSSs) have changed significantly since the mid-1990s, in line with the development of ICT and evolution of the financial industry. First of all, the payment and settlement volume has shown a steady rise. With the increasing number of financial and foreign exchange transactions, large-value payment system (LVPS) usage has expanded while that of retail payment systems (RPSs) is also growing rapidly thanks to the increasing use of non-cash payment instruments. In particular, as electronic payment instruments such as credit cards and internet banking have steadily replaced cash and paper-based payment instruments such as bills and cheques, they now constitute a much greater portion of total payment instruments, in both volume and value terms. Meanwhile, the number of mobile banking service users has been soaring across the globe, a trend that is expected to continue for some time.

Another change worth noticing is that while financial institutions have been forced to go digital to survive in the market, particularly where their payment and settlement services are concerned, considerable improvements in payment and settlement convenience and efficiency have at the same time been achieved through technological innovation. It is on the other hand likely, however, that payment and settlement systemic risks will also grow, as a wide range of institutions such as non-banking financial institutions and other various payment service providers are now participating in the payment and settlement businesses, and the procedures for payment and settlement are becoming more complicated.

Along with all of this, PSSs have become more interdependent due to the liberalisation and globalisation of financial markets and the variety of PSSs newly

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developed through innovations in ICT. This greater interdependency enhances the efficiency of each system, but also increases the possibility of systemic risk due to the newly emerging liquidity and operational risks. Particularly, malfunctions or disasters occurring in some PSSs can pose serious threats to the PSSs as a whole.

During the global financial crisis, some repo markets in the advanced countries proved to be a less reliable source of funding liquidity than expected. To the extent that repo clearing and settlement infrastructure roles are not fully transparent, the market participants may misperceive the credit and liquidity risks involved in their decision of entering into repo transactions. Over-the-counter (OTC) derivatives also contributed significantly to this crisis. The 2000 deregulation of OTC derivatives in the United States was a key turning point in the march toward the financial crisis. Without any oversight, OTC derivatives rapidly spiraled out of control and out of sight, growing to enormous amount.

The G-20, the Financial Stability Board (FSB) and other key international organisations have been discussing the establishment and improvement of international standards on OTC derivatives markets, in order to ensure their financial integrity and transparency. The Committee on Payment and Settlement Systems and International Organisation of Securities Commissions (CPSS-IOSCO) are currently also working to secure the implementation of new standards for Financial Market Infrastructures (FMIs) in member countries. To monitor the status of compliance among the key Korean FMIs, the Bank of Korea (BOK) needs to develop guidelines for compliance reviews, drawing upon precedent experience such as that of the global financial crisis and in cooperation with various public and private-sector stakeholders.

Under these circumstances, this paper explains why Korean PSSs are crucial for central banks and other authorities in their design and implementation of monetary policy and financial stability. In the next section, we provide shortly the PSSs in Korea. Section 3 reviews how well Korean PSSs could remain smooth even in the impact of the global financial crisis (the past experiences). Section 4 discusses in detail the response to the ‘Principles for Financial Market Infrastructures’ (PFMIs) (the present tasks). In addition, we present our future policy directions in Section 5 (the future initiatives), and some concluding remarks in the last section.

2. Payment Systems and Role of Bank of Korea

2.1 Payment Systems in Korea

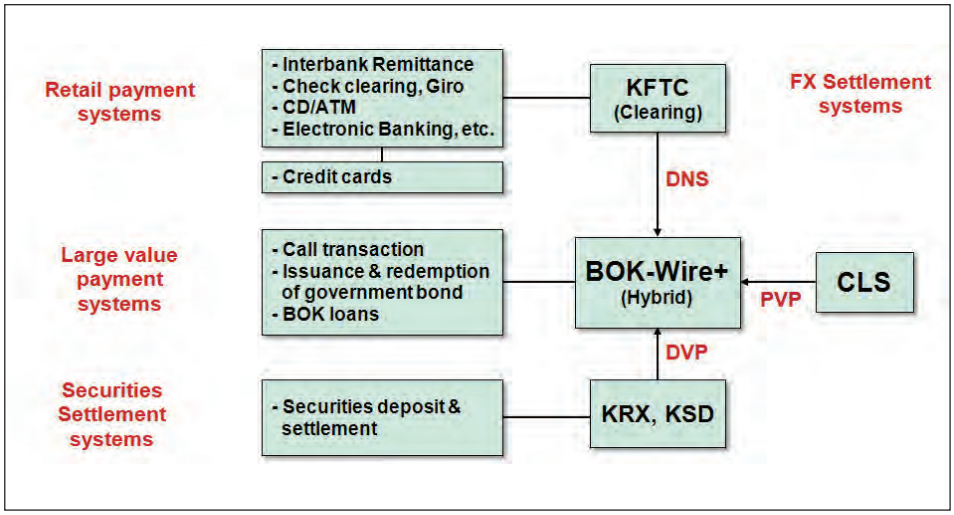
The PSS of Korea was for long heavily dependent on paper-based payment instruments. This is attributable to individuals' traditionally strong preference for cash as a payment instrument and the well-developed bill and cashier's cheque system. Nevertheless, the use of non-paper-based payment instruments has grown steadily since the 1980s with interbank funds transfer systems such as Interbank Funds Transfer System (IFTS) and the Interbank CD/ATM System being established. The spread of e-commerce transactions and introduction of Internet banking in recent years are accelerating the movement toward a further diversification of the range of electronic PSSs.

The PSS of Korea consists mainly of a LVPS, various RPSs, securities settlement systems (SSSs), and foreign exchange settlement systems.

BOK-Wire, introduced in 1994, was a LVPS owned and operated by the BOK. In its early days, BOK-Wire processed fund transfers based only on its real-time gross settlement (RTGS) mechanism. As the BOK-Wire settlement volume surged, however, the liquidity burden on participants increased. In 2009, the BOK completed the development of a new system (BOK-Wire+), which would use not only the RTGS mechanism but a hybrid settlement mechanism as well. A hybrid settlement system is a payment system which combines the characteristics of the RTGS system and netting system by adding bilateral and multilateral offsetting features.

The SSSs in Korea are operated by the Korea Exchange (KRX) and the Korea Securities Depository (KSD). The KRX also operates Korean Composite Stock Price Index (KOSPI), Korean Securities Dealers Automated Quotations (KOSDAQ) and Derivatives Markets. Both stocks and bonds are traded in the KOSPI Market while only stocks are traded in the KOSDAQ Market. In the Derivatives Market, options and futures based on various underlying assets including stocks, interest rates, currencies and commodities are traded. The KRX, acting as a central counterparty (CCP), plays the role of clearing house for the transactions conducted in the markets it operates. The KSD is a central securities depository and provides book-entry transfers. It conducts settlement for securities traded on the floors, and both clearing and settlement of OTC transactions. The securities transactions are settled through the account held with the BOK and some banks depending on the type of transactions.

Figure 1
Architecture of the Payment Systems in Korea



2.2 Role of Bank of Korea

Legislation determines the division of responsibilities among the relevant authorities for regulation, supervision and oversight of the FMIs. The responsibilities fall on the Financial Services Commission (FSC), the Financial Supervisory Service (FSS) and the BOK. The Bank of Korea Act (BOK Act) stipulates the clear legal basis for the BOK oversight of the PSSs in order to heighten the safety and efficiency of the nation's payment system as a whole. The FSC serves as the policymaking body for matters pertaining to the supervision of the financial industry as a whole for the purpose of promoting a sound credit system and fair business practices in Korea. The FSC drafts and amends financial laws and regulations, and also issues regulatory licences to the financial institutions. Regarding the PSSs, the FSC regulates the system operators, including the KRX, KSD and most providers of payment services, such as banks, financial investment companies, non-bank credit institutions, etc. The FSS acts as the executive arm for the FSC, and principally carries out examination of financial and other related institutions along with enforcement and other supervision activities as directed or charged by the FSC. Financial institutions including banks, non-bank credit institutions, financial investment companies, credit card companies, etc., and other related institutions, such as KRX and KSD, are supervised by the FSS.

With respect to the PSS of Korea, there is a broad range of laws and regulation. The BOK Act, among others, clearly stipulates that the BOK shall play a principal role in overseeing PSSs. The Act prescribes that the BOK may determine all the necessary matters concerning the payment systems that it operates. This authorises the BOK to require BOK-Wire+ participants to provide any relevant information. The BOK may also require other operating institutions to provide information related to payments and settlements, and if necessary, the BOK may request such institutions or the supervisory body to take measures for the improvement of the operating rules, etc. These provisions establish the legal ground for the BOK's collection of information, assessment, and requests for improvement of all PSSs, including the RPSs and the SSSs.

As the lender of last resort, the BOK may provide liquidity for banks facing unexpected temporary liquidity shortages, in order to prevent default contagion and ensure financial stability in Korea. The BOK provides emergency liquidity assistance to financial institutions or markets as necessary, to prevent financial market instability or a temporary liquidity crisis of a certain financial institution from spreading to the entire financial system. In addition, the BOK supplies settlement liquidity to participants lacking it through intraday overdrafts, in order to prevent delays in overall settlement caused by temporary liquidity shortages.

3. Global Financial Crisis and Payment Systems

3.1 Lehman Crisis and Policy Responses

3.1.1 Impact of Lehman's Collapse

The Korean foreign exchange and financial market were thrown into turmoil due to the global credit crunch following the collapse of Lehman Brothers (September 2008). The won/dollar exchange rate soared and market interest rates increased sharply while stock prices dropped. The depreciation of the Korean won was quite large in comparison with other Asian currencies although it was small compared to the Korean foreign currency crisis of 1997. In particular, the turbulence in the foreign exchange and financial market was worsened by the massive outflow of foreign portfolio funds. In 2008, the KOSPI fell more than 40% as foreign investors sold 35 trillion won worth of local stocks. As of the end of 2008, the ratio of foreign stock holdings in total Korean stock market capitalisation stood at 27%, down from 35% in 2006.

Domestic banks were exposed to the financial market turmoil due to their high loan-deposit ratio. As of the end of November 2008, their loan-deposit ratio

stood at 120% far higher than that of the major countries. Bank lending had grown, driven by the household loans in line with the rise in housing prices.

Domestic economic activity contracted rapidly in response to the global credit crunch and the slowdown of the world economy due to the psychological malaise engendered in part by the worsening foreign currency supply and demand conditions. Exports shifted to negative growth and the sluggishness of domestic consumption and investment deepened. The GDP growth rate in the 4th quarter of 2008 was minus 4.6% quarter-on-quarter (annualised rate ³%17.2%).

3.1.2 Policy Responses

To help alleviate the rapid economic downturn, the BOK cut its "base rate" at an unprecedented pace. From the start of the global financial crisis in October 2008 until February 2009, the BOK cut the "base rate" on six occasions, by 3.25%, from 5.25% to 2.00%. The scale of the policy rate reduction in Korea was similar to the average level seen in the most advanced nations, where the financial unrest was acute. Following the collapse of Lehman Brothers, the BOK expanded its provision of market liquidity dramatically, as part of its efforts to mitigate the credit crunch generated by deep concerns over credit risk. To improve liquidity conditions in the financial markets as a whole, the BOK bought back Monetary Stabilisation Bonds (700 billion won) prior to maturity and purchased Treasury Bonds (1 trillion won) outright. In addition, it expanded the types of permissible collateral[2] and the counterparties[3] eligible for its open market operations, in order to provide sufficient liquidity through the diversification of supply channels.

Liquidity support to vulnerable sectors was strengthened. To stabilise the markets for credit securities including corporate bonds, the BOK provided 16.8 trillion won through long-term RP purchases on an ad-hoc basis. To provide support to SMEs suffering from serious financial strains, the BOK raised its aggregate credit ceiling by 3.5 trillion won, from 6.5 trillion won to 10 trillion won. Financial institutions' capacity to enhance credit supply was also supported. To recapitalise banks and enhance their financial soundness, the BOK contributed to the Bank Recapitalisation Fund (3.3 trillion won) and made a one-off payment of 500.2 billion won on banks' required reserves (on December 11, 2008). For

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2. Bank debentures and special bonds were added to the list of collateral eligible for BOK open market operations (October 2008).
3. Twelve securities companies were added to its list of eligible counterparties for RP transactions (December 2008).

the purpose of financial market stability, the BOK provided 28 trillion won worth of liquidity - equivalent to 2.6% of nominal GDP.

As the global credit crunch worsened, it also actively provided foreign currency liquidity to stabilise the foreign exchange market. The availability of foreign reserves was greatly expanded through currency swap arrangements with the central banks of major countries. After signing a swap deal with the Federal Reserve at end-October 2008 (30 billion dollars), the BOK entered into currency swap agreements with the Bank of Japan (around 20 billion dollars) and the People's Bank of China (180 billion yuan) in December. Using its foreign reserve holdings as well as the proceeds of its currency swaps, the BOK provided a total of 26.8 billion dollars in foreign currency liquidity to the local market between October 2008 and February 2009.

The government implemented active fiscal stimulus measures to ward off an overly-deep recession in the real economy. Total additional fiscal spending and tax cuts directly and indirectly related to the financial crisis amounted to 38.8 trillion won in 2009. For example, passenger car purchase taxes were temporarily cut to help prevent a prolonged contraction in private consumption. The fiscal expansion associated with the crisis-related discretionary measures amounted to 3.7% of nominal GDP, larger than that in both the U.S. and the U.K., the epicenters of the financial crisis.

3.1.3 Recovery of the Financial and Real Economy

In 2009, the global financial markets shifted to a recovery trend. Short-term interest rates have stayed at low levels without precedent because of the low policy rates in the major countries, and long-term interest rates have continued to be stable. Global share prices have maintained an underlying upward trend. Long-term and short-term credit spreads such as the TED and corporate bond spreads have been stable at low levels. In the foreign exchange and financial markets, there has been a pronounced improvement in the movements of most financial indicators such as the exchange rate, interest rates and share prices since the second quarter of 2009, helped by the bold operation of policy and the easing of the international financial unrest. The Korean won/dollar exchange rate, which had risen to 1,520 at the end of February 2009, subsequently fell back to a level of 1,130 at the end of March 2010 as the foreign exchange supply and demand conjuncture improved because of the sustained current account surplus. Spreads between the long-term market interest rates such as corporate bond yields and Treasury bond yields narrowed to their level before the Lehman Brothers collapse amid the waning of credit risk fears. Share prices in terms

of the KOSPI index continued on an upward trend in keeping with the turn for the better in the economic situation, rising from 1,070 as of the end of November 2008 to 1,690 as of the end of March 2009.

Real economic activity has maintained its trend of recovery since the second quarter of 2009. GDP showed solidly-based quarter-on-quarter growth of 2.5% in the 2nd and 3.4% in the 3rd quarter. In the 4th quarter, GDP maintained a positive growth rate of 0.2%, in spite of the base period effect of the rapid growth in the previous quarter. GDP for 2009 as a whole registered a positive year-on-year growth rate of 0.3%. Korea was one of the fastest-growing economies among the OECD member countries. Only three countries, Korea, Poland and Australia, registered positive growth in 2009. Comparing the speed of recovery from the global financial turmoil with that from the foreign currency crisis of 1997, the time to get back to the pre-crisis level shortened from 6 quarters to 4 quarters.

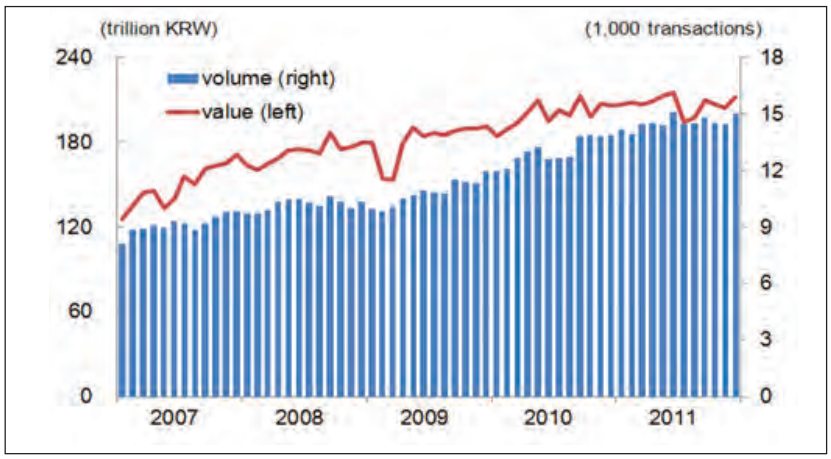
3.2 Payment Systems during the Crisis

Operation of the Korean PSSs remained smooth in 2009, even in the impact of the global financial crisis. The active supply of liquidity by the BOK contributed to this result. The daily volume of payments processed through BOK-Wire+ averaged 10,835 transactions in 2009, worth 181.0 trillion won in value – increases of 6.2% in volume and 4.8% in value compared to the previous year.

Despite a big drop in the amount of call money transactions owing to the timely supply of liquidity by the BOK, this growth in payment value came about due to the sharp increases in securities and foreign exchange settlement volume during the period.

Looking at the settlement risk-related indicators, the percentage of settlements processed through BOK-Wire+ after 16:00 fell significantly to 49.1% in 2009, from 60.1% a year earlier. Emergency policy measures employed by the BOK and the addition of a hybrid settlement function in BOK-Wire+ after the crisis had important effects on settlement liquidity.

Figure 2
Payments and Settlements Processed Through BOK-Wire+
(Daily Averages)



4. Response to 'Principles for Financial Market Infrastructures'

4.1 Background and Progress

FMIs[4] are considered to have fared relatively well even during the global financial crisis, thus contributing to the maintenance of financial market reliability. However, the increased interdependence among financial markets and FMIs has led to a diffusion of financial instability, highlighting the fact that financial system stabilisation hinges greatly on the smooth operation of the FMIs and leading to proposals in the international financial community for strengthening of the functions of FMIs in preparation against serious future crises.

In recognition of this, the CPSS of the Bank for International Settlements (BIS) and the IOSCO's Technical Committee (CPSS-IOSCO) have developed the PFMIs, a new package of international standards that focus, among other issues, on strengthening FMIs' crisis management capabilities and risk management standards, and encouraging the uses of CCPs[5] in the OTC

4. Refers to Systemically Important Payment Systems (SIPSs), Central Securities Depositories (CSDs), Central Counterparties (CCPs), Securities Settlement Systems (SSSs), and Trade Repositories (TRs).

5. A CCP plays the role of eliminating risks from trading counterparts and guaranteeing execution of their transactions, as it interposes itself between the transacting counterparties as a seller vis-a-vis the original buyer and a buyer vis-a-vis the original seller.

derivatives markets. Work on the PFMIs took off in March 2010, and the market consultation report on them was issued in March 2011. The final report on PFMIs was published on April 16 2012, after written approval from the CPSS-IOSCO and the Meeting of Governors of the BIS.

4.2 Key Contents of PFMIs

As new standards that replace the three existing sets of international standards for SIPSs, CCPs, and SSSs, the PFMIs which comprise 24 principles for FMIs and five responsibilities related to oversight, supervision and regulation, broaden the scope of FMIs to include trade repositories for OTC derivatives,[6] and promote strengthened management of FMI safety and soundness.

In line with the key contents of the strengthened principles in the final PFMIs, FMIs need to increase their stability by securing financial resources for settlement in preparation against credit and liquidity risks. In order to reduce credit risks, FMIs should increase their settlement capacities by fully covering their current exposures using margins and collateral and securing default funds. Notably, the standards for risk management of CCPs, which guarantee securities settlement, have been strengthened. For this, CCPs should maintain liquid resources sufficient for coping with potential stress scenarios, including the defaults of the two largest participants and their affiliates[7] ("Cover Two" requirements) in the cases of systematically-important CCPs[8], and the default of the single largest participant and its affiliates ("Cover One" requirements) in the cases of all other CCPs. In addition, the principles on liquidity risk require an FMI to secure liquidity

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6. A trade repository collects and stores information on OTC derivatives transactions, and reports this information to the relevant authorities and market participants.

7. An affiliate is defined as either a company that owns or controls over 20% of the securities with voting rights of a particular company, or a company that is integrated with another for the purpose of reporting financial statements and which controls or is controlled by the other.

8. Systematically-important CCPs refer to financial institutions that are present in multiple countries and clear products with complex risk structures (e.g., Credit Default Swaps (CDSs)). Whether a CCP is 'systematically-important' or not is determined by the financial authorities, in consideration of its transaction amounts, number of traded currencies, linkages with other FMIs, etc.

resources sufficient for prompt use for discharging payment obligations in a stress situation where a bankrupt financial institution has failed to settle its payment obligations. A CCP should strengthen its quantitative analysis, for example by setting up extreme but plausible scenarios and conducting stress tests on a regular basis, in order to appropriately calculate the financial resources needed for settlement.

The PFMIs also require a FMI to bolster its preparation against operational and general business risks. A FMI should set up data recovery functions at a secondary site located at a geographical distance from its primary site, aim to be able to resume operations within two hours following disruptive events, and ensure business continuity through immediate commencement of backup systems so that it can complete settlement for its clients by the end of the day, even in cases of extreme circumstances. A FMI should also hold high-quality, sufficiently liquid net assets funded by equity equal to at least six months of current operating expenses, so that it can cover temporary operational losses (with the exception of losses from participant defaults). including business managerial losses and customer compensation following computer network disruptions. And finally, a FMI should protect its customers' assets (margins and collateral) by holding them separately, strengthen its procedures and rules so that customer assets can be promptly transferred to a safe institution in any case of financial institution insolvency, and reduce the spread of settlement risks through identifying its own interdependence with other FMIs.

4.3 Korean FMIs Responses

Following the recommendations by the G20 and the FSB, major countries around the world have set the tentative goal of incorporating the requirements of the PFMIs into their legal frameworks by the end of 2012 and implementing them as soon as possible. The PFMIs are expected to be broadly used in various international organisations, including the IMF, as well as in major countries, as best practices in the oversight and supervision of FMIs. Considering the fact that the new principles are minimum standards to follow, domestic FMIs need to do their best to comply with them, to better protect investors in financial and securities products and to increase financial stability.

OTC derivatives in Korean financial markets have substantially increased until recent years. Legislative and regulatory steps need to be completed toward increasing the use of such products and processes. For this reason, a revision of the Financial Investment Services and Capital Markets Act was submitted to the National Assembly in November 2011. More detailed provisions of

enforcement ordinances and supervisory regulations required after legislation will be adopted.

The law and regulation requiring all standardised OTC derivatives to be cleared through CCPs will be in force by end-2012. In addition, the law and regulation requiring all OTC derivatives transactions to be reported to trade repositories have already been in place. The Financial Investment Services and Capital Markets Act and the Foreign Exchange Transactions Act require reporting of all OTC derivatives transactions to the authorities (FSS, BOK). Going forward, if necessary, we will try to improve some parts of the reporting system to meet international standards.

While some progress has been made with legislative initiatives regarding CCPs and TRs in Korea, the BOK and other supervisory body are still discussing the implementation of the principles at SIPSs. The BOK will adopt the principles through revising the Regulation on the Operation and Management of Payment Systems by the end of 2012. The FSC, the consolidated regulatory and supervisory authority in Korea, announced on June this year that the FSC will assess the KRX as a CCP and the KSD as a CSD, based on the principles.

Pursuant to the BOK Act and the Regulation on Operation and Management of Payment Systems, the BOK classifies the PSSs into SIPSs and "other payment systems". The SIPSs are payment systems whose malfunctioning can trigger spillover effects through the financial system or cause serious financial system disruption. The "other payment systems" refer to those not falling among the SIPSs. The decision to apply the principles to certain FMIs would be almost the same as the adoption of the principles for SIPSs.

Domestic FMIs need to review whether they comply with the PFMIs' key principles, such as on financial resources for settlement and risk management, and to come up with measures for improvement if necessary. Organisations operating CCPs should estimate and, if necessary, secure the amounts of collateral, default funds, and other financial resources sufficient for settlement, and establish systems enabling the prompt provision of liquidity during conditions of crisis. Risk management plans in the payment and the securities settlement systems, which are deferred net settlement systems, should also be bolstered. Korean FMIs should devote their best efforts to complying with the newly-introduced principle of holding assets equal to at least six months of current operating expenses, in preparation against general business risks. Considering the growing amount of investment in foreign securities by domestic clients, the joint response

systems operated with overseas FMIs should also be improved, in order to protect domestic clients' assets in cases of insolvency of foreign financial institutions.

5. Change of Environment and Future Initiatives

5.1 Enhancing Safety and Efficiency

5.1.1 BOK-Wire+

The BOK needs to further enhance the efficiency of BOK Wire+, while making constant efforts to minimise its operational risks. First, the BOK should work to improve the payment and settlement practice of participants in several ways, such as by encouraging system input of payment instructions as early as possible to make best use of the system's settlement liquidity saving function and lessen the heavy system workload at around day end.

Considering that the new system has a more complicated structure now, due to the introduction of its hybrid settlement mechanism, the BOK must also redouble its efforts to prevent operational risks stemming from computer system errors. Along with these efforts, the BOK will also endeavor to strengthen compatibility among all of the individual BCPs prepared by participants, given the increasing dependency on computer systems and interdependency among payment and settlement systems. In the long term, moreover, the BOK needs to come up with counterplans prepared for a variety of possible scenarios, to prevent any delays in or suspensions of the SIPSs.

5.1.2 Retail Payment Systems

The BOK needs to strive continually to improve the settlement risk management framework to ensure the completion of settlement even in the event of a participant's settlement failure, and thus minimise systemic risk, while at the same time working to reduce credit risk by bringing the designated net settlement time forward.

On top of this, the BOK must devote efforts to enhance confidence in the payment instruments while also helping individuals to use them in a safe and convenient way, by replacing magnetic stripe cards with IC chip cards and introducing various security tools to prevent fraud, falsification, and payment instrument hacking. It should also work to continue providing successful cross-border ATM services, after their launch in 2010, while preparing measures to manage the net settlement risks associated with these new services.

5.1.3 Securities Settlement Systems

The BOK needs to enhance the safety of the securities settlement systems in several ways, such as dematerialisation of securities and prevention of settlement delays or gridlocks caused by clashes between the different settlement processes in the KRX markets and OTC markets. This should be done in tandem with the efforts underway to develop the nation into a global financial hub.

To this end, in collaboration with the KRX and KSD, the BOK has implemented securities settlement reform plans to upgrade the SSSs since 2011. The reform plans include changing the settlement procedure for government bonds and repo transactions in the KRX markets from DVP3 to DVP1, and a new scheme for intraday BOK liquidity provision via collateral-on-flow, to ease concentration of securities settlement late in the day, so as to reduce related settlement risks.

This reform enabled earlier settlement of securities and funds, reducing the settlement risks embedded in the SSSs and hence enhancing the safety and efficiency of the systems, while also bringing them into greater conformity with other systems across the globe.

5.2 Responses to Major Global Discussions

5.2.1 Principles for Financial Markey Infrastructures

Following issuance of the PFMIs in April 2012, it is necessary for Korean FMIs to review their compliance with the new standards related to their financial resources for settlement and to their settlement risk management, and prepare measures for improvement in areas falling below the requirements. Korean CCPs also need to assess the adequacy of their financial resources such as collateral and default funds prepared for guaranteeing settlement, and put into place mechanisms for swift procurement of settlement liquidity in situations of temporary fund deficiencies.

Risk management in the funds and securities settlement systems with DNS (Deferred Net Settlement) mechanisms needs to be stepped up as well. Meanwhile, the increasing volume of investment in foreign securities by Korean investors makes it necessary to strengthen cooperation between domestic and foreign FMIs in order to protect Korean customers' assets in the event of foreign financial institution bankruptcy.

5.2.2 OTC Derivatives Market Infrastructures

In the wake of the global financial crisis, the G-20, the FSB and other key international organisations have been discussing the establishment and improvement of international standards on OTC derivatives markets, in order to ensure their financial integrity and transparency. In September 2009, at the G-20 Pittsburgh Summit, member state heads agreed on a series of measures to improve these markets, including having all standardised OTC derivative products cleared through CCPs and all transaction information reported to the TRs by the end of 2012. In the meantime, for transactions not cleared through the CCPs, higher capital ratios will be required of the institutions involved.

In order to meet these guidelines, it is therefore vital that the government, the financial authorities and market participants actively share information and cooperate with each other to build an OTC derivatives market infrastructure not only in compliance with international standards but also optimally adapted to the financial markets in Korea. The BOK, in its capacity as the oversight organisation for the PSSs, is cooperating actively with the other public and private-sector institutions involved in the building and operation of an OTC derivatives market infrastructure that conforms to the new international standards.

5.3 Stronger BOK Role

The recent global financial turmoil has focused attention on the importance in building up a stable financial system of core financial market infrastructures. In line with this development, it is necessary to strengthen the role of the BOK with regard to its oversight of the PSSs, by revising the BOK Act. The BOK must enhance its role in supporting and developing PSSs in the private sector, as well as in operating and overseeing those systems.

The BOK will cooperate closely with the relevant authorities such as FSC and the Financial Supervisory Service (FSS) to ensure the effective supervision and oversight of Korean FMIs. This cooperation allows the BOK as overseer to call on FMIs to change their behaviour, if necessary.

6. Conclusions

The operation of the Korean PSSs remained smooth in 2009, even in the impact of the global financial crisis. The active supply of liquidity by the BOK contributed to this result. The PSSs did not appear to trigger or aggravate directly our financial unrest and real economic contraction.

The volume of payment and settlement in Korea is continuously growing and the landscape is changing significantly. This is mainly due to the rapid increase in financial transactions with steady expansion of the Korean economy and to the accelerated integration of financial markets at home and abroad. The rapid advancement of information and communication technology has contributed to this result as well. With the wider use of electronic PSSs, and the increasing PSS interconnectivity, systemic risk is growing.

In the meantime, discussion on strengthening central bank's oversight of the PSS is taking place actively. This is based upon recognition since the recent financial crisis experience of advanced countries that design and operation of a sound payment and settlement system is essential for monetary policy and financial stability.

Major countries in the world are currently working toward a tentative goal of enacting the requirements under the PFMIs as recommended by the G-20 and the FSB. Given that the PFMIs are expected to be broadly used going forward as best practice standards for FMI oversight and supervision in international organisations and major countries, Korean FMIs need to make their best efforts to strengthening the protection of investors in Korean and foreign financial products and increasing financial stability.

Considering these circumstances, it is necessary to strengthen the role of the BOK with regard to its oversight of the PSSs. The BOK should enhance its role in supporting and developing PSSs the private sector, as well as in operating and overseeing those systems. The BOK should also cooperate with the other public and private sector institutions in the building and operation of FMIs that conform to the new international standards.

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Chapter 6

THE ROLE OF PAYMENT SYSTEMS IN THE MONETARY AND FINANCIAL STABILITY IN MYANMAR

By
Nwe Ni Tun[1]

1. Introduction

The Payment and Settlement System (PSS) plays a critical role for economic and financial stability. A safe and efficient payment system contributes to the maintenance and promotion of financial stability and economic growth. The effective implementation of monetary policy depends on the orderly settlement of transactions and effective distribution of liquidity. Therefore, payment systems that are functioning properly enhance the stability of the financial system, reduce transaction costs in the economy, promote efficient use of financial resources, improve financial market liquidity and facilitate the conduct of monetary policy.

The central bank has a legitimate and important part in guaranteeing the safety, soundness, efficiency and fairness of the payment system. As the lender of last resort, it is necessary for the central bank to have the information and the means to oversee and, if necessary, assist the institutions participating in the payments system. Given the roles of the central bank and its special responsibilityto avoid systemic risk, any largevalue payment mechanism requires the central bank's particular attention.

Like the rest of the other central banks, the Central Bank of Myanmar (CBM)is in charge of monetary and financial stability and supports the development of the national economy. In accordance with the law, the CBM implements monetary policy to safeguard economic stability and oversee the smooth functioning of the financial system. In this regard, the CBM has a significant role to maintain a safe and sound PSS and to develop the PSS in Myanmar. The CBM also endeavours to promote the efficiency of the payment mechanism. To facilitate the smooth functioning of the payment system, the CBM provides intraday liquidity support (ILS) to the financial institutions that have opened accounts at the Central Bank for a period not exceeding 92 days for the government securities guaranteed by the government.

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The aims of this paper are to assess the PSS standards; identify the key challenges and issues to improve the efficiency of the PSS; identify areas where the PSS directly influence domestic monetary and financial stability; assess the efforts to further develop and improve the PSS; and identify the key areas of cooperation among the SEACEN members.

This paper is organised as follows. Following this introduction,Section 2 describes the background of the economy and the PSS framework. Section 3 reviews the literature on PSSs in relation tomonetary policy and financial stability, followed by the assessment of the current PSS framework in Section 4.Section 5 highlights the policy implications based on the assessment results and offers some suggestions for the improvement of the PSS.The conclusion is presented in Section 6 and includes some of the major challenges forimproving PSSefficiency and some suggestions for PSS promotion in Myanmar in the future.

2. Background of Economy and PS System Framework in Myanmar

2.1 Background of Economy

The Republic of the Union of Myanmar has formulatedits short-term five-year development plan,now in its second year of implementation. This plan spans the Financial Year (FY) 2011-2012 to FY 2015-2016, and purposes to achieve more balanced development through economic reforms and sustainable economic growth.

The new government which was elected by the people in accordance with the State constitution in March 2011, intiated reform measures in the economic and financial areas with a view of improving the country's macroeconomic framework. Some relevant laws and procedures have been enacted and some existing laws and procedures amended.

One of the important macroeconomic policy reform measures is the unification of the exchange rate and the lifting of exchange restrictions on international transactions. Myanmar changed it official exchange rates to a managed floating exchange rate with effect from 1st April, 2012. Under this exchange rate regime, the external value of the national currency, the Myanmar kyat, is determined by the supply and demand conditions in the exchange market. The official exchange rate, which has been pegged since 1977 at the level of 8.50847 kyats to SDR with a market determined exchange rate, is the first step toward unifying the various exchange rates. In all these areas, the CBM, domestic and relevant international agencies are working together to establish the smooth operation of the exchange rate regime.

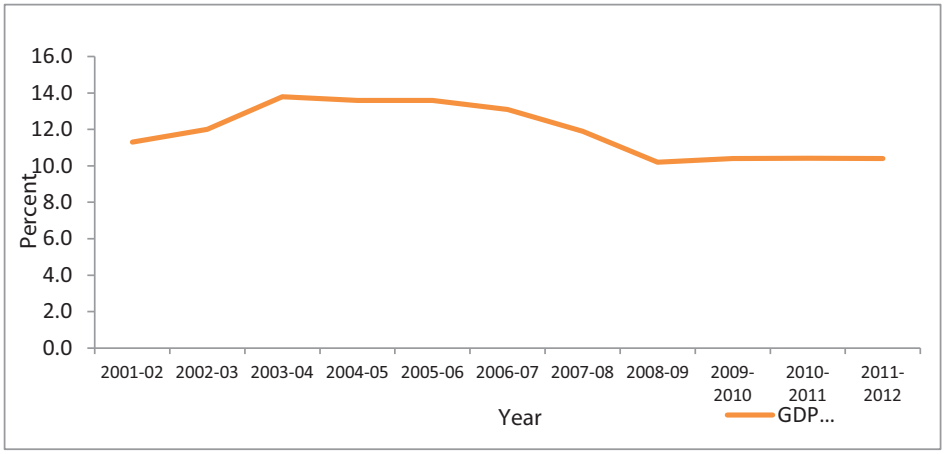
Regarding the reforms in financial sector, the CBM has issued money changer licences to six private banks starting from September, 2011.The Money Changer Licensed banks can buy or sell foreign exchange within the band of reference rate which is determined by the CBM. At the end of May, there are 66 money changer counters. On November 25, 2011, the CBM has issued to Authorised Dealers Licences to 11 private banks to engage in the foreign banking business.

During the FY 2010-2011, the value of exports increased by 28.06% as compared to the previous year, mainly due to increase in natural gas, pulses and beans, marine product, garments, teak, hardwood, rice and rice products. During the reporting period, the value of imports increased by 56.52% compared to the previous year.

During the FY 2010-2011, the overall balance of payment position continued to be positive, due mainly to the significant rise in the trade surplus. With the increase in exports earnings and other capital inflows, gross international reserves at the end of March 2011, are sufficient to cover about 13.1 months of imports.

In the FY 2010-2011, the real Gross Domestic Product (GDP) rate increased 10.42% over the previous year (Figure 1).

Figure 1
Real GDP Growth Rate



Source: Statistical Year Book, Myanmar.

During FY 2010-2011, agriculture, livestock, fishery and forestry sectors were the main contributors to GDP with the share of 37.84%, followed by 37.89% by services and other sectors, and 24.27% by the industrial sector.

The inflation rate as measured by the Consumer Price Index (CPI) decreased significantly from 2.40% in FY 2009-2010 to 8.22% in FY 2010-2011. This was due to prudent fiscal and monetary policies.

2.2 Monetary Policyand Financial Stability in Myanmar

2.2.1 Monetary Policy

The main objectives of monetary policy in Myanmar are to maintain macroeconomic stability and promote domestic savings. Currently, the CBM uses interest rate policy as its main monetary policy instrument while using reserve requirements and open market operations to a certain extent.

The Central Bank rate, as at March 2011, was 12.00% per annum and the maximum interest rate for bank deposit and maximum interest rate for bank lending were at 12.00% and 17.00% per annum, respectively.

As an indirect instrument of monetary control, the CBM, on behalf of the government, has issued 2-year, 3-year and 5-year government Treasury bonds. The interest rate of treasury bonds are 8.75 %, 9.0 %, and 9.5%, respectively.

2.2.2 Financial Sector Development in Myanmar

The financial sector plays an important role in the development of the country's economy. The Myanmar government is trying to improvefinancial sector development to support the changing needs of the economy. The financial sector in Myanmar consists essentially of the banking sector and the non-banking sector comprising insurance business, finance companies and small-loan enterprises.

2.2.3 Banking System in Myanmar

At present, the banking sector in Myanmar consists of the CBM, four state-owned banks, and 19 private banks. The state-owned banks include the Myanma Economic Bank (MEB), Myanmar Foreign Trade Bank (MFTB), Myanma Investment and Commercial Bank (MICB) and Myanma Agricultural Development Bank (MADB).

At present, the foreign banks have been permitted to open representative offices in Myanmar. As at end of May 2012, there are 16 foreign bankrepresentative offices in Myanmar.

2.2.4 Non-bank Financial Institutions

In the non-banking financial sector, there is one state-owned finance company, the Myanma Small Loan Supervisory Enterprise (MSLSE); one private finance company, the Myanmar Oriental Leasing Co., Ltd. (MOLC); one state-owned insurance enterprise, the Myanma Insurance (MI); one private insurance company, the Myanmar International Insurance Company (MIIC) ; and four foreign insurance companies' representative offices.

2.2.5 Supervisory and Regulatory Framework in Myanmar

The CBM takes over the functions for monetary stability and financial sector stability under the Central Bank of Myanmar Law 1990. For the management of financial stability, the Central Bank uses the CAMEL framework which looks at the six major aspects of a financial institution. The CAMELframework is simple and effective supervisory framework consisting of these components:

C - Capital Adequacy;

A - Asset Quality;

M - Management Soundness;

E - Earnings;

L - Liquidity; and

S - Sensitivity to Market Risk

The Banking Supervision Department (BSD) of the CBM undertakes off-site monitoring and on-site examination of banks. The CBM takes regulatory action on the operations of banks by applying the following provisions:

1. 10% of total deposits is required to be maintained by each bank as the minimum reserve requirement. 75% of the required reserve is to be deposited with the Central Bank and 25% of the reserve may be maintained in the form of cash.
2. The required reserve for a bank to be maintained with the Central Bank must not exceed 35% of the total liabilities of the bank. However, in the

event of serious inflationary pressure, the Central Bank may increase the 35% ceiling requirement.

3. Banks are required to maintain the level of their liquid assets against their eligible liabilities at not less than 20%.
4. The risk weighted assets of a bank shall not exceed ten times the combined total of its capital and reserves.
5. The banks must inform the CBM about their reserve position and liquidity ratio on a weekly basis and report on their capital adequacy ratio on a monthly basis.
6. The banks are taking appropriate measures to cover the loans as much as possible and the CBM is also giving them instructions and guidance in order to take necessary steps.
7. All banks are required to build up and maintain a general provision account amounting to at least 2% of total outstanding loans and advances at the end of the year.They are also required to maintain specific provision for doubtful and/or bad loans on a case-by-case basis.
8. Also, according to the financial Institutions of Myanmar Law, a bank cannot lend more than 20% of its capital plus reserves to a single individual, an enterprise of an economic group.

2.2.6 Current Banking Regulatory and Supervisory Measures

In order to reinforce the regulatory and supervisory framework on anti-money laundering, the Central Bank issued a series of instructions and guidelines on bank inspection for compliance with the AML/CFT requirements pursuant to the Control of Money Laundering Law and Rules enacted in June 2002 and December 2003, respectively.

The CBM has examined all the domestic private banks based on the AML/CFT requirements in conjunction with its regular on-site inspection which is conducted applying a special audit programme for the state-owned banks for compliance with the AML/CFT rules and regulation since September 2004.

Under the guidance of the Central Supervision Committee (CSC) led by the Minister for Ministry of Finance and Revenue, the CBM is continuously strengthening the supervisory and regulatory controls as well as taking the necessary actions. The CBM also monitors closely the bank activities and encourages the banks to be in compliance with the international standards and norms.

2.3 Payment and Settlement System Infrastructure

2.3.1 Payment and Settlement Systems in Myanmar

The CBM is responsible for the development and oversight of the national payment system that it is efficient, fast, safe and reliable.

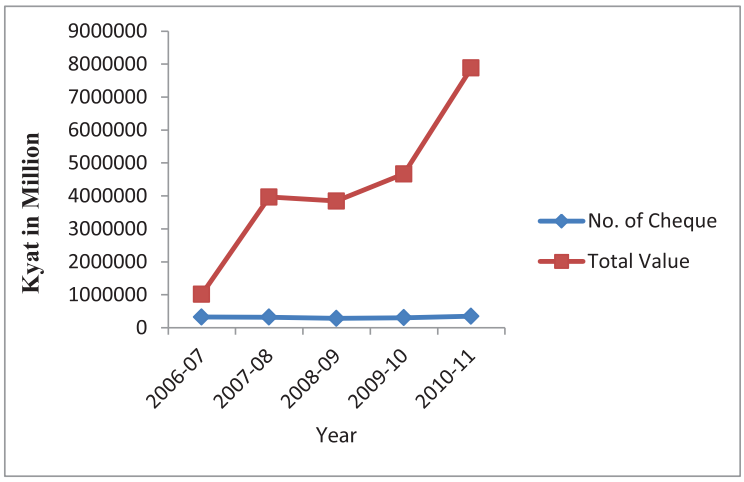
2.3.2 Large Value Payment System

The PSSs have not seen much development in Myanmar up to as late as 2012. Only two clearing and settlement mechanisms are relevant to the operations of the financial institutions for the large-value payments, notably the paper-based cheque clearing house and electronic fund transfer system.

2.3.3 Cheque Clearing Houses

At present the paper-basedcheque clearing system does not cover the whole country. The CBM operates three manual clearing houses at Nay Pyi Taw (Head Office), Yangon and Mandalay. All state-owned banks and private banks are eligible to participate as clearing members. The clearing members in Nay Pyi Taw (Head Office), Yangon Branch and Mandalay Branch are 15, 56 and 22, respectively. The CBM issues the daily balance positions of the banks with CBM and all the banks carry out final settlement (net settlement) at the end of the day. During 2006-07 to 2010-2011, the total value of transactions settled through the clearing house averaged about nine times Myanmar's Gross Domestic Product.

Figure 2
Clearing House Settlement by Value and Volume



Source: Annual Reports of the Central Bank of Myanmar.

2.3.4 The Electronic Fund Transfer

The Electronic Fund Transfer (EFT) was introduced in December, 2011 allowing banks to make largevalue fund transfers through EFT. It is operated by the CBM. All state-owned banks and private banks can access this system. All participating banks can transmit payment instructions rapidly and these payments are settled almost in real time.

2.3.5 Retail Payment System

The retail payment system includes systems that process small-value payments, such as cash, cherub, payment order and debit cards. Table 1 shows a summary of the retail payment systems operating in Myanmar. For retail payment system, cash remains an important payment method.

In order to reduce the currency in circulation within the country and the problem of handling large denomination currencies, the CBM launched a new payment instrument in the form of certified cheque to enhance public confidence in making payments by cheque.

Regarding retail payments, the Myanmar Payment Union (MPU) which was formed in November 15, 2011, under the guidance and supervision of the

Myanmar Payment System Development Committee (MPSDC), issues the MPUCard, adebit card, which can be used in all sectorsof thebanking network.

The MPU membership consists of 3 state-owned banks and 14 domestic private banks. All MPU members contribute equal sharesto the capital of MPU. For the initial stage, the MPU cards can be used in the major cities of Yangon, Nay Pyi Taw and Mandalay. One MPU member, a state-owned bank, performs the settlement service for MPU cards.

Table 1
Classification of Retail Payment and Settlement Systems (RPSS) in Myanmar

Sr.	Main Payment Instruments	Service Providers	Users	Purpose
1	Cash	Central Bank, Commercial Banks and Private Banks	Consumers	Personal Expense
2	Cheque	Central Bank, Commercial Banks and Private Banks	Enterprises	Payment
3	Certified cheque	Commercial Banks and Private Banks	Customers	Payment
4	Payment Order	Central Bank, Commercial Banks	Government Organisation and enterprise	Payment
5	Debit Card, ATM Card	MPU	Customers	Personal Expenses and Payment

Source: Author's Compilation.

2.3.6 General Legal Aspects

One of the objectives of the CBM is to promote efficient payment mechanisms and the liquidity, solvency and operation of a sound financial system in Myanmar.

Although the Payment System Law has not been enacted, the CBM Law covers the smooth functioning of the payment mechanism in Myanmar. The CBM issues regulations covering the clearing business and clearing settlement to the clearing houses; and regulations covering payments by electronic card to the financial institutions.

2.3.7 Oversight of Payment and Settlement Systems

The CBM sets the limit on the credit line that the banks may grant to borrow from the Central Bank. The credit line may not exceed the total amount of free treasury bonds that the banks hold.

The failure of one participant to manage its intraday liquidity effectively may result in its inability to meet its payment obligations within the expected timeline, thereby affecting its own liquidity position and that of other participants. The recent global financial turmoil highlighted how quickly interbank liquidity can dry up, underscoring the paramount importance of effective liquidity risk management, both at the system level as well as by the individual participants, in view of the systemic repercussions of a liquidity shortfall of a single institution[2].

The CBM law provides for liquidity support to the banks for maintenance of a smooth payment system in Myanmar. The CBM is responsibile for ensuring prompt payment settlement and provides ICF facility to the banks to cover any fund shortage for them to settle their clearing positions.

2. Malaysia Financial Stability Report, 2011.

Table 1
Financial Market Infrastructure in Myanmar

Types of Payment System	Mechanism	Operator
Large-value Payment and Settlement System	- EFT	CBM
	- Cheque Clearing House	CBM
Retail Payment and Settlement System	- Cash	Commercial banks and private banks
	- Cheque	Commercial banks and private banks
	- Payment Order	Commercial banks and private banks
	- Certified Cheque	Commercial banks and private banks
	- Debit Card	MPU
	- ATM	MPU
Securities[3] Settlement System	- Cash	Underwriters[4]
	- Transfer	CBM

Source: Author's Compilation.

2.4 Importance of PSS in Supporting Economic Development

It is important for all the economic sectors to be developed, especially trade, services, hotel and tourism, and the banking, to stimulate the development of the Myanmar economy. Safe, efficient and reliable payment systems are required to support the development of these sectors. The MPSDC and MPU were established to coordinate the development and promotion of a sound PSS.

3. Securities include government Treasury bonds issued by the CBM on behalf of the government.
4. Underwriters include the MEB and the Myanmar Securities Exchange Centre.

2.5 Development of Payment Systems

2.5.1 Myanmar Bankers' Association

The Myanmar Bankers' Association (MBA) was formed in 2007 with the aim of developing the banking sector and financial system. It is chaired by the Minister of Ministry of Finance and Revenue and includes the Governors of the CBM, state-owned banks and private banks. Under the guidance of the MBA, many committees are formed to perform specific duties relating to the development of the banking and financial sectors.

2.5.2 Banking Network Committee

The Banking Network Committee (BNC) was formed on September 29, 2007 to developthe payment mechanism in Myanmar. At present, the BNC is launching the fund transfers among the financial institutions using online system.

2.5.3 Myanmar Payment System Development Committee

The MPSDC was formed in 2008 in order to develop the payment mechanism in Myanmar. The Committee has also set up the Electronic Fund Transfer (EFT) which banks can use to make fund transfers.

2.5.4 Myanmar Payment Union

Under the guidance and supervision of the MPSDC, the MPU was formed in November 15, 2011 to issue the Myanmar Payment Union Card which can be used in all sectors covered by the Banking Network.

2.6 Regional Payment Systems

The Asian Clearing Union (ACU) was established at the initiative of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). The Draft Agreement establishing the ACUwas finalised at a meeting of senior officials of the governments and central banks held at ESCAP, Bangkok, in December 1974 after five central banks (India, Iran, Nepal, Pakistan, and Sri Lanka) signed the Agreement. Bangladesh and Myanmar were the sixth and seventh signatories to this Agreement. Bhutan and Maldives signed the Agreement in 1999 and 2009, respectively. At present, there are nine member

countries, consisting of Bangladesh, Bhutan, India, Iran, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka.

The ACU began its operations by the first week of November 1975. The secretariat office is located in Tehran, Iran. Myanmar formally applied for membership in November 1976 and became a member of the ACU on January 13, 1977. Participation in the ACU shall be opened to the Central Bank or Monetary Authority of each regional member or associate member of ESCAP.

The CBM has appointed the MFTB, MI and MEB for the purpose of making the payments to be made through the clearing facility.

2.6.1 Purposes

The ACU seeks to achieve four basic objectives for its participating member countries: (1)Provide a facility to settle on a multilateral basis, payments for current international transactions among the territories of the participants; (2)Promote the use of participants' currencies in current transactions between their respective territories, thereby encouraging the use of the participants' exchange reserves; (3)Promote monetary co-operation among the participants and better integration between the banking systems intheir territories, thereby contributing to the expansion of trade and economic activity among countries in the ESCAP region; and (4)Provide for currency swap arrangement among the participants so as to make Asian Monetary Unitsavailable to them temporarily.

2.6.2 Operations

The accounts of the ACU are maintained using a common currency designated as Asian Monetary Units (AMUs). The value of one AMU is, with effect from 1 January, 1996, equivalent to one US dollar. The AMU is denominated as the ACU Dollar. Upon approval of the 37th ACU BOD Meeting, the AMUs are denominated as ACU dollar and ACU euro, which are equivalent in value to one US dollar and one Euro, respectively, with effect from January 1, 2009.

2.6.3 Settlement of Balances

Settlement shall be made of the net positions and accrued interest at the end of each two monthly settlement period. The Secretary-General

notifies each participant of its net position, including accrued interest, and of the amount it shall pay to, or receive from the other participants at the end of each settlement period. Each debtor shall make the payments within four working days of receipt of notification from the Secretary-General. Settlements with members countries of the ACU are made in ACU dollar or ACU euro through the ACU Mechanism. Payment may be made in the currency of the creditor subject to specific consent. Starting from the settlement period at the end of August, 2003, the CBM has been making settlement in euro with ACU member's central banks.

2.6.4 Currency Swap Arrangement

Any participant in net deficit at the end of a settlement period is eligible to avail the facility. Every eligible participant is entitled to the facility from every other participant up to 20% of the gross payments made by it through the ACU mechanism to other participants during the three previous calendar year. The rate of interest chargeable on each draw is equal to US dollar or euro LIMEAN derived from the respective two months LIBOR declared by the British Bankers' Association, applicable for the concerned value date. A participant may draw under the swap arrangement for a period of two months at a time.

2.6.5 Myanmar's Trade with ACU Member Countries

Myanmar exports beans, timber, ply wood, betel nuts, dry ginger, natural rubber latex and other commodities to ACU member countries. Myanmar imports bicycles, parts for tractor, medicine and other commodities form the ACU member countries.

3. Theoretical and Conceptual Basis of PSS to Money, Monetary Policy and Financial Stability

3.1 Definition of Payment and Settlement Systems

The term payment system has a range of meanings. The PSS is "a set of arrangements including instruments, organisations, operating procedures, information and communication system that serve to initiate and transmit payments from payers to payeesand to settle payments or transfer of money."[5]

5. BIS CPSS.

A payment system is generally categorised as either a retail payment system (RPS) or a largevalue payment system (LVPS). A RPS is a fund transfer system that typically handles a large volume or relatively lowvalue payments in such forms as cheques, credit transfers, direct debits and card payment transactions. RPSs may be operated either by the private sector or by the public sector, using a multilateral deferred net settlement (DNS) or a real-time gross settlement (RTGS) mechanism.

A LVPS is a fund transfer system that typically handles large-value and high-priority payments. In contract to retail systems, many LVPSs are operated by central banks, using RTGS or equivalent mechanism.

The payment systems usually addresses the major risks connected with the payment systems. The most important risks are the following;

(1) Systemic risk

(2) Credit risk

(3) Liquidity risk

(4) Counterparty risk

(5) Legal risk

(6) Operational risk

3.2 Theoretical and Conceptual Basis of PSS to Money and Monetary Policy

Humphrey (1995) states that "the relationship between money supply and economic activity is expressed in the well known relationship MV = PT". The money supply (M) times its velocity (V) is equal to the price level (P) times the number of transactions (T)." [6]

PT represents some aggregate level of economic activity, such as GNP. The efficiency of the payments system is reflected in the money turnover rate, which indicates how many times money supply has to be re-used 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 a shorter time to be cleared and settled before the

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6. Humphrey D.B, (1995), "Payment Systems: Principles, Practice and Improvement," ***World Bank Technical Paper,*** No.260.

funds being transferred can be re-used to finance another payment. Consequently, improvements in the efficiency of the payment system would permit a country to reduce its domestic money supply, assuming that economic growth and other things remain constant. Holding PT (or GNP) constant, an increase in payment system efficiency raises velocity (V) allowing money supply (M) to be reduced in the absence of economic growth to support the same level of economic activity.

Therefore, the payment system links economic activity and money. The efficiency with which money is used is largely determined by the efficiency of the payment system. In this regard, the float that normally results from payment processing inefficiencies as well as malfunctions in the clearing and settlement process, can affect monetary policy.

3.3 Role of Central Banks in Payment and Settlement Systems

Listfield and Negret (1994) state that "the central bank has a legitimate and important role in guaranteeing the safety, soundness, efficiency and fairness of the payment system. The central banks as the lender of last resort much have the information and the means to oversee and, if necessary, assist the institutions participating in the payments system. Given the central bank roles and special responsibility to avoid systemic risk, any large-value payment mechanism requires the central bank's particular attention."[7]

Destruction 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 systems. 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 the financial markets. Such policies are necessary to help avoid financial crises from arising, payment institutions and systems will provide stability. Furthermore, central banks should establish designs and operations for public and private sector arrangement that can 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 can focus on the enhancement of the payment system. It can reduce uncertainty and risk, and provide the needed clarity.

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7. Listfield R., Negret F. M.., (1994),"Modernising Payment System in Emerging Economics," ***World Bank Policy Research Working Paper*** 1336.

3.4 Payment Systems and Financial Stability

Padoa-Schioppa (2002) contends that "financial stability is a condition where the financial system is able to withstand shocks without giving way to cumulative processes, which impair the allocation of savings for investment opportunities and the processing of payments in the economy"[8]. The payment services are important because, like disruptions to the intermediation function, disturbances to the payment system have the capacity to inflict adverse effects on the level of economic activity.

3.5 Payment Systems, Monetary Policy and Financial Stability

Gertude Tumpel Gugerell mention that"central banks all round the world are involved in payment systems and market infrastructures in many different ways owing to their roles and responsibilities in relation to monetary policy and financial stability. Payment system disruption would not only affect financial stability, but may potentially also have an impact on monetary policy implementation. Central banks have found ways of safeguarding price stability while at the same time ensuring the smooth functioning of the payment system, by drawing a clear line between providing intraday liquidity for payment system purposes and providing credit for monetary policy implementation. Moreover, the sufficient availability of collateral is important today as a contribution of central banks to financial stability."[9]

The stability of the financial system is also dependent on the assumption of ample market liquidity and most critically of the smooth functioning of the payment system and market infrastructures.

3.6 Liquidity Shortage Problem: Myanmar Case

In early 2003, Myanmar suffered a servere banking and financial crisis. It was caused by the collapse of a succession of informal finance schemes in late 2002, the crisis spreaded quickly to the country's emerging private banking sectors.

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8. Padoa-Schioppa, Tommaso (2002), "The Transformation of the EuropeanFinancial System," Policy Panel Introductory Paper Presented at Second ECB Banking Conference, Frankfurt Am Main, 24 - 25 October.
9. Gertude Tumpel Gugerell,(2007), Opening Remarks at the ECB- Bank of England Conference, 12-13 November.

The informal finance firms gave high interest rate on deposits in order to attract investors. In the case of Myanmar's informal finance sector, they were at best a function of highly speculative investments in the real estate, construction and commodity trading. The informal finance sectors were not authorised as deposit-taking institutions under the financial institution of Myanmar Law, and as such could not legally accept deposits. The collapse of the informal finance companies brought about direct losses for at least some of the authorised banks.

The liquidity shortage which surfaced as the result of the crisis, caused instability in the banking system and affected financial stability.However, the CBM managed to resolve thefinancial crisis by carrying out its lender-of-last-resort function. The CBM provided liquidity support to the troubled banks with the aims of preventing the collapse of the banking system and of maintaining the payment system.

4. Assessment of Current PSS Framework

4.1 Financial Market Infrastructure

The Financial Market Infrastructure (FMI) is defined as a multilateral system among participating institutions including the operators of the system, used for the purposes of clearing, setting or recording payments, securities, derivatives, or other financial transactions. It is important that FMIs be safe and efficient and allow for the reliable transfer of funds and securities between the central bank, its counterparties and the other participants in the financial system so that the effect of the monetary policy transactions can be spread widely and quickly throughout the economy[10].

Principles for FMIs are principles which consist of standards for systemically important payment systems (SIPSs), central securities depositories (CSD), securities settlement systems (SSS), central counterparties (CCP) and trade repositories (TR), (collectively "FMIs"), which have been introduced by the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organisation of Securities Commissions (IOSCO).

FMIs typically establish a set of common rules and procedures for all participants, a technical infrastructure, and a specialised risk-management framework appropriate to the risks they incur.

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10. Principles for the Financial Market Infrastructures, BIS, April 2012.

4.2 Assessment of Current PSS Framework[11]

This section covers the assessment of the current PSS framework in Myanmar by the author. In Myanmar, the cheque clearing system (CCS) is a systemically important payment system. Our CCS will assessed based on the relevant principles of the 24 principles prescribed for FMIs. All the state-owned banks and private banks are eligible to participate as clearing members. Therefore, we will use the term‘participants’ to refer to ‘clearing house members’in this paper.

Principle 1: Legal Basis

A FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

There is no specific legislation for payment systems in Myanmar. However, the legal basis for the clearing house and fund transfers are covered by the following laws, act and instructions. The laws that are important for the payment systems are:

- The Central Bank of Myanmar Law (1990) which defines the aims, duties and functions of the CBM.
- The Financial Institution of Myanmar Law (1990) regulates the establishment and operations of financial institutions.
- The Control of Money Laundering Law (CMLL),
- The regulatory guidelines and instructions to enforce the CMLL, 2002, issued bythe CBM, cover the compliance of CDD (Customer Due Diligence), record keeping and STR(***Suspicious Transaction Reports)*** and CTR(***Currency Transaction Report)***reporting requirement.
- The negotiable Instruments Act covers the negotiable instruments under the Negotiable Instruments Act of 1881.
- Instruction for the Electronic Payment Card (2/2012) issued by the CBM covers the payments for all electronic cards.

11. The PSSs in Myanmar have not been assessed by any organisations until now, and this assessment by the author is carried out in line with the current law, procedures and rules relating to the PSS.

Principle 2: Governance

A FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

According to the CBM Law 1990, the Board of Directors (Policy Board) comprises of eight members and supervises the policy matters of the CBM. The Board consists of the Governor, six members appointed by the government and a secretary. The Governor serves as chief executive officer of the Central Bank and the Board is responsible for the day-to-day management of the Central Bank and the implementation of the policy.

The Head of Payment and Settlement System Department (PSSD) supervises the daily operation and smooth functioning of the PSS. The other senior management level and middle level managers take charge of the daily operation of the the cheque clearing house and fund transfer function.

The participants of the clearing members are requireded to open their current accounts with the CBM for their daily cheque clearing operation. They are also required to deposit enough balance for their operations.

Principle 3: Framework for Comprehensive Management of Risks

A FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operations, and other risks.

For the PSSs, there may be found the risks like legal, credit, liquidity, operations, and other risks.

The CBM issue the instructions regarding the daily operations for the clearing house, liquidity support for the daily operation, collateral arrangement and credit problem to mitigate the risk management. It covers the credit risk management, liquidity risk management and collateral. The authorities of the PSSD review the procedures of risk management to be in line with the current economic situation.

The team of PSSD monitors the balance amount of current accounts of the participantswith the CBM, the credit line for collateral for their daily operation and liquidity.

Principle 4: Credit Risk

AFMI should clearly measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. A FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that has activities with a more complex risk profile or that is systemically important in multiple jusdictions should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme, but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions.

The participants of the cheque clearing house perform settlements for their cheque clearing using their balances at the central bank.They are allowed access to intraday credit extended against collateral. The CBM may lend to the banks that have opened accounts at the CBM for a period not exceeding 92 days secured by government securities as collateral in accordance with the CBM Law. The CBM controls the credit risk since the current accounts cannot be overdrawn.

Principle 5: Collateral

A FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks. A FMI should also set and enforce appropriately conservative haircuts and concentration limits.

In order to mitigate the credit risk and liquidity risk, the CBM provides its participants access to theILF with collateral. In order to tender the collateral for their daily liquidity positions, the following procedures must be followed:

- The banks need to open their accounts at the CBM.
- If the banks face a daily liquidity problem, they can borrow money from the the CBM by pledging government Treasury bonds which are bought from the CBM as collateral.
- 10% of total deposits is required to be maintained by each bank as the minimum reserve requirement, with 75% at CBM and 25% in the form of cash. If there is sufficient funds in the current accounts with CBM, banks can purchase Government treasury bonds or free bonds. These bonds can be used as collaterals for daily settlements. The amount of collateral of the banks should not exceed free bonds.
- If the participants want to get the collateral from the CBM, the participants must apply the following procedures:
  - o First, the participants must apply to the head of PSSD regarding the amount of advance.
  - o The relevant official of PSSD checks the amount of Treasury bonds which are bought from the CBM and the approval of the credit line.
  - o When they meet our requirements, the CBM lends the money and transfers the money to their accounts with the CBM.
  - o The CBM gives advance to the participants according to their need for credit and liquidity.
- First, the participants must apply to the head of PSSDregarding the amount of advance.
- The relevant official of PSSD checks the amount of Treasury bonds which are bought from the CBM and the approval of the credit line.
- When they meet our requirements, the CBM lends the money and transfersthe money to their accounts with the CBM.

The CBM gives advance to the participants according to their need for credit and liquidity.

Principle 7: Liquidity Risk

A FMI should effectively measure, monitor, and manage its liquidity risk. A FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limiteded to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.

The CBM Law provides the liquidity support for the banks to maintain a smooth payment system in Myanmar. The CBM has the responsiblitiy for overseeing prompt payment settlement and for responding to any eventuality of banks failing to settle their clearing due to lack of fundsin their accounts with the CBM, by providing them ICF.

In the cheque clearing system, all the transactions that coursed through the CCH are in kyats.

Principle 8: Settlement Finality

A FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, a FMI should provide final settlement intraday or in real time.

The operating hours of clearing house is from 12:00 noon – 3:00 p.m. At the manual clearing house, the participants can settle the debit and credit of the payments and receipts availing of the funds in the current account with CBM within operating hours. According to the instructions issued by the CBM for the clearing house, the members of clearing house perform daily clearing operations. The current manual clearing system provides for final settlement at the end of the day.

The CBM issues separate instruction for the transfer of fund and discharge of payment for the government Treasury bonds. For the fund transfer, the concerned participants inform the CBM of the fund transfer. The officer-in-charge in CBM verifies the signatures, signing authority of the persons and the account balance of the participant. If the requirements are in order, the payment transaction is executed and the amount is credited to the beneficiary bank on the value date.

Principle 9: Money Settlement

A FMI should conduct its money settlements in central bank money, where practical and available. If central bank money in not used, a FMI should minimise and strictly control the credit and liquidity risks arising from the use of commercial bank money.

All the participants must open a current account with the CBM for their daily operations. Therefore, the settlement money of the participants is in money of the CBM.

Principle 12: Exchange of Value Settlement System

If a FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminateprincipal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

As Myanmar does not introduce the system of DvP and PvP, Myanmar does not face principal risk by conditioning the final settlement of one obligation upon the final settlementof the other.

Principle 13: Participant-default Rules and Procedures

A FMI should have effectively and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designated to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet it obligations.

The instruction of the clearing house includes the default of settlement of participants. If a participant cannot cover its settlement position, the officer-in-charge of the clearing house informs to the authorised personnel of the participant bank to remedy the situation. The participant can utilise such methods as discount window facility to fund its account with the CBM.

Principle 15: General Business Risk

A FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

In order to participate in the clearingsystem, participants are required to open their accounts with CBM.

Principle 16: Custody and Investment Risks

A FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. A FMI's investment should be in instruments with minimal credit, market, and liquidity risks.

The cheque clearing system is for the settlement of the participants and the participants' accounts are maintained for daily operation.

Principle 17: Operational Risk

AFMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.

The CBM has not drawn upa business continuity plan as yet. At thecurrent Manual Clearing System, the interbank credit transfer process performed is a paper-based system. For operational risk management, the CBM keeps the back-up data for the daily clearing and settlement operations in electronic form.

The CBM has trained, educated and experienced staff to run the daily operations.The operational procedures, records and data are audited by the

external auditor from the the Accountancy Office. The audit department, one of the department of the CBM, also examines the operation of the PSS.

Principle 18: Access and Participation Requirements

A FMI should have objective, risk-based and publicly disclosured criteria for participation, which permit fair and open access.

The CBM issued the instruction for the clearing house. It includes the participation and designation of the clearing house, operational procedures, mechanism of clearing house, and miscellaneous. The membership of clearing house includes the state-owned banks and private banks. If a banks desires to participate in the clearing house, it is required to submitan application 14 days in advance.

Principle 19: Tiered Participant Agreements

A FMI should identify, monitor, and manage the material risks to the FMI arising from tired participation arrangements.

The clearing house members are state-owned commercial banks and private banks and they are mostly direct participants.

Principle 21: Efficiency and Effectiveness

A FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

The current settlement system is a net settlement system and manual clearing system. The current clearing system can fulfill the requirements of all its participants in line with the country's economy and market demand.

Principle 22: Communication Procedures and Standards

A FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedure and standards in order to facilitate efficient payment, clearing, settlement, and recording.

For the clearing house, the CBM issues instructions and guidelines to all the banks. The CBM uses the standardised messaging formats for them. All the

representatives of the participating banks must submit the form which includes the chequesforcollection and payment.

Principle 23: Disclosure of Rules, Key Procedures and Market Data

A FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees and other material costs they incur by participating in the FMI. All the relevant rules and key procedures should be publicly disclosed.

The CBM issues instructions and guidelines for the clearing house and provides them to all the participating banks.

4.3 Findings Assessment of Payment and Settlement System

From the assessment, it is observed that the PSS in Myanmar is broadly in compliance with the applicable CPSS principles for FMIs. CBM is endeavoring to develop its payment system in accordance with its objectives stipulated by the CBM Law. However, the CBM Law should include a more comprehensive legal framework to regulate payment systems. Much work remains for Myanmar to develop the payment system law, procedures of the oversight payment system, default-rules, crisis management and designated parties responsible for handling crisis situations.

4.4 Responsibilities of Central Banks, Market Regulators, and Other Relevant Authorities for FMI

Responsibility A: Regulation, Supervision, and Oversight of FMIs
FMIs should be subject to appropriate and effective regulation, supervision, and oversight by a central bank, market regulator, or other relevant authority.

Responsibility B: Regulatory, Supervisory, and Oversight Powers and Resources
Central banks, market regulators, and other relevant authorities should have the powers and resources to carry out effectively their responsibilities in regulating, supervising, and overseeing FMIs.

Responsibility C: Disclosure of Policies with Respect to FMIs
Central banks, market regulators, and other relevant authorities should clearly define and disclose their regulatory, supervisory, and oversight policies with respect to FMIs.

Responsibility D: Application of the Principles for FMIs
Central banks, market regulators, and other relevant authorities should adopt the CPSS-IOSCO Principles for financial market infrastructures and apply them consistently.

Responsibility E: Cooperation with Other Authorities
Central banks, market regulators, and other relevant authorities should cooperate with each other, both domestically and internationally, as appropriate, in promoting the safety and efficiency of FMIs.

4.5 Role of CBM in Payment and Settlement Systems

Like other central banks, the main functions and duties of the CBM are acting as the sole issuer of the domestic currency, banker to the government, formulating and implementing monetary policy and exchange rate policy, banker for the financial institutions and managing the international reserve of the state. While implementing these objectives in accordance with the CBM Law, the CBM is endeavoring to promote an effective payment mechanism. The CBM is performing as operator, overseer and regulator of the payment system.In doing so, the CBM is coordinating with the national payment system development committee (NPSDC) and other regional payment system in promoting the safety and efficiency of FMIs.

5. Policy Implications

According to the result of the author's assessment of the FMIs for the PSS, the following issues can be surmised:

(1) In Myanmar, the payment system law has not yet been enacted. The payment system issues are covered in the CBM Law and the Financial Instruction of Myanmar Law. The legal basis for the payment system appears to be sound.

(2) At present the cheque clearing system is a paper-based manual system and not in real time. Cheque clearing service is not available nation-wide. The clearing houses are in three places, namely, Nay Pyi Taw, Yangon, and Mandalay. To speed up the collection of cheques, an Automated Clearing House (ACH) should be introduced.

(3) In order to reduce the waiting period for payment transactions and lower the settlement risk and credit risk, RTGS should be introduced.

(4) Myanmar is a cash-based society and the public need to be educated on the use of the cheque, cards and other electronic payments for the development of the payment system.

(5) Myanmar needs to develop the procedures for the oversight of the payment system, default rules and procedures, crisis management and assign the party(s) responsible for handlinga crisis situation.

(6) For the development of the retail payment system, Myanmar needs to develop credit cards and other developed payment methods instead of payment by cash.

6. Conclusion

It is important for Myanmar to have a safe and effective payment system for the country to maintain the stability of its financial system and to facilitate economic development. The Central Bank, as operator, regulator and overseer of the PSS, has an essential role to play in contributing to the development of a safe and effective PSS.

In Myanmar, the CBM is endeavoring to develop its payment system in accordance with its objectives as stipulated by the CBM Law. However, the CBM Law should provide more transparency and bettercoverage of the CBM objectives in the area of payment systems.

Moving forward, Myanmar should adopt a roadmap for the development of its clearing system incorporating the ACH, RTGS for large-payment values and enactment of the PSS law. Myanmar also needs to address the development of a retail payment system promoting the usage of card payments, mobile payments and mobile banking.

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Appendix

Table 1
Currency in Circulation

Year	Currency in Circulation (USD million)	Value per inhabitant (USD)	Value as a % of GDP	Value as a % of narrow money
2007-2008	567996.15	0.01	2.5	18.43
2008-2009	581763.45	0.01	2.0	16.20
2009-2010	742293.51	0.01	2.2	15.92
2010-2011	967880.93	0.02		16.38
2011-2012	1124087.41	0.02	2.5	16.72

Table 2
Clearing House Turnover

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Nominal GDP (in million Kyat)	16,852,758	2,3336,113	29,233,288	33,894,039	39,846,694	4,4278,875
Value of Clearing House Transactions (in million Kyat)	1,015,458.18	3,964,792.09	3,844,132.08	4,668,801.86	7,881,349.36	-
Clearing House Turnovers	16.60	5.89	7.6	7.26	5.05	-

Table 3
Basic Statistical Data

	2007-08	2008-09	2009-10	2010-11	2011-12
Nominal GDP (in million USD using FX Rate Average)	4362300.77	5039230.17	5929969.81	7379017.41	8199791.67
Population (in millions)	47.76	48.14	53.41	53.49	54.58
Exchange rate (Average)	5.2	5.8	5.7	5.4	5.4

Table 4
Monetary Data

(Kyat in Billion)

	2007-08	2008-09	2009-10	2010-11	2011-12
Currency in Circulation	2,953.58	3,374.23	4,231.07	5,226.56	6,070.07
Narrow Money (M1)	3081.6	3589.7	4660.4	5901.6	7484.0
Broad money (M2)	4392.5	5420.7	7304.9	9957.4	13268.5

Sources: StatisticalYear Book, 2011.
Article IV IMF Country Report.

Table 5
Volume and Value of CBM's Clearing House

	2006-07	2007-08	2008-09	2009-10	2010-11
CBM's Clearing **House**					
Value of Clearing House Transactions (in million Kyat)	1,015,458.18	3,964,792.09	3,844,132.08	4,668,801.86	7,881,349.36
Volume of Clearing House Transactions	324261	320322	281556	305312	348121

Source: CBM Annual Reports.

Table 6
Framework of Financial Institutions

Categories	Institutions	Branches
Central Bank	1	2
State-owned Banks		
Myanma Foreign Trade Bank	11	1
Myanma Investment and Commercial Bank	1	1
Myanma Economic Bank	1	*
Myanma Agricultural and Rural Development Bank	1	*
	1	
Banks		
Domestic Private Banks	19	*
Foreign Representative Offices	25	---
Microfinance institutions	70	*

Source: Author's compilation.
Notes: As of 31.12.2012 (Estimate)
*Exact number not available.
— none.

Chapter 7

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY IN NEPAL

By
Binod Raj Acharya[1]

1. Introduction

The modern banking history of Nepal dates from the establishment of the Nepal Bank Limited (NBL), a commercial bank founded in 1937. Prior to this, some government entities like 'Kaushi Tosha Khana' and 'Tejarath Adda' carried out some limited financial operations for government officials. From the very beginning, the non-institutional sectors, like landlords and rich merchants, have been serving as money lenders in Nepal and are still in existence in various parts of the country.

The Nepal Rastra Bank (NRB) was established as a Central Bank on 26 April 1956. It was followed by the establishment of a commercial bank, Rastriya Banijya Bank (RBB) and two development banks, the Agriculture Development Bank (ADB) and the Nepal Industrial and Development Corporation (NIDC). The Nepalese banking and financial system stagnated for a long period until the government adopted the policy of economic and financial liberalisation. It encouraged Nepalese promotors to set up various banks and financial institutions in the country in joint venture with foreign and local capital participation. As a result, the Nepalese financial system today has 31 commercial banks, 58 development banks, 81 finance companies and 19 microfinance development banks. In addition to this, there are 30 insurance companies, 1 stock exchange company, 1 citizen investment trust, 1 employee's provident fund, 1 postal saving service and 1 deposit insurance and credit guarantee company.

The Nepalese financial system is in a nascent stage of development. Most of the banks and financial institutions and their branches are located in the urban areas of the country, while the money market remains unorganised in the rural areas. It has been felt that the unorganised institutions have the potential to mobilise a wide range of financial sources.

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As a central bank, the NRB has been empowered by statutory act to have direct control on the banks and financial institutions within the country. The payment and settlement system (PSS) linking banks and financial institutions is a major component and plays an important role in the economy. The PSS is recognised as a crucial institution for a small and developing economy like Nepal. A developed PSS facilitates the implementation of monetary policy and financial stability in the country.

In the Nepalese financial system, the NRB is the main regulatory and supervisory body for the banks and financial institutions. The other institutions like insurance companies, stock exchange company, and cooperative institutions come under the jurisdiction of different regulatory bodies. Good coordination among these regulatory bodies is essential and requires a legal framework.. Lacking a comprehensive legal framework, the payment system is mainly covered by such statutory acts as the Nepal Rastra Bank Act, 2001; Bank and Financial Institution Act, 2006; Foreign Exchange Regulation Act, 1962; and the Negotiable Instrument Act, 1977.

With the increase in the number of banks and financial institutions as well as the growing number of new payment products in the country, there is a need to have an efficient banking system. As a central bank, the NRB is responsible for supporting the monetary policy goals, maintaining financial stability and promoting the efficiency of the financial system. For this, an efficient and safe payment system is needed. A sound and efficient payment system will enhance the allocation of resources, facilitate growth and improve the social welfare. The payment system plays a fundamental role in the economy by providing a range of mechanisms through which transactions can be easily settled.

2. Literature Review

This paper is based on two other research studies: (1) "Payment System" by Susil Ram Mathema, published in '***Fifty Years of Nepal Rastra Bank'*** by the NRB; and (2) "The Payment and Settlement System in Nepal" by Jagadishwor Adhikary, published in '***The Payment and Settlement Systems in the SEACEN Countries***, ***Vol. II,***' by the South East Asian Central Banks Research and Training Centre. Some articles published in newspapers and magazines were also included in the review of the literature. All these publications highlighted the existing PSS practices in Nepal and the need for development of the legal framework. However, these papers could not prescribe what kind of legal framework and coverage that is needed. Hence, the objective of this paper is to prescribe the essential elements that should be incorporated in the legal framework, so that

the PSS can support the monetary policy framework and financial infrastructure in the country.

In spite of the expanding role of different substitutes, the banknote is still a fundamental payment instrument in Nepal. The payment system is not well developed in Nepal due to its small economy and low business volume. Generally, the Nepalese payment system encompasses domestic payments and cross-border payments. The domestic payment system comprises cash for small-value transfers, and cheques, drafts, and telex transfers for large-value payments by organised enterprises and business houses. Most of the banks have started issuing the Automated Teller Machine (ATM) cards, credit cards and debit cards as well as providing Internet banking, mobile banking service, and Any Bank Branch Service (ABBS). The operation of the clearing house is only the systemic payment system in the country. The payment transactions of all the banks and most of the financial institutions are settled through the clearing house. Whereas demand draft, mail transfer, telex transfer and SWIFT transfer and credit cards are the most common instruments in the cross-border payment system.

Most of the banks use the traditional payment instruments for the cross-border payments. Such instruments are foreign currencies, traveler cheques, cheques, draft, telex transfer and letters of credit. Under the Foreign Exchange (Regulation) Act, 1962, the NRB monitors the foreign currency transactions. The cross-border payment system consists of payment system for Indian currency and a separate system for other convertible currencies. Due to bilateral payment arrangement, open border, geographical proximity, historical and cultural relations between India and Nepal, the exchange regulation covering Indian currency is very soft and liberal. A maximum of INR 25,000 can be exchanged at a single time for retail transactions. Trade payments between Nepal and India are settled mostly in Indian currency. For certain specific Indian machinery and industrial raw materials, the payments are made in US dollar.

The Nepalese foreign exchange regime has not been fully liberalised. The current account transaction is convertible under the regulatory framework, whereas the capital account transaction is unconvertible, and such transaction is subject to the prior approval of the Government of Nepal or the NRB. Authorised moneychangers, hotels, travel agencies and banks can accept foreign currencies in cash, traveler cheques and credit cards. Those who want to receive payment from abroad, whether foreigners or Nepalese, can receive the money in the form of bank cheque, draft, mail transfer or telex transfer, and so on. Pursuant to Nepal's commitment to the Financial Action Task Force (FATF), an inter-governmental body established to combat money laundering and other related

threats to the integrity of the international financial system, the Nepal government has recently passed the Anti Money Laundering Act, 2012, for Nepal to avoid being blacklisted, as it can be very difficult for the country to settle the cross-border payments. In most of the cases, the payments and settlement are through cheques and demand drafts for both domestic and for cross-border payments. The payment system presently is running smoothly, but the possibility exists of payment error that may arise in such a system. Hence, e-payment is a must to mitigate such error.

Similarly, the transmission mechanism of monetary policy and quick and accurate recording of transactions are the two major components for monetary stability. The PSS influences these areas. First, the transmission mechanism of monetary policy in Nepal moves from the Treasury Bill auction rate, to interbank rate, to market liquidity, to change in the lending rate, to credit availability and to real variables. Without a proper PSS, such transmission mechanism cannot run effectively and efficiently. Secondly, an inefficient PSS can distort the monetary aggregates variable significantly. At present there is a significant number of banks and financial institutions in Nepal. Without a sound and efficient PSS the financial sector cannot function smoothly for financial stability to be attained.

As a member of the world economy and the global financial sector, Nepal is being made aware that it should take measures to develop its PSS in order to preempt potential problems in the payment system. It should adopt the international best practices and simultaneously develop a comprehensive legal framework reflecting such practices. For this, NRB should implement the BIS' Core Principles for Systemically Important Payment Systems (CPSIPS) and move towards the implementation of a real time gross settlement (RTGS) system gradually.

3. Assessment of Current PSS Framework

As a least developed economy, the PSS in Nepal is not fully automated. Cash and paper-based instruments, like cheques and commercial bills, are mostly used in the country. The Nepalese financial sector has started adopting new financial technology and the populace using ATM cards and credit cards have increased. Due to the lack of a comprehensive legal framework, the payment system operation is based on the various statutory acts. These acts, however, do not adequately sanction and regulate the payment procedure.

The existing PSS in Nepal is categorised into two payment systems, one is for domestic payments and the other for cross-border payments.

3.1 Domestic Payments

The domestic payment system comprises cash for small-value transfers; and cheques, drafts, telex transfers for large-value payments in all organised enterprises and business houses. The use of traveler cheques in domestic currency is not widely accepted, and most of the banks have started issuing ATM cards.

The Nepal Clearing House Limited (NCH) was established with the support of the NRB in conjunction with the Nepal Bankers' Association (NBA) for the settlement of corporate interbank payment transactions in the Kathmandu valley. Banks and financial institutions, including the NRB, participating in the NCH are required to be a member of the NCH, paying a membership fee to the NCH. Whereas, the NRB itself has been providing clearing house services at seven of its branches in different cities. The branches of banks and financial institutions in the city where the NRB branch is located, are eligible to join as a member of the NRB branch clearing house. The settlement is based on the multilateral transactions among the clearing members.

The payment system in the domestic market is not clearly governed by any regulation, but the law and practice regarding payment instrument is defined by the Negotiable Instrument Act (NIA). The NIA is the codification of long-settled merchantile custom and practices relating to the payment and transfer of money in the European continent. The main objective of this act is to set rules relating to the payment and transfer of money through instruments instead of currency notes or coins, to make monetary transactions easier.

Promissory Note, Bills of Exchange and cheques have been legally recognised as negotiable instruments in the country. Any document which entitles a person to a certain right and transferable by mere delivery is accepted as a negotiable instrument. However, negotiable instruments such as bearer share certificates, bearer debenture/bonds, dividend, etc., have yet to be introduced in Nepal. As such, the payment system in the domestic market mainly involves the issuance of promissory note, postal saving, Nepal Stock Exchange, National Saving Bond, Citizen Saving Bond, Development Bond, Treasury Bills, etc.

(a) Promissory Note: Promissory Note is an instrument in writing containing an unconditional undertaking to pay a certain sum to, or to the order of, a specified person, or to the bearer of the instrument, and is duly signed by the maker. However, the bank note or currency note is not considered a promissory note as this is dealt under a separate statute.

(b) Postal Savings Service: To promote the saving habit among the rural people, the concept of Postal Savings Bank (PSB) was introduced in 1977. Although the PSB network is spread over the 75 districts of the country, the volume of savings is relatively low.

(c) Nepal Stock Exchange: After restoration of democracy in 1990, Nepal adopted the policy of financial liberalisation. In this regard, for the development of stock market in the country, the Nepal Stock Exchange Ltd. (NSEL) replaced the Securities Exchange Centre in 1992. The number of listed companies in the NSEL increased from 176 to 209 in FY 2011/12. The NEPSE index decreased to 363 in 2011/12 from 478 in 2010/11. Market capitalisation as well as annual turnover decreased in 2011/12 in comparison to 2010/11 due to the prevailing uncertainty in business environment and the deteriorating law and order situation.

(d) National Saving Certificate, Citizen Saving Certificate, Foreign Employed Bond and Development Bond: The NRB, on behalf of the government, issues government bonds, notably the National Saving Certificate, Citizen Saving Certificate, Foreign Employed Bond and Development Bond, to finance the government budget deficit. The National Saving Certificate, Citizen Saving Certificate and Foreign Employed Bond are generally issued with a tenor of five years with fixed interest rate payable, and cater for the non-banking sector, i.e., ordinary Nepalese citizens, Nepalese foreign employed and Nepalese non-residents. The Development Bond is generally issued with a tenor of three years at fixed interest rates and is offered to the banking sector through auction. Generally, the competitive bidders quote at premium interest rate during the Development Bond's auction and the bidders who quote the higher premium interest rate will be awarded. During the year 2011/12 the government mobilised Rs. 14.0 billion, Rs. 500 million and Rs. 12.6 million by issuing, respectively, the Development Bond, National Saving Certificates and Citizen Saving Certificates. So far the government published the notice for the issuance of Foreign Employed Bond during the year 2011/12, and was met poor response as the Nepalese foreign employed and Nepalese non-residents were reluctant to purchase such bond. Hence, only a negligible amount of capital could be raised through the issuance of the Foreign Employed Bond during the said year.

(e) Treasury Bills: After the implementation of financial liberalisation policy, the monetary policy stance shifted from the direct method to the indirect method. In this regard, the NRB emphasises on open market operation (OMO) as the monetary policy instrument. Since 1988, the auctioning of

treasury bills was introduced as open market operation. In the beginning, 91-day treasury bills were issued once a month of irregular intervals and the auction of treasury bills is done once a week since 1989. The NRB announces the amount of treasury bills to be auctioned and the deadline for submitting the bids, with the discount rate enlisted in the previous auction two to three days before each auction. After examining the bids, allocation is made on the basis of first priority to the lowest interest bidder. If the bid is abnormally higher than the trend, or if the open market operations committee feels the bid is a distortion of the market situation, it can impose a discretionary cut-off rate for each auction. Settlement takes place on the day of the auction, by charging directly on the banks' reserve accounts in the NRB. During the FY 2011/12 the government mobilised Rs. 17.28 billion by way of short-term government securities, like treasury bills.

(f) Secondary Transaction of Treasury Bills and Development Bonds: The NRB conducts secondary transactions of Treasury Bills and Development Bonds for liquidity management purposes. The NRB provides a Standing Liquidity Facility (SLF) to banks and financial institutions, loaning them 90% of the total face value of Treasury Bills and Development Bonds offered as collateral, for very short periods, i.e., up to five working days. The banks and financial institutions are required to pay to the NRB interest together with the principal sum on maturity of the loan.

Similarly, if the Liquidity Monitoring and Forecasting Framework (LMFF) indicates a shortage or excess of liquidity for a short period, the NRB will offer the banks and financial institutions REPO and Reverse REPO auction. But, if the LMFF indicates shortage and excess of liquidity for a long period, then the NRB will offer the banks and financial institutions for outright purchase and sale auction.

In case of REPO, the NRB offers for auction government securities of certain amount for a short time period (tenor of 7-28 days) to banks and financial institutions. From the auction result, the NRB lends the money to the banks and financial institutions, who quote a higher interest rate up to the cut-off interest rate for that offer amount, against the government securities. And on the maturity of the REPO, the banks and financial institutions should pay back the total principal and interest to the NRB. For Reverse REPO, the NRB offers for auction government securities of certain amount for a short time time period (7-28 days) to banks and financial institutions. From the auction result, the NRB borrows the money from banks and financial institutions, who quote the lower interest rate up to the cut off interest rate for that offer amount, against the

government securities. And on the maturity of the Reverse REPO, the NRB should pay back the total principal and interest to banks and financial institutions.

Similarly, in case of Outright Purchase and Outright Sale, the NRB offers auction for purchase and sale of certain amount of the government securities up to the maturity period of that securities, to banks and financial institutions. From the auction result, the NRB lends money to/from banks and financial institutions, who quote the higher/lower discount rate up to the cut-off discount rate for that offer amount for outright purchase and outright sale. The payment and settlement for the SLF, REPO, Reverse REPO, Outright Purchase and Outright Sale transaction will be by debiting and crediting the NRB account and Vostro account of banks and financial institutions.

3.1.1 Payment Instruments

The payment instruments that are used domestically in Nepal are cash, cheques, draft, telex transfer (TT), Nepalese rupee credit and debit card and ATM card. Currently, the ATM card, credit and debit card have been becoming increasingly popular due to the collaboration of systems arranged by the commercial banks with the departmental stores, hotels, restaurants and big business houses. Over the last decade, the Nepalese payment system has made some progress in replacing cash with other instruments like cheque, draft and TT, and even the plastic card, but the usage of such instruments is concentrated in the urban areas, including the capital city of Kathmandu.

(a) Cash

Major portions of the settlement of purchasing and services transactions are made by cash (banknotes and coins). Cash payment remains the most convenient method for making small-value payments when payment is made at the point of sale. Most of the middle and lower middle-class people in the urban area and rural people prefer to hold cash for their transactions.

During the fiscal year 2011/12, the currency in circulation expanded by 18.5%, compared to 14.5% in the previous year.

(b) Cheques/Banker's Cheque

Cheque is the second most important payment instrument for small-value and large-value payments. The depositor issues an order to his banker to make payment through the cheques. Since the cheque is regarded as the most developed

credit instrument in the money market, most of the modern business transactions consistently have been using cheques in settling their accounts.

Banker's cheques are issued as a service extended to customers and a means of transacting business for the bank. The cheques are printed on security paper, pre-numbered as well as prepared in conjunction with a manifold set of forms, which include an advice to the customer, advice to payee and a register copy.

Manager's cheques outstanding for more than six months from the date of issuance are transferred to Bills payable under their respective subsidiary accounts. The operating branch should approve all debits to these accounts.

(c) Draft, Telex Transfer, Mail Transfer

Draft, TT and mail transfer (MT) are other popular methods of payment for the large-value transactions. The issuance of foreign currency draft, TT and MT is the subject to NRB regulation. The draft that remains outstanding for more than six months from the date of issue, should be transferred to bills payable.

Mail transfer is cost effective as a payment mode, but the time-lag involved in this method makes this method less popular. TT is the most frequently used instrument in Nepal. Total transactions utilising these payment modes are on a decreasing trend.

(d) Electronic Payment

Now most of the banks and some of the financial institutions offer electronic payment services. The electronic payment facilities includes the Credit Card, Debit Card, Automated Teller Machine (ATM), Prepaid Cards, Branchless Banking, Internet and Mobile Banking.

(e) Credit Card

Although the concept of credit card is new to most Nepalese, the volume and usage of credit card are increasing. The security of using credit cards for payment compared to cash and the discounts available with the use of cards is attracting consumers to their use.

Commercial banks issue credit cards to their high-income customers. Generally, the lower-income class do not have access to card facilities.

All cardholders are charged a minimum initial enrolment fee and an annual fee, as fixed by the card issuing companies.

Seven banks in the Nepalese financial market are offering credit card facilities and they have issued 30,079 domestic credit cards and 4,865 international credit cards, as of 20011/12.

(f) Debit Card

Most of the banks are now issuing the debit cards. The debit cards issued have increased by 123% to 288,790 cards in fiscal year 2011/12, compared to previous fiscal year. The total value of debit card transactions has increased by more than 300% to Rs. 3.17 billion in 2011/12 in compared to previous year.

(g) Automated Teller Machine (ATM)

Almost the all banks and some financial institutions have established ATM services in the country. To date, more than 300,000 ATM cards have been issued by the commercial banks, serviced by an ATM network of 1,002 terminals in the country. Current and saving account holders with a minimum account balance are eligible to apply for an ATM card. Generally, the ATM cards are issued with minimal cost, whereas the transactions are free of charge. ATM machines is a convenient channel for cash withdrawals by the public. The ATM service provider may also offer other ATM payment functions, such as on-line fund transfer. An expansion in the ATM network may lead to a decline in the volume of cheque transactions.

(h) Prepaid Card

Without the need of operating a bank account, customers can obtain the prepaid cards from the issuing banks. The customers can avail this facility for self-use for domestic and cross-border payments. As of mid-July 2011, 49,275 domestic users and 4,535 international users are using this facility from six commercial banks in the country.

(i) Branchless Banking

It is a distribution channel for delivering financial services through point-of-transaction machine using smart cards, without relying on bank branches. The

customers can avail deposit and withdrawal facilities via the branchless banking system. Two commercial banks are operating branchless banking systems in five districts.

(j) Internet and Mobile Payments

The rapid growth of e-commerce and the use of the Internet have led to the development of new payment mechanisms capable of exploiting the Internet's unique potential for speed and convenience. Similarly, the broader usage of mobile phones has encouraged banks and non-banks to develop new payment modes, and the channel through which payment instruction is entered into the payment system defines mobile payments.

To date, 28 commercial banks are providing the Internet banking services to 147,833 users while 26 commercial banks are providing Mobile Banking (SMS Banking) to 267,426 users.

3.1.2 Nepal Clearing House Ltd. and NRB Clearing House

The NCHL is established to settle corporate interbank payment transactions in the Kathmandu valley in collaboration with NRB and the NBA. Every participating bank and financial institution including the NRB, is required to be a member of the NCHL by paying a membership fee. The NRB itself, at branch level, has been operating a clearing house in each of its branches in seven different cities. The branches of the banks and financial institutions in the city where the NRB branch is situated, are eligible to become a member of the NRB branch clearing house. The settlement is based on the multilateral transactions among the clearing members.

(a) Participating in the System

All commercial banks, development banks, and finance companies licensed by the NRB are eligible to participate in the clearing system. The corporate branch office will be a representative member and other branches located in Kathmandu valley will be ordinary members of NCHL. All clearing member banks are needed to have a transaction account with NRB. Interbank clearing and settlement in Kathmandu as well as outside Kathmandu are run on paper-based, manual system. For the seven cities outside the Kathmandu valley, the clearing system is run by the NRB branches. All the branches of the banks and

financial institutions are eligible to be members of the regional clearing house and each is required to open a transaction account in the respective NRB branch.

(b) Types of Transactions Handled

The clearing house facilitates the clearing of cheques, drafts and similar payment orders in Nepalese rupees as well as in foreign currencies.

(c) Operation of the System

The NRB Banking Office, Thapathali, is the venue of the clearing house in Kathmandu, whereas the clearing houses outside the Kathmandu Valley are located in the premises of the NRB Branch office. In the cities where the NRB does not have a branch, a bank branch is authorised by NRB to act as clearing house. The clearing house meets twice on each business day. The first meeting is scheduled at 10:00 a.m. and the second meeting at 2:00 p.m. The payment instruments such as cheques, drafts, etc., are presented at the first meeting and final settlements are made at the second meeting. In case of non-acceptance of such instruments, the returned items will be presented at the second meeting. The clearing operation is on "same day settlement." If any member fails to overdrawn during the settlement process, the concerned member is not permitted to participate the clearing house until the balance is recovered.

(d) Operation Procedure

- All member representatives are to prepare and submit a summary sheet of their total presentation to the clearing house. The clearing house then prepares a settlement of the clearing transactions and provides a copy to each member that will show the total volume and value of clearing transaction for that day.

- After checking the 1st settlement copy the members have to submit a separate adjustment summary sheet by 2:00 p.m.

- An ordinary member should inform their representative bank on the same day if any cheque/draft is not honoured. Then the member representative should prepare a statement of returned cheques and submit it to the clearing house by 2:30 p.m. on the same day.

- All member representatives meet at 3:00 p.m. at clearing house with details of the transactions. The clearing house will prepare and provide to the members a 2nd settlement sheet with adjustment, if any.

- After correcting the mistakes (if any), the clearing house will prepare a final settlement of clearing transactions for the day and provide debit/ credit advice to member representatives.

In the event of a dispute, the matter is initially referred to the clearing house officer. If the officer is unable to resolve the dispute, reference shall be made to the senior management of the banks involved. If the senior management reach a deadlock, the clearing house committee shall then be convened.

(e) Settlement Procedure

Each member bank must maintain a transaction account with a minimum balance to be determined by the clearing house on the basis of its clearing transactions with the NRB. The net clearing figure of each member bank shall then be debited and/or credited to its account. Where the transaction/clearing account is overdrawn, the bank shall reconstitute it within 24 hours to create a credit balance out of which claims on it shall be paid.

Unpaid items, which have been presented through the clearing house, must be returned through the clearing house itself. The member banks must be informed regarding the clearing house details of unpaid items on the same day of the clearing, latest by 2:30 p.m. The clearing house officer will then raise a separate debit voucher regarding the returned item to be debited/credited to respective member bank's account.

All instruments that are not returned shall automatically be deemed to have been paid by the drawee bank. Each unpaid item shall bear, on an attached slip, the reason(s) for the refusal of payment. Such statements shall be written in full and not abbreviated.

(f) Pricing Policy

The member banks do not have to pay any charge for the payment and settlement service. The members pay a membership fee to join the NCHL. They are also required to pay for the communication charges such as telex, mail, courier, etc., incurred in the clearing of foreign cheques, drafts, etc. However, the NRB does not levy any service charge on the member banks.

(g) Management of Risk in Clearing House System

Precautionary measures are taken into account to minimise the risks. The member banks in the domestic payment system are obliged to open an account with the central bank and maintain a minimum balance. This will cover, to a certain extent, the risk arising from liquidity shortage. As far as systemic risk is concerned, this is minimised to a large extent as the summary form is balanced in the presence of all the member banks and then only is it signed by the clearing house officer. The system hardly incurs credit risk, since the payment instructions are executed only if there are sufficient funds in the participant's account. There will be no credit risk involved if payments are accepted while recipients are notified after the payments are settled.

(h) Volume of Transaction

The volume and value of the transactions are increasing and trending upward. Hence it may not be possible to continue doing the clearing through the manual system. An electronic system is being launched for the clearing house settlement. This electronic system is currently in the testing phase. The manual system will continue until such time when the electronic system is ready for cut-over.

3.2 Cross-border Payment System

The cross-border payment system in Nepal is still in a primitive stage. Most of the commercial banks use the traditional payment instruments. The Foreign Exchange Management Department (FEMD) of NRB monitors the foreign currency transactions. The cross-border payment system consists of payment system for Indian currency and a separate system for other convertible currencies.

3.2.1 Payment System for Indian Currency

Although under the Foreign Exchange (Regulation) Act, 1962, the Indian currency comes under the definition of foreign currency, the exchange regulation for Indian currency is liberal due to the bilateral payment arrangement, open border, geographical proximity and the historical and cultural relations between Nepal and India. For the purposes of receipt and payment accompanied by documents, the Indian currency is convertible for both Nepalese and Indian citizens. However, for retail transactions, a maximum of Indian Rs. 25,000 can be exchanged at a single time. For trade purposes, telex transfer is the prevailing

method for advance payment, deferred payment, and letter of credit (LC), with the bills of transport being the most popular method. The trade payment between Nepal and India is settled in Indian currency. Payments for the import and export of commodities from India are effected in cash through drafts and TTs. Thus, a LC is not essential. A LC is essential only if payment is to be made in US dollars for some specific Indian machinery and industrial raw materials to be imported from India. Nepalese commercial banks have maintained their Indian currency agency accounts in Indian banks to settle the above payments.

3.2.2 Payment System for Other Convertible Currencies

The foreign exchange regime in Nepal is partially liberalised. Current account transaction is convertible under the regulatory framework while capital account transaction is not convertible. As Nepal is a member of the Asian Clearing Union (ACU), all the trade payments among member countries, except India, are settled through the clearing system of the Union in ACU dollars. Moreover, some restrictions are imposed on the usage of foreign currencies since the rupee is not convertible. The same payment modes such as drafts, mail transfer, telex transfer, SWIFT transfer, credit cards and ACU dollars are in use for cross-border payments for convertible currencies.

3.2.2.1 Asian Clearing Union

The ACU was established in 1975 with the purpose of:

- Providing the facility to settle on a multilateral basis, payments for current international transactions among the participating countries;

- Promoting the use of participants' currencies in current transactions between the respective territories, thereby effecting economies in the use of participants' exchange reserves; and

- Promoting monetary cooperation among the participants and closer relations among the ACU banking systems.

Nepal is one of the founder members of the ACU. When the ACU started its operations in 1975, all individual transactions were required to be cleared through the respective central banks. According to the ACU agreement, all payments relating to trade and trade-related transactions among member countries should be routed through the ACU payment systems. Under this system, payments arising from trade transactions with member countries are first settled by the

respective commercial banks with their central banks, and thereafter request to settle the same is made to the corresponding bank of the member country. In turn, the respective central bank advises the central bank of the recipient member country to settle that payment with the corresponding recipient commercial bank. The central bank of the recipient's member country then settles the payment with their local commercial bank. Interest is debited or credited to the account at the end of the day, depending on debit or credit balance in the account. All the settlements are made in US dollars.

The ACU head office maintains accounts in ACU dollar for each member central bank and updates the debit and credit entries as advised by the respective member central banks. At the end of the settlement period, i.e. two months, the ACU informs the net position of each bank (debit or credit) for the final settlement among member central banks. There is no cross border fund transfer during the settlement period, i.e. two months. The cross-border settlements take place only after final settlements are made among themselves by the member central banks.

The total transactions settled under the ACU amounted to Rs. 3,275 million during the calendar year 2010. The amount was higher by Rs. 1,274 million compared to the previous year. Total exports of goods settled under the ACU registered a rise from Rs. 1,452 million to Rs. 1,534 million. Similarly, total imports increased by Rs. 1,470 million.

3.3 Some Comprehensive Analysis and Interpretation

As explained above, cash, cheque, draft, TT, MT and traveler cheque are the most used domestic payment instruments, and credit card, debit and ATM card are also widely used in the urban areas, mostly in the Kathmandu valley. Regarding the cross-border payment, bank draft, TT and SWIFT are the most popular instruments.

More than 75% of the population live in the rural areas which are without a banking network, so cash remains the main payment mode. The currency in circulation to narrow money (M1) is still 68% in Nepal, which establishes that cash is predominant in the payment system. Over the last decade the Nepalese payment system has made some progress replacing cash with credit cards, debit and ATM cards in the urban areas, and cheque, draft and TTs in the rural areas. Since 2002, the banking sector in Nepal has continued to make further advancement in computerisation. However, the commercial banks are oriented towards big clients; the villagers who live in remote areas are without access

to these facilities. Besides cash, cheque is the most frequently used payment instrument and is issued by businessmen and government enterprises for both small as well as large-value payments. Draft is another important method of payment and is typically used by businessmen and the rural inhabitants. As a matter of fact, draft is the safest mode of payment for the rural populace.

Regarding cross-border payment, draft and TTs are most often used and LC is used if the payment is denominated in US dollars in the case of payment between Nepal and India. The LC is also the most popular method of payment regarding other convertible currencies. Financial institutions use the SWIFT network facility for the fund transfers and/or other financial transactions.

The settlement of the financial claims takes place when cheques are presented to the clearing house by the representatives of the participating banks. So, the system followed is real time net settlement. This refers to simultaneous transmission, processing and net settlement of financial claims

Regarding the settlement of securities, both bilateral and multilateral methods of payments are used. Most of the cross-border transactions takes place bilaterally. Draft, TTs and SWIFT are the most used payment method for bilateral settlement. Draft and TTs are mostly used by the NRB whereas SWIFT is mostly used by commercial banks. With respect to cross-border payment and settlement, Indian currency is used for transactions with India, whereas convertible currencies are used for transactions with other nations. Multilateral settlement takes place through the ACU.

4. Policy Implication and Role of NRB in PSS for Monetary Policy and Financial Stability

The central bank plays a key role in the payment system. Money is fundamental to the functioning of a market economy. Money denominated in a given currency serves as the medium of exchange. By sharing a currency, the members of a community have in common a measure and store of economic value, and a set of instruments and procedures to transfer this value. However, as the value of money lies in trust, there can be no absolute guarantee that confidence in the currency can be preserved over time. It may be shaken by a monetary crisis or by the malfunctioning of the payment system. As a result, maintaining trust in the currency and facilitating its circulation is of major public interest. The central bank is designated as the institution to pursue this public interest.

Likewise, payment systems play a fundamental role in the economy by providing a range of mechanisms through which transactions can be easily settled. Bank notes are part of the payment system landscape. In spite of the expanding role of its various substitutes, the banknote is still a fundamental payment instrument in the economy. The NRB is making determined effort in structuring an conducive environment for sustainable development through price stability, strengthened balance of payments, sound and efficient payment systems, and reform and promotion of the banking and financial system. Therefore, the focus of monetary policy has centered on the gradual modernisation of the payment system.

Generally, commercial banks maintain the clearing account and statutory reserve requirement account with the NRB. By implication of monetary policy, the NRB can influence the money supply as well as credit creation of the banks through changes in reserve money, required reserved ratio and OMO. Changes in the requirement of the clearing account with NRB will affect the overall bank liquidity ultimately, and impart on the payment system.

Time lags in clearing and settlement affect the level of float or items in transit, forcing the commercial banks to maintain a certain degree of liquidity or clearing balances that are necessary. NRB's willingness to provide standing liquidity facilities and daylight overdrafts may reduce the need of holding high amount of clearing balances. In addition, the degree of decentralisation of clearing accounts to the district offices also affects the level of liquidity. The NRB acts accordingly in light of the above to conduct its monetary management activities efficiently. The efficiency and effectiveness of monetary policy, thus, are affected by the efficiency and reliability of the payment system.

The transmission mechanism and quick and accurate recording of transactions are two major areas of concern for the implementation of monetary policy. These are influenced by the PSS. First, the transmission mechanism in Nepal moves from the treasury bill auctioning rate to interbank rates, market liquidity, changes in the lending rates, credit availability and finally to the real variables. The efficiency and effectiveness of this mechanism is vitally affected by the PSS. Secondly, 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 PSS can distort these variables significantly.

The development of the payment system is one of the indicators that determine the level of the country's economic development. As the payment

system plays an important role in the economy, the NRB must pay close attention to the importance of payments systems in supporting economic growth. Since there is a very close interconnection between the financial institutions, the failure of one of them may jeopardise the solvency of others. This calls for vigilance on the part of the NRB to keep abreast of payment system technology. Due to the rapid advancement of technology, especially in financial services, such as banking, investment, insurance, etc., the world economy has become borderless, increasing the complexity of the financial sector. It is incumbent upon the NRB to assume greater responsibility in enhancing the effectiveness of the payment system as there has been continuous expansion of the banking system and advancement of new technology in PSS. The NRB plans to install the GL software programme and will fully implement the ABBS system very soon. Hence, it is timely for the NRB to work towards the implementation of the real time gross settlement (RTGS) system for the PSS. For this to take place, the NRB should be serious about adopting the core principles prescribed by the BIS for financial market infrastructure.

Also, in order to encourage economic activities in the country, the NRB should be involved in monitoring the payment system to minimise the occurrence of problems during settlement. In the absence of a special Act, it is difficult at present to perform payment and settlement activities efficiently in the country. As such, it is timely that the NRB plays an active role in the development of the PSS.

4.1 Oversight of the Payment System

A robust payment system is a key requirement for the maintenance and promotion of economic and financial stability. It facilitates management of the macroeconomy as well as of micro objectives, particularly in the core area of payment systems. Payment systems can involve significant exposures and risks for participants and users when payment system failures occur. In addition, payment systems can be a channel for the transmission of disturbances from one part of the economy or financial system to another, disrupting the functioning of the payment system and the stability of the financial system, and thereby disrupting the entire economy. This issue of systemic risk is one important reason warranting the close interest and attention of central banks in the oversight of payment systems.

It has become an internationally accepted principle that a central bank should disclose the key aspects of its policy on the oversight of payment systems. The

oversight of payment systems is an integral part of its wider responsibility for monetary and financial stability. The maintenance of the stability of the financial system is a matter of concern for the central bank regarding the payment and settlement infrastructure.

The Nepal Rastra Bank Act, 2001, has entrusted the responsibility of supervision and control over banks and financial institutions to the NRB. To ensure the sound and efficient operation of the financial system, the NRB regularly inspects and supervises the bank and financial institutions through its Inspection and Supervision Department (ISD). But, there is no specific provision governing the oversight of PSS in Nepal.

It will be relevant here to quote the Ferguson Report which noted that: "because of consolidation, central bank oversight of payment system is becoming more closely linked with traditional bank safety and soundness, supervision at the individual firm level. Increasing cooperation and communication between banking supervisors and payment system overseers may be necessary both domestically and cross border."

It also added "central banks and bank supervisors should carefully monitor the impact of consolidation on the payment and settlement business, and should define safety standards where appropriate. In particular, central banks, in conjunction with bank supervisors, may need to consider various approaches, possibly including standards that could be used to limit potential liquidity, credit and operational risk stemming from concentrated payment flows through a few very large players participating in payment systems."

Due to the rapid development of the financial sector in Nepal, the risk and efficiency related concentration may arise; it will benefit Nepal to formulate ahead policy measures regarding the PSS oversight.

5. Problems, Challenges and Conclusion

The payment system in Nepal is virtually dominated by cash transactions. Bank drafts, cheques, SWIFT payments and plastic-card-based transactions (ATM cards, credit cards and debit cards) are also available, but their use is very much limited due to these reasons:

- Bank drafts attract relatively high service and transaction charge and are also relatively slow (incurring several days) in respect of affecting the required fund transfer.

- Cheques carry inescapable credit and documentary validity risks, and also their clearing takes at least two days and up to ten days or more for cheques outside the Kathmandu valley. The legal provisions in Nepal for enforcement of payment concerning dishonoured cheques are not satisfactory.

- Plastic-card-initiated transactions are rising but are mostly available to bank account holders. Non-bank account holders only have access to small sums that can be transacted through plastic card. There are only about six million bank accounts out of a population of about thirty million.

The challenge for the development of the Nepalese payment system is to find a solution, which meets the needs of banks and other sectors of the economy, and more pertinently, of the NRB and ordinary consumers. The NRB is making efforts to reduce the volume of cash in circulation and to strive for more efficient management of macroeconomic conditions through the management of OMO.

A number of innovative products for making payment such as e-money, Internet and mobile payments have been developed in recent years. Developments in these products have been evoking considerable interest over the last few years. E-money does not exist in the Nepalese financial market; some financial institutions have started introducing Internet and mobile payment systems in the market. Their usage, however, is very low compared to cash and traditional non-cash payment instruments. The introduction of e-money and/or Internet and mobile payment instrument as a potential substitute for cash for making small-value payments raises policy implications and issues for central banks in terms of the central bank's revenues, implementation of monetary policy, and role in payment system oversight.

For payment systems related to retail payments, large value payments as well as electronic based payments, NRB as the central bank, needs to look at the infrastructure for the legal aspects, oversight, security as well as cross border issues. Without the proper development of the financial market infrastructure, the further enhancement of the payment systems is not possible. Hence, the NRB along with the other stakeholders must be committed to the development of the financial market infrastructure. The PSS should be developed hand in hand with the central securities depositories system (CDS), securities settlement system (SSS), central counterparties system (CCS) and trade repositories system (TRS) in order to lay down the infrastructure for the implementation of a RTGS system. We need to develop a sound financial market infrastructure to accommodate the growing economic, banking and financial activities in the country.

The above problems and challenges can be solved by adopting the appropriate technological innovations regarding the payment system as explained above. To facilitate the adoption of technology, the current legal framework should also be revised. The PSS in Nepal is covered by piecemeal enactments and regulations. Hence, it is high time for Nepal to review and consolidate the existing laws and formulate a comprehensive legal framework covering PSSs.

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Chapter 8

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY FOR THE PHILIPPINES

By
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1. Introduction

Payment systems are essential to the effective functioning of financial systems worldwide. They provide the channels through which funds are transferred among banks and other institutions to discharge payment obligations arising from economic and financial transactions across the entire economy. An efficient, secure and reliable payment system reduces the cost of exchanging goods and services. It is an essential tool for the effective implementation of monetary policy and the smooth functioning of money and capital markets. In contrast, a payment system that is not efficient, secure and reliable can adversely affect the financial system and the efficient transmission of monetary policy, and that it can, in turn, contribute to a systemic crisis. It is this key role played by payment and settlement systems (PSS) in the smooth functioning of an economy in general and its financial and monetary system in particular that gives the central bank (CB) a strong incentive for ensuring that an effective, reliable and secure payment and settlement system is in place.

Central banks have a strong interest in promoting and improving safety and efficiency in payments systems as part of their overall concern with financial and monetary stability. For one, the payments 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. As Guitián (1998) observed, the payment system can act as a conduit through which financial and non-financial firms and other agents affect overall financial system stability. The payments system also affects the transmission process in monetary

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management, the pace of financial deepening, and the efficiency of financial intermediation. Consequently, monetary authorities have typically been active in promoting sound and efficient payments systems and in seeking the means to reduce related systemic risks.

In the Philippines, the settlement infrastructure has evolved and transformed from a purely physical settlement structure to a more modern electronic process. The Bangko Sentral ng Pilipinas (BSP), fully cognizant of its role in establishing facilities for payment services as mandated under Section 102 of the New Central Bank Act, 1993, or the BSP Charter (Republic Act No. 7653) and the importance of a safe and efficient payments system to financial stability, developed a real time gross settlement system (RTGS) known as the Philippine Payments and Settlements System ***(PhilPaSS)*** on 12 December 2002. The ***PhilPaSS*** is an automated facility that provides online, real time uninterruptible settlement of high-value payment transactions between banks through the Demand Deposit Accounts (DDA) of banks maintained with the BSP. As a gross settlement system, the ***PhilPaSS*** processes and settles fund transfer instructions individually, without netting debits against credits. As a real time settlement system, it effects final settlement continuously rather than periodically at pre-specified times provided that a sending bank has a sufficient balance in its DDA.

Since its implementation, the ***PhilPaSS*** has evidently minimised the settlement, operational and other risks related to high-value and critical interbank payments by providing a safer and cost-efficient channel for the delivery of funds to intended counterparty-accounts maintained with the BSP. However, the changing contours of the global financial environment have important implications for the payment system and financial stability because they provide new sources of risk and challenges for regulators like the BSP. In particular, developments in technology and the financial innovation they allow, the increasing size and complexity of financial systems, and the globalisation of financial markets are reshaping the landscape in which the payment and settlement system operates.

This paper is generally aimed at identifying the key challenges and issues affecting the efficiency of the payment and settlement system in the Philippines and assessing its implications or influence on domestic monetary and financial stability, and economic performance. The paper starts with this introduction, followed by a section discussing the BSP policy framework in relation to monetary stability, financial stability and an efficient payment system. The third section gives a description of the payment system infrastructure in the Philippines and talks about the system's influence on domestic monetary and financial stability, and economic performance. The paper then also briefly identifies the key issues

and challenges affecting the efficiency and reliability of the country's PSS. The next section provides an assessment of the efficiency and reliability of the country's current PSS infrastructure. Lastly, the paper takes stock of the policy implications of the developments facing the Philippine payments system today.

2. BSP Policy Framework

Jenkinson (2007) noted that the central banks' two core functions – monetary, or more specifically, price stability, and financial stability – emerged from their earlier role in providing the ultimate settlement asset in the payment system. From being the provider of the ultimate settlement asset, it became critical for the central bank to maintain monetary stability. This is because it is the central bank's liquid liabilities that are the instruments in which the bulk of domestic payment obligations are legally finally settled. For central bank money to be considered safe so that all participants remain confident about its acceptability as a settlement asset, the promotion of monetary stability became critical.

Central banks also have a natural interest in promoting financial stability. Specifically, it is the central bank's role to ensure that the banking sector is able to meet the public's demand for liquidity. Allowing a bank run to occur when a bank is inherently solvent is not in the interest of financial stability as this can lead to a system-wide crisis that can weaken all banks, and possibly even the central bank itself. Subsequently, the central bank has an integral role in guaranteeing the safety, soundness, efficiency and fairness of the payment system. As former US Federal Reserve Chairman Alan Greenspan observed in his book, "The Age of Turbulence," that if someone wanted to cripple the US economy then they would only have to "…take out the payment system. Banks would then be forced to fall back on inefficient physical transfers of money…the level of economic activity across the country could drop like a rock."

On account of the central banks' strong interest in financial stability as well as the maintenance of the public's confidence in the domestic currency and the smooth functioning of markets for the implementation of monetary policy, the central bank needs to take an active interest in the design, development and smooth functioning of the payment system. As Listfield and Negret (1994) noted, CBs have "a legitimate and important role in guaranteeing the safety, soundness, efficiency and fairness of the payment system."

In accordance with the interrelated role of a CB in monetary and financial stability and maintenance of a stable payment system, the BSP's policy framework revolves around these three main pillars. As prescribed in the BSP

charter, the BSP pursues the following primary activities: maintaining price stability through the conduct of prudent monetary policy; promoting financial stability through effective banking supervisions and regulation; and ensuring the safety, soundness and efficiency of the payment and settlement system. These three pillars serve as guidepost to ensure that the BSP appropriately and quickly responds to emerging challenges to price and financial stability.

2.1 Monetary Stability

The BSP, as the Philippine's central monetary authority, has the primary objective to "maintain price stability conducive to a balanced and sustainable growth of the economy." This is spelled out in Section 3 of the New Central Bank Act of 1993.

Achieving price stability is a universal goal shared by ***CB***s and monetary authorities all over the world. Price stability, or its equivalent, stability in the domestic purchasing power of the currency, appears as the dominant or one of the dominant legal objectives in 33 of 45 ***CB***s (Ortiz, 2009). This does not mean, however, that the BSP pursues price stability to the exclusion of other objectives. Although the price stability objective is the BSP's main priority, other economic goals—such as achieving broadbased, sustainable economic growth—are given consideration in policy decision-making. Thus, the BSP coordinates with other government agencies to ensure that its policies are part of a consistent and coherent overall policy framework.

Price stability refers to the condition of low and stable inflation. By keeping price stable, the BSP helps ensure strong and sustainable economic growth and better living standards. Monetary policy refers to the actions or measures taken by the BSP to regulate the supply of money in the economy to achieve price stability.

The BSP has a number of monetary policy instruments at its disposal to influence the timing, cost and availability of money and credit, as well as other financial factors, for the purpose of stabilising the price level. Of the monetary policy tools at its disposal, the main policy levers are the policy interest rates, which are the overnight repurchase (lending) rate (RP) and the overnight reverse repurchase (borrowing) rate (RRP). In addition, to increase or reduce liquidity in the financial system, the BSP also uses open market operations, accepts fixed-term deposits, offers standing facilities such as the rediscounting facility, and requires banking institutions to hold reserves on deposits and deposit substitutes.

In terms of its approach to monetary policy, the BSP followed the monetary aggregate targeting approach in the past. This approach is based on the assumption that there is a stable and predictable relationship between money on the one hand, and output and inflation on the other hand. In effect, under the monetary targeting framework, the BSP controls inflation indirectly by targeting money supply. This approach was modified beginning in the second semester of 1995 under the modified form of monetary targeting to put greater emphasis on price stability instead of rigidly observing the targets set for monetary aggregates. On 24 January 2000, the BSP's policy-making body, the Monetary Board (MB), approved in principle the shift to inflation targeting as a framework for conducting monetary policy. This was formally adopted in January 2002.

Inflation targeting focuses mainly on achieving price stability as the ultimate objective of monetary policy. Under this approach, the BSP commits to keeping inflation at a pre-announced average rate that the BSP promises to achieve over a given time period. The BSP then compares the actual headline inflation against its inflation forecasts. It uses the various monetary policy instruments at its disposal to achieve the inflation target. This involves mainly adjustments in the key policy interest rates of the BSP and the use of other instruments, including rediscounting and reserve requirement. The ***CB*** also provides regular reports explaining its policy decisions and containing its assessment of the inflation environment and outlook. If the ***CB*** fails to meet the inflation target, it is required to explain to the public why the target was not achieved and to come up with measures on how to steer inflation towards the target level.

The inflation targets have been set at 4.5% with a tolerance interval of +1.0 percentage point for 2010 and 4.0% with a tolerance interval of +1.0 percentage point for 2011. In July 2010, the MB announced the BSP's shift to a fixed inflation target for the medium term of 4 ± 1% for 2012-2014. The shift to a fixed medium-term inflation target from a variable annual inflation target was approved by the Development Budget Coordination Committee (DBCC) on 9 July 2010, under DBCC Resolution No. 2010-3.

During the recent global financial crisis, the BSP maintained a prudent monetary policy stance to keep inflation in check and allow market interest rates to decline, hence providing a conducive environment for businesses to expand. As the impact of the global financial crisis began to be felt and the Philippine economic growth began to slow down, the sustained decline in the inflation rate gave the BSP scope to adopt an appropriately accommodative monetary policy stance. Among the measures implemented accordingly include:

- Liquidity-easing measures in 2008 and 2009, including the reduction in bank reserve requirements by two percentage points, opening of the US dollar repurchase window, increase in the peso rediscounting budget to P60 billion, and provision of greater accessibility to these facilities to banking institutions.

- Reduction in the BSP's policy rates by a total of 200 basis points from December 2008 to July 2009 to provide liquidity for the orderly functioning of the financial markets and help support the economy against possible fragilities in the operating environment.

In 2010, the relatively benign inflation environment afforded the BSP the flexibility to keep policy rates steady during the year. At the same time, with economic recovery underway and financial markets starting to normalise, the BSP gradually unwound the liquidity enhancing measures it implemented in 2008-2009 to ensure that ample liquidity was available during the global financial crisis. The peso rediscount rate was aligned with the overnight RRP rate while the peso rediscounting budget was lowered from P60 billion to the pre-crisis level of P20 billion. Requirements for the availment of the rediscounting facility were likewise brought back to their pre-crisis terms.

In early 2011, the BSP continued to unwind from liquidity enhancing measures in the preceding years to help forestall inflation pressures as unfavourable weather conditions and protracted tensions in the Middle East and North Africa (MENA) contributed to mounting pressures on food and oil prices. In particular, the policy rates were raised by total of 50 basis points from March – June 2011. The BSP also raised the reserve requirements by two percentage points as a preemptive move to help manage liquidity given the prospects of sustained foreign exchange inflows. Subsequently, the BSP found scope to maintain monetary policy settings, especially as downside risks to global growth intensified, dampening global growth.

Starting in 2012, the MB decided to hold eight monetary policy meetings a year to discuss and decide on the appropriate monetary policy stance of the BSP in order to keep inflation within the target. Based on the assessment of the macroeconomic environment and the price situation of commodities, the MB takes the necessary actions consistent with the chosen monetary policy stance. The MB receives recommendations from the Advisory Committee (AC), a technical body which meets regularly a few days prior to each MB monetary policy meeting. The meetings of the AC are intended to serve as a forum for in-depth, comprehensive, broad-ranging and balanced assessment of monetary conditions, economic outlook, inflationary expectations, and the forecast inflation

path. The AC members agree by majority vote on a set of recommendations that are then submitted to the MB.

In the first seven months of 2012, amid continued benign inflation and the modest pace of growth of domestic demand, reflecting mainly the impact of weaker external demand, the MB cut policy rates by a total of 75 basis points. Moreover, the MB decided to approve three operational adjustments in the BSP's reserve requirement policy during its meeting on 2 February 2012 to increase the effectiveness of reserve requirement as a monetary policy tool, simplify its implementation, and improve the monitoring of banks' compliance. These adjustments, that were made effective April 2012, include:

- The unification of the existing statutory reserve requirement and liquidity reserve requirement into a single set of reserve requirement;

- The non-remuneration of the unified reserve requirement;

- The exclusion of vault cash (for banks) and demand deposits (for non-bank financial institutions with quasi-banking functions) as eligible forms of reserve requirement compliance;

- The reduction in the reserve requirement ratio by three (3) percentage points to 18% from 21% to offset the impact on the intermediation costs of banks.

See Table 1 for changes in the BSP policy rates[3] and the reserve requirement ratio from 2001 to 2012.

2.2 Financial Stability

Alongside its mandate to support price stability, the BSP has also been tasked with maintaining financial stability. While the BSP charter is not explicit on its financial stability objective, the BSP has pursued the promotion of financial stability through its mandate to supervise banks and quasi-banks, their subsidiaries and affiliates, and the non-bank financial institutions that the BSP is mandated to supervise under special laws. It should be noted, however, that the BSP shares oversight responsibility over the Philippine financial systems with other domestic financial regulators such as the Securities and Exchange Commission (SEC) for the non-bank sector and capital market, the Insurance Commission (IC) for the insurance industry, and the Cooperative Development Authority (CDA) for the

3. Specifically, the overnight RRP rate.

cooperative industry. However, since the Philippine financial system is largely bank-based rather than market-based, the onus for the promotion of financial system stability rests largely with the BSP.

The BSP defines financial stability as pertaining to the financial system's efficiency to redistribute and manage risks and carry out payments settlement, while remaining responsive to the demands and challenges faced by the economy. This has been pursued through the issuance of prudential rules and adoption of applicable internationally accepted standards and best practices cognizant of the domestic conditions. The BSP also appropriately monitors and assesses the operational soundness of all banks and other financial institutions under its supervision.

Since the 1997 Asian financial crisis, the BSP has initiatives to expedite the clearing out of non-performing assets and strengthening of bank balance sheets. Furthermore, the BSP pursued broad-based reforms geared toward maintaining a strong banking system, including: (a) aligning domestic prudential standards with international benchmarks and best practices, such as Basel Committee recommendations on supervisory practices and capital adequacy, International Accounting Standards (IAS) and International Financial Standards (IFRS) for the proper accounting and disclosure of financial transactions, and the Organisation for Economic Cooperation and Development (OECD) principles on good corporate governance; (b) implementing a consolidated and risk-based approach to examination, a shift from the traditional checklist approach; and (c) complementing the on-site examinations of banks with off-site surveillance functions[4] through the introduction of new supervisory reports (Financial Reporting Package and Capital Adequacy Ratio Report) and the review of other reports periodically submitted to the BSP. Hence, the BSP has issued rules and guidance aimed at improving risk management and corporate governance of banks and strengthened its own capacity to monitor and intervene.[5] The BSP issued new capital adequacy guidelines in line with BASEL II and plans to adopt BASEL III in 2014.

The BSP has also put in place macro-prudential measures that can help guard against a credit boom and excessive leveraging. These include, among others:

- A ceiling on the ratio of UKbs' and Kbs' loans to the real estate sector set at 20% of the total loan portfolio;

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4. Central Point of Contact
5. IMF Report on the Philippine Financial Sector Assessment Programme, April 2010

- A loan-to-value (LTV) ratio ceiling for real estate loans at 70% of the appraised value of the real estate collateral for commercial banks;

- A minimum leverage ratio of 5% as a trigger for Prompt Corrective Action (PCA) if not complied; and

- A 100% asset cover for their foreign exchange liabilities and 30% liquidity cover to limit the build-up in system-wide financial risk.

Supervisory coordination has also been strengthened by the creation in July 2004 of the Financial Sector Forum (FSF), composed of the BSP, the SEC, the IC and the Philippine Deposit Insurance Corporation (PDIC). This resulted in the improved exchange of information among the different regulatory agencies and coordinated the supervision and regulation of the financial system, particularly with the establishment of formal information-sharing agreements with five foreign supervisors.

However, unlike price stability, financial stability is not easy to define or measure given the interdependence and the complex interactions of different elements of the financial system among themselves and with the real economy. Cognizant of this, the BSP uses various surveillance and analytical tools to measure the safety and soundness of banks and other institutions under the BSP supervision.

- To assess bank's individual performance and supplement its risk-based approach to examination, the BSP has adopted the use of the following: the Capital Adequacy, Asset Quality, Management, Earnings, Liquidity and Sensitivity to Market Risks (CAMELS) ratings system; the Risk Assessment System (RAS); the Risk Management, Operational Control, Compliance and Asset Quality (ROCA) rating system; the Strength of Support Assessment (SOSA) rating system; and, the Trust Rating System (TRS).

- To address both systemic and idiosyncratic risks confronting the financial system, the BSP has developed early warning systems (EWS) for the macroeconomy, which focuses on currency crisis contagion effects, and an EWS for bank solvency.

- The BSP also performs periodic stress tests on the absorptive capacity of bank capital using a modified IMF stress tester 2.0.

Also in relation to its financial stability role, the BSP began to draft a financial stability report (FSR) in 2006. Initially, the exercise rested solely with the Department of Economic Research (DER). However, over time, as interest in financial stability continued to gain ground, the exercise has been formalised with the establishment of the BSP Financial Stability Committee (FSC) in September 2010. The high-level FSC is tasked to take stock of potential system-wide risks in the Philippine financial system. Technical work is underway on the measures and metrics needed to monitor and mitigate system-wide risks. It has also been placed in charge of the FSR which, to date, remains distributed only internally.

2.3 Efficient PSS

Systemically important payment systems can transmit economic shocks across markets and international borders. Hence, poorly designed or operated payment systems can create economic disturbances, while well-managed systems help minimise these disturbances.

The BSP, fully cognizant of its role in establishing facilities for payment services as mandated under Section 102 of R.A. No. 7653 and the importance of a safe and efficient payment system to financial stability, also takes the lead in maintaining a safe, sound and efficient payments and settlements system for the country. As the country's central monetary authority that has the exclusive authority to issue the currency, the BSP performs a pivotal role in the payments and settlements system in the Philippines by: (a) providing/operating the payment facility for final settlement to financial institutions – i.e. through the real time gross settlement system known as the ***PhilPaSS***; (b) issuing policy related to payments and settlements; (c) providing credit facilities for banks as a lender of last resort; (d) overseeing the payments and settlements system; and (e) initiating studies/systems reform for the improvement and maturity of payment systems in accordance with the global standards. Moreover, the BSP constantly strives to ensure that the payment infrastructure meets the highest standards for safety soundness and operational resilience.

The BSP's Payments and Settlements Office (PSO), under the direct supervision of the Deputy Governor of the BSP's Resource Management Sector, performs the operator function as it is responsible for the operation and maintenance of the ***PhilPaSS*** and its critical components. The BSP's Payments and Settlements Steering Committee (PSSC) recommends policy directions and formulates strategy, standards, rules and regulations. Meanwhile, the Core Information Technology Supervision Group (CITSG) of the BSP's Supervision

and Examination Sector has oversight on all payments and settlements system of banks and industry consortia.

As operator of the payment systems, the PSO ensures that the payment systems remain safe and efficient and exerts all efforts so that time-critical payments are completed as expected in order to facilitate and enhance economic processes, manage risks, and absorb shocks in order to promote financial stability. The BSP also provides for, maintains and upgrades the system hardware and software to ensure uninterrupted operations, that adequate Continuity of Business (COB) plans are in place, and that adequate back-up files are available for the continuous and efficient operation of the system.

To ensure that the ***PhilPaSS*** efficiently processes large-value transactions, facilitates the flow of payments among banks, and reduces losses that could arise associated with the payments and settlements process, the following refinements were put in place:

- Implemented the delivery-versus-payment (DvP) system for transactions on secondary trading of government securities in 2004 and the Enhanced Delivery-versus-Payment (e-DvP) system through the Philippine Dealing System (PDS) Settlement Highway in 2008;

- Enhanced the Intraday Liquidity Facility (ILF) system;

- Interconnected the PDS Settlement Highway and the BSP ***PhilPaSS***;

- Exerted continuous effort to automate other transactions affecting the demand deposit accounts;

- Connected BancNet and MegaLink to the ***PhilPaSS***; and

- Rationalised transaction fees charged to participants to make the fees more reasonable and equitable from P100 per transaction to an amount ranging between P5.00 to P400.00 depending on the value of transaction. However, transactions valued at P100.00 and below are free of charge.

Since payment systems affect the daily demand for liquidity of banks/financial institutions and may therefore affect the level of money market interest rates, the BSP, as a lender of last resort, provides liquidity tools to the ***PhilPaSS*** participants. Aside from the overnight repos that banks may avail with the BSP in case of liquidity problems, the BSP also established liquidity facilities intended

for banks experiencing unexpected temporary liquidity shortages so as to ensure continuous settlement of banks financial transaction, prevent chain defaults and achieve financial stability. The liquidity support facilities provided by the BSP include:

- ILF – a fully collateralised facility established to maintain the smooth and efficient operation of the payments system in order to avoid interbank payments gridlock in the settlement process.

- Overdraft Credit Line (OCL) – a short term credit facility intended to assist bank experiencing unexpected or higher than usual volume of inward cheque transactions. The governing policies and procedures are provided under BSP Circular 681 in order to provide additional liquidity for banks encountering liquidity problems due to cheque clearing losses as well as protect the BSP against settlement exposures.

As overseer of the payment systems, the BSP also relies on policies, circulars, rules and regulations, as well as moral suasion to conduct review and evaluation of systematically important payment systems operating outside of the BSP. Pending the enactment of the Payments Act, the oversight of payment system outside of the BSP is currently confined only to the following:

- The PDS Group due to its quasi-banking licence to provide electronic depository, registry and custody services and the linkage of the PDS Settlement Highway to the ***PhilPaSS***;

- BancNet, Inc. and MegaLink Inc., since both are affiliates of banks and outsourse service providers for ATM switch networks;

- Smart Money by Smart Telco, since this is an outsourcing service provided by Smart to its partner banks (i.e. BDO, Chinabank and Landbank), it allows the BSP to have access to the operations of Smart Money; and

- Globe G-Cash operation under Circular 649 dated 9 March 2009.

Lastly, through the role it plays in the PSS, the BSP promotes financial stability by exerting all efforts to ensure that time-critical payments are completed as expected especially of financial/interbank market transactions in order to facilitate and enhance economic processes, manage risks, and absorb shocks. Likewise, the payments system plays a critical role in the implementation of the BSP's monetary policy through the settlement of domestic money market

transactions, e.g. siphoning off excess liquidity in the system and ensuring that monetary policy changes get transmitted to the markets faster. The BSP, through the payments system, is also able to monitor the behaviour of the interbank money market and is able to effectively forecast liquidity conditions in the economy. Given a reliable and efficient payment system with real time or same-day settlement, the BSP is able to enhance the effectiveness of monetary policy tools used.

3. Philippine Payment and Settlement Infrastructure

A payment system is defined as an arrangement that allows users to transfer "money". In simple terms, "money" is regarded as cash (i.e., notes and coins issued by the government or central bank) and claims against credit institutions in the form of deposits. The use of bank deposits to make payments has become an important medium in most developed countries and to make a payment, the payer must issue an instruction in the form of a paper-based instrument (e.g. a cheque) or an electronic instruction (e.g. using a credit or plastic card).

The effectiveness of payment activities is fully dependent on the arrangements that facilitate fund transfers between members and it is these arrangements that constitute a "payment system". Payment systems consist therefore of networks that link the members with existing rules and procedures for the of use of this infrastructure. A payment system normally requires the following:

- Standard methods of transmitting payment messages between members;
- Agreed means of settling claims within the members/participants (normally through the deposits of the members/participants with the central bank); and
- Common operating procedures and rules (admission, fees, operating hours).

3.1 PSS Participants

3.1.1 Bangko Sentral ng Pilipinas

The BSP's role in the PSS is already discussed above.

3.1.2 Banks, Non-banks with Quasi Banking Function, and Other Financial Institutions

In the Philippines, the majority of payment service providers are banks. Though there are few non-bank payment service providers, they are not independent from the banks. Under the BSP charter, all banks and non-banks with quasi banking function (NBQBs), including their subsidiaries and affiliates engaged in related activities are supervised and regulated by the BSP.

As of end-June 2012, there were 37 universal and commercial banks, with 4,928 branches. Among such commercial banks, 18 were privately domestic banks, 3 were government-owned banks, and 16 were foreign banks and their subsidiaries. Almost all commercial banks issue their own Automated Teller Machines (ATM) cards.

There are four types of thrift banks operating in the Philippines. These are the Savings and Mortgage Banks (SMBs), Private Development Banks (PDBs) and Stock Savings and Loan Associations (SSLAs) and microfinance-thrift banks. As of end-June 2012, there were 69 thrift banks, with 1,453 branch offices.

For rural banks, as of end-June 2012, there are 606 rural and cooperative banks with 2,114 branches.

The existing specialised government banks are the Development Bank of the Philippines (DBP), the Land Bank of the Philippines (LBP), and Al-Amanah Islamic Investment Bank of the Philippines (AAIIB).

In addition to the foregoing banking institutions, as of end-June 2012, there were 15 non-banks financial intermediaries performing quasi-banking functions with 62 branches. Those non-banks without quasi-banking functions consist of 71 non-stock savings and loan associations with 124 branches, 6,463 pawnshops with 10,665 branches – all under the regulation/supervision of the BSP.

3.1.3 Other Bodies (PCHC, ATM Consortiums, PDS, Credit Card Companies, Other Self-Regulating Organisations (SROs) and Government Agencies)

3.1.3.1 Philippine Clearing House Corporation (PCHC)

The PCHC, incorporated in July 1977, is a private corporation co-owned by all commercial banks enlisted as members of the Bankers Association of the

Philippines (BAP). With the Clearing House Rules and Regulations approved and subsequently the arbitration mechanisms in place, the PCHC commenced its live operations on 06 June 1980 and stood proud being the first automated Magnetic Ink Character Recognition (MICR) Cheque Clearing House in Southeast Asia. Its main purpose was to automate the cheque clearing system through the medium of MICR-encoded cheques.

The PCHC provides cheque clearing services covering sixty nine (69) geographical regions – thirty (35) Greater Manila/Integrated Regions and thirty nine (34) Regional "local" exchange centres, processing a daily average of about 700,000 clearing items from more than 6,000 participating bank branches nationwide. The clearing period for Inter-Regional cheques is 4 days while Greater Manila cheques is 3 days.

3.1.3.2 ATM Consortiums

There are 5 Automated Teller Machine (ATM) switch operators in the Philippines, namely: BancNet, ENCASH, ExpressNet, MegaLink and NATIONLINK. BancNet, ExpressNet and MegaLink are considered major players in the payment systems because of their customer reach. BancNet, ExpressNet and MegaLink are co-owned by the big commercial banks. Their services go beyond the traditional transactions that coursed through the ATM. Meanwhile, ENCASH and NATIONLINK are more geared towards reaching out to people in the rural areas who are not normally reached by the major ATM consortiums.

a) **BancNet** connects the ATM Consortium networks of more than 49 local banks. As a multi-channel payment gateway, BancNet enables its customers to transact at any ATM terminals anywhere, anytime, at point-of-sale (POS), the Internet or through mobile phones. BancNet is also the exclusive gateway of China UnionPay. BancNet has also forged an alliance with the global payment brand JCB International. BancNet serves 8 million members with over 4,000 ATMs and more than 10,000 POS terminals.

b) **ExpressNe**t connects the ATM networks of seven major banks in the Philippines. At present, ExpressNet has 3.5 million customers and has 2,213 ATMs operating nationwide.

c) **MegaLink** connects the ATM networks of 15 member banks in the Philippines with a more than 2,921 ATMs nationwide and 32,439[6] POS terminals.

To this date, this three major ATM networks are already interconnected with each other to enhance the services they provide to their clients.

d) **Electronic Network Cash Tellers, Inc. (ENCASH)** is an independent switch network that also provides ATM service to the Philippine countryside and a close competitor of ENCASH. As the first Independent ATM deployer, ENCASH provides privately-owned ATMs to areas not deemed viable by commercial banks, allowing users in remote locations to conveniently access to their finances. Initially connecting the ATMs of five (5) rural banks in the Philippines, the ENCASH network eventually expanded to more than 101 member- rural banks and cooperatives with 220 ATMs deployed, and operations implemented Luzon, Visayas and Mindanao. ENCASH is a member of MegaLink which is interconnected with the other Philippine interbank networks, i.e., BancNet and ExpressNet. It is also the first network in the Philippines to fully adopt EMV technology on all its ATM cards, although the regular magnetic stripe cards remain an option for the network. ENCASH provides both rural and commercial bank ATM cardholders with the convenience of having access to ATMs in more locations all over the country.

e) **NATIONLINK**'s members consist mostly of savings banks, credit unions, rural banks, cooperatives and non-governmental organisations, and is largely concentrated in rural areas, where the reach of ATMs are more limited than in the cities. The network focuses heavily on the overseas Filipino worker (OFW) market.

The use of ATM networks enable their customers to transact at any ATM terminal anywhere, anytime, at point of sale, the internet or through mobile phones the following transactions: cash withdrawal, cash advance, account balance inquiry, bills payments, funds transfer, load fulfillment and purchases.

3.1.3.3 Philippine Dealing System

The Philippine Dealing System Holdings Corp ("PDS Group") is a private corporation tasked to reshape the architecture of the Philippine financial markets

6. Source: MegaLink, figures as of end-December 2011.

to meet the needs of public investors while abiding with best international standards. The PDS Group has three operating subsidiaries: Philippine Dealing & Exchange Corp. (PDEx) - an entity that operates electronic trading platforms for securities; Philippine Depository & Trust Corp. (PDTC) - one that provides securities depository, registry and custody services, and Philippine Securities Settlement Corp. (PSSC) - the company that provides electronic settlement facilities with straight through process and delivery vs. payment capabilities. The PDS Group manages or operates electronic trading and settlement platforms in the Philippine's Debt Securities and Foreign Exchange markets, and performs key post-settlement functions for the Debt and Equity markets through its electronic Depository, Registry and Custody services. The large value of financial transactions coursing through the Group's collective platforms make these important to the Philippine financial system. The Group's shareholders are all institutions that are established leaders across the sectors of finance, manufacturing and technology. The Group actively interacts with financial market regulators and participants in its effort to build the venue where investors may have a wider array of financial instruments and issuers have an efficient medium to raise capital for their company's requirements.

3.1.3.4 Bureau of Treasury

With the transfer of the fiscal agency functions from the BSP to the Department of Finance (DoF), the Bureau of Treasury (BTr) has taken the function of booking government securities through the Registry of Scripless Securities (RoSS) effective November 4, 1996. RoSS is the official registry of government securities maintained and administered by the BTr.

3.1.3.5 Philippine Postal Corporation

Under the Republic Act No. 7354, the Philippine Postal Corporation (PPC) is authorised to issue domestic and international money orders. Any mailing patron can buy money order cheques from their local post office; this may be drawn payable to another person or to the person making such application, if he desires so. Money order cheques are then transmitted to the beneficiary either through registered letter or speedy airmail. Upon receipt, domestic money orders may be presented for payment at the designated paying office, issuing office or commercial bank within 90 days from date of issue. For services provided, fees are collected by the issuing post office based on the aggregate or total amount applied for.

3.1.3.6 Securities and Exchange Commission

The SEC, established on 26 Oct 1936 by virtue of the Commonwealth Act No. 83 or the Securities Act, was prompted by the need to safeguard public interest in view of the local stock market boom at that time. Its major functions included registration of securities, analysis of every registered security, evaluation of the financial condition and operations of applicants for security issuance, screening of applications for broker's or dealer's licence and supervision of stock and bond brokers as well as the stock exchanges.

3.1.3.7 Privately-owned Payment Service Providers

Since all large-value payments are finally settled in the DDAs of banks in the BSP and this type of payment is normally used by banks, there is no existing large-value payment system (LVPS) other than the ***PhilPaSS.*** Retail payment systems (RPS), on the other hand, are owned by private payment service providers, which are incidentally owned by the banks themselves through a separate corporation. Though the majority of the RPS in the Philippines are co-owned by the banks, there are few systems which are owned by non-banking institutions. These retail payment services are registered and supervised under the jurisdiction of the SEC.

3.2 Payment Instruments

Payment instruments in the Philippines may be classified into cash or non-cash. Non-cash payment instruments may be sub-classified generically into cheque payments, direct fund transfers and card payments.

3.2.1 Cash

By law, the BSP has the sole right and authority to issue currency in the Philippines. At present, currency notes are issued in denominations of 1000, 500, 100, 50 and 20 pesos; and, coins in 25, 10, 5 and 1 cent(s). Although in recent years there has been an increasing tendency to use alternative payment methods, a large portion of payments to individuals is still made in the form of cash, especially in the areas of retail trade, land transportation and personal services. This explains the wide increase of cash in circulation from ₱194.7 billion in 2001 to ₱484.0 billion as of end-2011 or 148.6% in 10 years.

3.2.2 Non-cash

There are six main non-cash payment instruments/media that are currently used in the Philippines, as follows:

3.2.2.1 Cheques

Cheques are commonly used by consumers for bills and small value payments. For businesses, cheques are utilised as payment for purchases of goods and services. In the Philippines, banks exchange cheques through Electronic Cheque Clearing System (ECCS) operated by the PCHC for processing and consolidation. The cheque clearing results are then electronically transmitted to the BSP for the corresponding settlement in the banks' respective DDAs.

The volume of cheques cleared in the PCHC increased by 2.15% from 169.952 million in 2005 to 178.60 million in 2011. The increase in volume indicates that cheque is still the preferred mode of payment indicative of consumers' confidence and trust in such payment medium in spite of the availability of electronic payment instruments.

3.2.2.2 Direct Debit and Credit Transfers

The direct debit and credit transfers are used mainly for the settlement of large value payments for small volume transactions such as Interbank Call Loan (IBCL) lending/borrowing, ₱/USD trades/purchases as well as Government Securities trades and purchases. These direct debit and credit transactions covering large value payments settle through the country's real time gross settlement system called the ***PhilPaSS.***

3.2.2.3 Credit and Debit Cards

There are at least 12 major credit cards issued in the Philippines. All credit cards in the Philippines have affiliations with major international credit cards, such as Visa, MasterCard, Diners and JCB. Some domestic and international cards have access to the banks' ATM network in the Philippines. Several stores/ retailers issue cards for use in their own chains.

Credit cards in the Philippines are usually issued by the banks which have formed part of their marketing strategy to increase the number of their customer base and improve income that can be generated from retail consumer business. Credit card use is no longer limited to the ordinary purchase of goods and services

by the cardholders. Banks have expanded its usage for other purposes such as cash advance, easy installment plan for purchases, link-up to savings and chequeing accounts of cardholders, etc., to attract more customers. On the other hand, most commercial banks and some thrift banks issue debit cards. Debit cards enable 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, e.g. that of a cash card or cheque guarantee card).

3.2.2.4 ATM Cards

The ATM card is a commonly used card issued normally by banks and can be used for account inquiry/information, deposits, withdrawals, bills payment, and interbank funds transfer coursed through the network switches, i.e., BancNet, MegaLink, ExpressNet, NATIONLINK and ENCASH. Some of these switches have developed their own POS systems to allow their cardholders to pay for their purchases electronically through their accounts for credit to the retailer's account.

3.2.2.5 E-money or Stored Value Cards

E-money is a kind of value stored electronically in a device such as a chip card or a hard drive in a personal computer. The BSP classifies e-money further as monetary value stored electronically in an instrument or device, which can be withdrawn in cash and, if issued by a bank, shall not be considered as deposit. The most popular forms of e-money in the Philippines are SMART Money and Globe's G-Cash.

Stored Value Cards are prepaid cards in which the record of funds can be increased as well as decreased. It is also called an electronic purse. In the Philippines, these cards are commonly single use instruments and non-reusable. Typical examples of single use cards are those issued by the Light Rail Transit Authority (LRTA), Metro Rail Transit Authority (MRTA) and major telecommunications companies. A bank also pioneered the use of multi-purpose reloadable e-Cash that can be used for cash withdrawals through the bank's counter or automated teller machines or payment of bills to the accredited establishment of the e-Cash issuer.

3.2.2.6 Electronic Banking

Banking institutions in the Philippines provide electronic banking services which includes telephone banking, desktop banking and mobile banking. Desktop banking and telephone banking are common electronic distribution channels.

Most banking institutions also offer services through their internet banking facilities such as account balance summary, request for account statements, funds transfer between own accounts or third-party accounts, bills payments, cheque book request services and even mobile banking registration.

Likewise, most users of the electronic bill payment system that facilitates customers to pay their various utility bills (e.g. electricity, telephone and water bills, etc.) electronically are coursed through the various ATM network facilities of banks. However, credit card and direct debit are still the preferred method of payment.

3.3 Philippine Payment System Landscape

The Philippine PSS began when banks and other financial institutions used the Enhanced Multi-transaction Interbank Payment System (MIPS2) for their interbank transaction. The MIPS2 was an electronic net clearing system operated by the BAP and the PCHC, in coordination with the BPS. Both counterparties in an interbank transaction under the MIPS2 had to input their transactions through the PCHC, which, in turn, verified and authenticated the transactions prior to electronic transmission to the BSP for settlement. The details of the transactions of banks/financial institutions were obtained by the participants through the reports from the MIPS2, while the balances of their demand deposits were being advised through an hourly electronic broadcast by the BSP Comptrollership Department.

However, the MIPS2 had some problems that hampered the speed of transactions between banks. First, the participant banks needed to wait for the fixed hourly broadcast from the BSP through cc:mail system in order to know the details of the transactions debited from and credited to their accounts and the available balances of their DDA. Second, the MIPS2 had limited operating hours between 10:00 a.m. and 4:00 p.m. daily.

Recognising the need for a system that would enable online, real-time settlement of interbank transactions and eliminate risk in the settlement process, the BSP, in collaboration with the BAP, the Chamber of Thrift Banks (CTB),

the Rural Bankers Association of the Philippines (RBAP) and the Investment House Association of the Philippines (IHAP), formally launched on 12 December 2002 an RTGS known as the ***PhilPaSS.***

Today, the landscape of Philippine Payment and Settlement System is composed of the following major systems:

3.3.1 Philippine Payments and Settlements System (PhilPaSS)

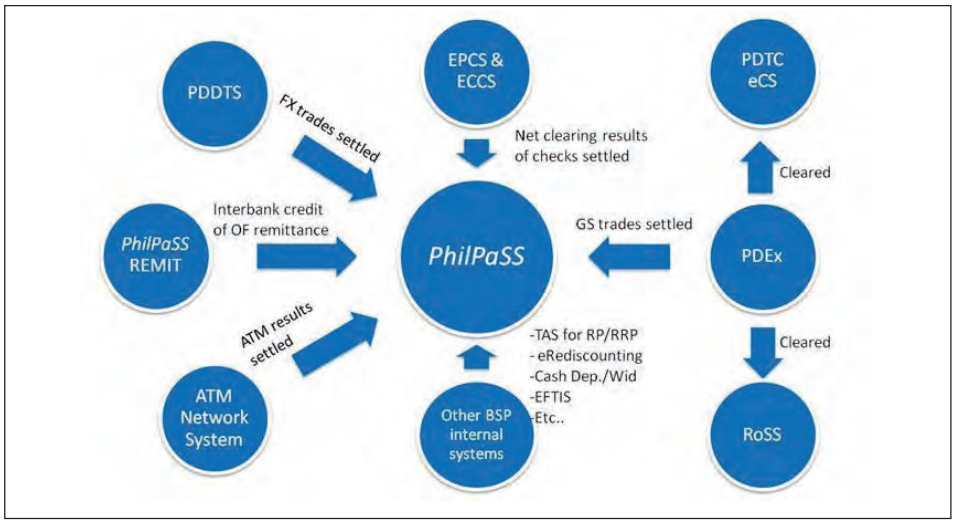
The ***PhilPaSS*** is a real time gross settlement system, owned and operated by the BSP that caters to the settlement of large value transactions of banks through their DDA maintained with the BSP. The system was implemented in 2002. In the ***PhilPaSS,*** all transactions are processed and settled on a real time basis through its Central Accounting System (CAS) which prompts the accounting and recording of the settlement instructions received from SWIFT (for Swift member banks) and Philippine Payment System – Front-End System (PPS-FES) (for non-swift), into the participants' DDA with the BSP. The CAS debits the account of the paying bank and credits the account of the receiving bank.

Commercial banks use the SWIFT-based network and message formats to transmit their financial transactions to the ***PhilPaSS*** for processing and settlement. The thrift/savings banks, financial institutions or NBQBs and rural banks use the PPS-FES which was developed by the BSP's Information Technology, Infrastructure and Operations Department (ITIOD) to enable them to transmit their financial transactions to their counterparties through the ***PhilPaSS***-CAS.

In February 2012, the BSP implemented the use of Participant Browser (PB) for the ***PhilPaSS*** participants. The PB is a web-based facility that aims to improve the banks' mode of accessing the ***PhilPaSS***. It is a state of the art browser that will enable the ***PhilPaSS*** participating banks to efficiently manage their respective DDA maintained with the BSP. The authorised users of the system will be capable of checking and verifying the status and details of incoming and outgoing interbank transactions. Users can also re-prioritise or cancel queued payments as well as generate reports reflecting the DDA transaction that has settled during the day based on the file formats available in the system. More importantly, the PB will eliminate the connectivity problems normally encountered when using dial-up access to establish the link with the BSP-***PhilPaSS***.

The ***PhilPaSS*** maintains an **interface** or also **act as settlement system for other major payment systems** operating in the country (as shown in diagram below).

Figure 1
The Philippine Payments and Settlements System (*PhilPass)*



3.3.1.1 Electronic Peso Clearing System (EPCS) and ECCS owned and operated by the PCHC

The ECCS pertains to the online transmission of cheque data to the PCHC for a faster exchange of value and the delivery of the corresponding physical items later. Banks use the ECCS front-end application to transmit their outward clearing demands and retrieve their inward data clearing files to debit the account of their individual clients. The cheque items/data are processed and cleared through the PCHC ECCS, the net clearing results of which are then electronically transmitted in the afternoon of the same day by PCHC to the ***PhilPaSS*** for settlement.

The EPCS, on the other hand**,** is an interbank account-to-account fund transfer system that supports bulk, recurring and non-time sensitive payment and collection transactions. Under this system, the PCHC receives payment instructions from various participating banks. These are instructions coming from bank's client to pay his obligations by transferring the amount owed from his account to the account of the creditor maintained in another bank, which are then forwarded to the PCHC. The electronic transmissions of electronic peso

transfers between banks occur between 9:00AM and 4:00PM. Being an online processing system, the participating banks/branches are permitted to gain access to the EPCS Host Computer located at the PCHC via data communication lines. The system enables payees to use funds on the next business day while withdrawals of transferred funds from the payees' accounts in the Peso Netting require at least 48 hours following the remittance date. The fund transfer instructions are processed and cleared through the PCHC EPCS, the net clearing results of which are also electronically transmitted in the afternoon of the same day by the PCHC to the ***PhilPaSS*** for settlement.

Unlike the ECCS, the payment instruction documents by the banks from their clients are retained by the banks, and no physical document is forwarded to the PCHC.

Any bank which incurs an overdraft in its deposit account with the BSP shall fully cover it, including interest at a rate equivalent to one-tenth of one percent. (1‰) per day or the prevailing 91-day T-bill rate plus three percentage points, whichever is higher, not later than the next clearing day. The corresponding clearing office (PCHC and the BSP Regional Clearing Office) shall officially notify the banks with overdrawn balances.

Settlement of the clearing balances with the BSP shall not be effected for any account which continues to be overdrawn for five consecutive banking days until such time that the overdrawn amount is fully covered or otherwise converted into an emergency loan or advances pursuant to the provisions of Section 84 of R.A. No. 7653. Banks may also borrow from other banks through the interbank facility or from the BSP through the overnight or term regular repurchase facilities at existing rates to cover overdrafts.

3.3.1.2 Philippine Domestic Dollar Transfer System (PDDTS)

The PDDTS is a local clearing and electronic communication system operated by the BAP, PCHC, PSSC and Citibank Manila (as the USD settlement bank). It is a facility used by the banking industry to move US dollar funds from one Philippine bank to another on the same day without having to go through a correspondent bank in the US. The PDDTS allows on-line, real-time gross settlement of domestic interbank US dollar transfer and third-party account to account US dollar transfers.

The PDDTS participating bank maintains a US dollar interest bearing account with the settlement/depository bank (PDDTS account) used solely for effecting

credits and debits and other transaction arising from the PDDTS transactions as well as payment(s) of transactions and other charges attendant to the PDDTS transactions. The end-of-day net positions of banks arising from OFW remittances which are coursed through the PCHC, are also settled through the PDDTS.

If the sending bank's PDDTS account balance is insufficient to cover the transfer, the transfer instruction will be placed on queue. Participants who may be temporarily short of funds during the day may then request Citibank for daylight overdraft facility for the queued transactions.

The PDDTS also made possible the implementation of Payment vs. Payment (PvP) facility in 2003 for interbank USD-Peso transactions with the dollar leg settling in the PDDTS and the peso leg settling through the BSP-***PhilPaSS***.

In PvP transactions, the USD leg is checked first and where sufficient, the USD amount is earmarked. A peso payment instruction is then sent to the ***PhilPaSS*** system, which is queued together with all other payment instructions of the same bank. Upon successful posting of the peso payment debiting the USD buyer's ***PhilPaSS*** account and crediting the USD seller's ***PhilPaSS***, the ***PhilPaSS*** sends a confirmation message to the PSSC PDDTS System, which triggers the actual transfer of the earmarked USD amount in the USD seller's PDDTS account to the PDDTS account of the USD buyer.

In the Philippines, the peso-dollar trading among banks and between these banks and the BSP are done through the PDS electronic platform called the Philippine Dealing and Exchange Corporation (PDEx).

3.3.1.3 PhilPaSS REMIT System

The ***PhilPass*** REMIT is a system developed by the **ITSS** group of the BSP that will allow the use of the ***PhilPaSS*** as a settlement arm for overseas Filipino (OF) remittances in order to ensure safe and immediate transfer and settlement of remittance funds into beneficiary accounts maintained in another bank. Implemented in May 2010, the system interfaces with the ***PhilPaSS*** to cover the electronic settlement of OF remittances that are received by the 11 private commercial banks, three government-owned banks, and one thrift bank from overseas branches or correspondent banks and partner remittances agencies abroad but for further credit to beneficiary accounts maintained with other banks in the Philippines. Once an OF remits funds through the overseas bank branch or remittance partners abroad, and sent via wire transfer to the participating remitting bank in the Philippines, the remitting banks using an interface ***PhilPaSS***

Remit system will prepare and transmit the batched files indicating the details of beneficiary accounts to be credited. Upon settlement in the ***PhilPaSS***, the beneficiary bank will further credit the remittance to the account of the ultimate beneficiary. The system has a feedback mechanism feature that requires the beneficiary banks to inform the BSP and remitting bank that it has credited the OFW's beneficiary account within the same day (Day 1) or at the latest on Day 2 , if further validation of beneficiary accounts is needed.

3.3.1.4 BancNet and MegaLink ATM Network Systems

BancNet is the biggest interbank network connecting the ATM Consortium networks of more than 49 local banks compared to MegaLink with just 15 member banks.

The use of ATM networks enable their customers to transact at any ATM terminal anywhere, anytime, at point of sale, the internet or through mobile phones. BancNet and MegaLink send electronic payment instructions/settlement report via leased line to the ***PhilPaSS*** for the settlement of network funds against the DDA maintained by member banks with the BSP.

3.3.1.5 Registry of Scriptless Securities (RoSS)

The RoSS is a central securities (Treasury Bills and Bonds) depository maintained and administered by the BTr. All government securities (GS) floated/ originated by the National Government under its scripless policy is recorded in the registry in the name of the Government securities eligible dealer (GSED) by virtue of the auction award made by an auction committee. Subsequent transfer of ownership on the scripless securities out of the securities account of a GSED is recorded in the RoSS through the securities account of the counterparty GSED. As of end-December 2011, there are 11,228 registered accounts. (Banks – 12; Non-bank financial institutions – 11; and Others – 11,205).

In the primary market, the BTr through the bridge systems announces, two days in advance, the details of the scheduled GS for auction. The GSED submits their bids using the Reuters Interface, which are electronically linked to the BTr's Automated Debt Auction Processing System (ADAPS). Upon award of GS to a winning GSED bidder, the securities award are electronically downloaded to the RoSS system and cash settlement reports are generated and forwarded to the ***PhilPaSS*** for debiting the DDA of the winning GSEDs and crediting the DDA of the BTr.

In the secondary market, the GSEDs/non-GSEDs input settlement instructions for closed deals via the PDEx of the PDS which is electronically linked to the RoSS System. The RoSS system checks the securities in the seller's account and earmarks these for transfer. The system then sends an electronic settlement file to the ***PhilPaSS*** to debit the DDA of the buyer and credit the account of the seller. Securities and cash settlement of GS transaction to the secondary market is done via delivery versus payment on a real time gross trade for trade basis.

3.3.1.6 Philippine Depository and Trust Corporation System (PDTC)

The PDTC a subsidiary of PDS, that provides depository and settlement services for listed fixed income securities traded and cleared in the PDEx (another subsidiary of PDS). This includes government securities and corporate debt issues. The PDTC operates a depository and electronic book-entry transfer system for the centralised handling of all kinds of securities which supports the settlement of securities by book entries in the records of the PDTC without physical delivery of stock certificates. As a depository for the equities market, the PCTC centralises the management of shareholders information through dematerialisation. Dematerialisation eliminates the need to deliver paper certificates for securities traded; hence it eliminates the risk associated with maintaining physical certificates and speeds up the processing and settlement of trade transaction.

Fixed income trades at the PDEx settle on T+1 under PDEx DvP model 1 system (i.e., gross simultaneous settlement of securities and funds transfer) method in which the cash settlement side is linked to the ***PhilPaSS.***

3.3.1.7 In the Pipeline

Soon to settle in the ***PhilPaSS*** are equities traded at the Philippine Stock Exchange (PSE), the clearing of which is handled by the Securities Clearing Corporation of the Philippines (SCCP). Trades at the PSE settle on T+3 under SCCP-DvP model 3 system (simultaneous net settlement of securities and fund transfer) net settlement method for broker-to-broker transactions. Meanwhile, settlement of trades in the PSE-listed stocks between broker and investor is typically done via cheque for local clients and direct credit to bank accounts for foreign clients.

3.3.1.8 Other BSP Internal Systems

The BSP has also integrated in the ***PhilPaSS*** various BSP internal systems affecting the the DDA accounts of the banks, such as:

a) Electronic Fund Transfer Instruction System (EFTIS) - developed and implemented in 1997 to automate the peso funds transfer instructions coming from authorised agent banks (AABs) of the Bureau of Internal Revenue (BIR) and the Bureau of Customs (BOC) to the BSP. The System ensures that such peso funds transfer instructions are transmitted and settled promptly and efficiently without delay or with minimal manual intervention. The system's implementation was a joint effort between the BAP and the BSP utilising Lotus Notes as the messaging software.

AABs accept the public's (individual/corporate) payments of internal revenue taxes of the BIR and customs duties of the BOC and electronically transmit the fund transfer instructions via EFTIS their remittances of revenue collections to the ***PhilPaSS*** - for credit to the deposit account of the BTr-National Government maintained with the BSP.

Banks also use EFTIS to transmit transfer instructions to comply with the reserve requirements of ***other intra-bank accounts with BSP***, namely: Common Trust Fund (CTF), Trust, Other Fiduciary Accounts (TOFA) and Small- and Medium-enterprise (SME) accounts.

As identified in the BSP's COB Plan, the EFTIS also serves as the back-up messaging system in case SWIFT or PPS-FES Client System becomes inoperable.

b) Electronic Cash Withdrawal System (ECWS) - implemented in February 2006 in order to improve the processing and settlement of banks' cash withdrawals for their daily requirements for peso notes and coins in various denominations.

The ECWS standardised the process of ordering various currency denominations by the introduction of a Cash Order Slip (COS), where banks specify their desired currency denominations subject to approval based on the availability of currency stock held at the BSP Cash Department. The amount approved in the processed COS is indicated in the SWIFT/PPS-FES message instruction sent to the ***PhilPaSS*** for settlement, subject to available balances in the deposit account of the withdrawing bank. Once

settled, a system-generated settlement electronic notification is transmitted to the BSP-Cash Department to trigger the release of the proceeds of withdrawals to awaiting bank representatives.

The use of the ***PhilPaSS*** as the settlement system of the ECWS eliminated the use and presentation of cheques before cash withdrawals can be completed. The ECWS also facilitated the reengineering of processes involved on previously transacted over-the-counter (OTC) cash withdrawals from the BSP. The system has made cash more convenient and efficient for the banks.

The implementation of the ECWS also resulted in man-hour savings for the banks in terms of time spent in cheque preparation, authorisation of signatures and delivery to the BSP.

c) eRediscounting System – The Electronic Rediscounting System or eRediscounting is an online internet-based rediscounting facility that the BSP makes available to all active and qualified banks nationwide. This facility allows banks to conduct their rediscounting transactions and inquiries with the BSP in on-line, real time basis at the convenience of their own bank premises. With its simplified and end-to-end processing capability, the system provides immediate availability and fast delivery of credit to banks, especially those in the countryside. More importantly, it will reduce the transaction costs of banks, which will mutually benefit the participating banks and their clients.

***d) PhilPaSS* Participants**

As of end-August 2012, the following institutions participated in the ***PhilPaSS:***

- 34 commercial banks
- 3 specialised banks
- 40 savings and thrift banks
- 30 rural banks
- 14 Non-bank with Quasi Banking Function (NBQBs)
- 2 ATM Networks
- Bureau of the Treasury (BTr)

- BSP-Department of Loans and Credit (DLC)[7]
- BSP-Provident Fund Office (PFO)[8]
- BSP-Supervision Departments
- BSP-Treasury Department (TD)
- Philippine Clearing House Corporation
- Philippine Dealing Exchange

See Table 2 on the number of the ***PhilPaSS*** participants from 2004 to 2011.

3.3.1.9 Transactions Processed and Settled in PhilPaSS

To date, the following transactions (with value dates equal to the ***PhilPaSS*** business day) are accepted for processing and settlement in the ***PhilPaSS***:

- High-value interbank transfers
- Sale and Purchase of GS trades under outright and repurchase agreements with the BSP in connection with the latter's Open Market Operations
- Interbank Sale and Purchase of Primary and Secondary Market GS trades via the DvP System
- Settlement of payments for the public (tertiary level) market trading of government securities
- Settlement of the peso leg of foreign currency transactions via the PvP System
- Interbank settlement of ATM transactions within the members of ATM network provider and settlement of inter-network transactions of ATM network providers
- Customer payment instructions
- Cash deposits/withdrawals of notes and coins – banks' head offices
- Cash deposits/withdrawals of notes and coins – banks' regional branches
- Results of cheque clearing
- Revenue Collections (Internal Revenue Taxes and Customs Taxes/Duties)

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7. DLC manages the e-rediscounting window and overdraft clearing lines of banks.
8. PFO manages the investment portfolio of BSP employees' retirement fund.

- Treasury Department (domestic) trades/purchases and lending/borrowing
- E-rediscounting, emergency and special facility loans
- OF remittances
- Withdrawal of banks' excess reserves
- Annual supervisory fees

There are no limits on the value or type of transactions that can be processed in the ***PhilPaSS*** provided both counterparties are maintaining DDAs in the ***PhilPaSS*** and the value dates of the transactions are equal to the current business date of the ***PhilPaSS***. If the transactions are future dated, the value dates should not be more than four (4) calendar days than the current value date of the system. The ***PhilPaSS*** Business Day opens at 9:00AM and closes at 5:45PM.

Participants may issue system enquiries and secure settlement/status reports through the System by using the message types applicable to SWIFT-user (commercial) banks and PPS-FES user (thrift/rural) banks.

The system has the following capabilities: real time accounting, availability of on-line inquiries and on-demand reports; gridlock detection resolution; liquidity management (Intraday Liquidity Facility); payment queuing/prioritisation; general ledger interface and system security, control and audit trails.

The system rules and regulations governing the ***PhilPaSS*** are embodied in the Agreement for the Philippine Payments System via Real Time Gross Settlement (PPS-RTGS) and the Rules and Regulations Governing the Philippine Payments System via RTGS that were signed and approved individually by the ***PhilPaSS*** participants.

Because of the different types of transactions processed and settled in the ***PhilPaSS*** and sent by other payment systems interfacing the ***PhilPaSS***, different settlement timelines are implemented to avoid settlement concentration and prevent closing time bottlenecks. For instance, the cut-off time for settlement of ATM transactions is before 11 am, while for the net results of cheque clearing before 5:45 pm.

3.3.2 Other Retail Payment System Providers

Third party non-financial institutions also offer payment processing services through the internet (such as Pay Pal, Western Union) and through the mobile

payment system. However, in the absence of a Payments Act, these are not subject to BSP's oversight and supervision.

3.3.2.1 Mobile Payments System

The most popular forms of e-money in the Philippines are Smart Money and Globe's Gcash. Gcash is an internationally acclaimed micropayment service which transforms a mobile phone into a virtual wallet for a secure, fast and convenient money transfers at the speed and cost of a text message. Gcash is owned and operated by a private company, Globe Telecoms.

Smart money is a Mastercard electronic product issued by Banco De Oro and co-branded with Smart Communications Inc. It is a reloadable payment card that may either be accessed through a smart mobile phone or a mastercard-powered card, similar to a debit/cash card. Smart money enables smart subscribers to manage their money from their mobile phones, wherever they are, whenever they want.Unfortunately, mobile payments are not linked to the ***PhilPaSS***.

3.3.2.2 Pay Pal, Xoom et al.

Electronic payment systems provided by non-bank, non-financial operators using the internet like the Pay Pal and Xoom are also utilised for fund transfers in the Philippines. Since the systems are provided by a non-bank, these types of payment providers are likewise not linked to the ***PhilPaSS***.

3.4 Dealing with Risks to the Stability of Philippine PSS

Kahn and Roberds (2007) said that payments systems are typically seen as "essential, pervasive and boring until there's a malfunction." Indeed, policymakers and market participants oftentimes take for granted that transfers will be settled as expected. They assume that the PSS will perform as solidly under market stress as it does under normal conditions. Payment systems, however, involve significant exposures and risks for members and it is for this reason that central banks have always taken into account the design and operation of payment systems and additional control features to eliminate these risks.

To ensure the resilience of key payment infrastructures, the BSP has adhered closely to the Core Principles for Systemically Important Payment Systems (Core Principles, 2001) in the design and operation of the ***PhilPaSS.*** In particular, the

BSP has adapted certain measures/strategies to mitigate risks associated with credit, liquidity, settlement, operational and legal risks, including:

- Strict observance of the ***PhilPaSS***' value-added features to mitigate settlement risks;

- Ensure strong adherence of participants to the membership criteria;

- Monitoring/restricting members/class of members which may pose significant risks to the systems;

- Application of caps or limits on intraday exposures to the system by the participants along the lines of counterparty exposure that members themselves adhere to in the markets; and

- System limits so that no single party breaches such limits.

With the ***PhilPaSS***, since transactions are settled on a trade-for-trade basis and with finality subject to the availability of balances in the deposit reserves maintained by banks with the BSP, the related risks are eliminated. The BSP is not obliged to effect the transfer of funds in the deposit reserves maintained by banks and NBQBs if there are insufficient balances in the reserve deposits of the transacting (paying) parties. Likewise, the liquidity tools provided by BSP, in case availed by the participants, are all highly collateralised.

In terms of operational risk, each participant is responsible for ensuring the confidentiality, safety and security of its login IDs, passwords and authentication keys for activating the system and initiating IBCL transactions. The participant is legally bound by its electronic fund transfer instruction, which it sends through the system without need of any other manually prepared confirmation, paper, or instrument, provided that the same has been authenticated by the BSP and provided further that they comply with the terms and conditions set forth in the Memorandum of Agreement. Moreover, both the BSP and all the ***PhilPaSS*** participants shall be responsible for ensuring that adequate COB plans are in place for uninterrupted operations and that all potential single points of failure in its operations are observed.

The ***PhilPaSS*** has two back-up systems – a local back-up system located within the BSP head office and an off-site location. The back-up systems mirrors the transaction from the primary site in real time so that it can switch its operation at any point in time in case the primary site is inoperable.

In case the two back-up systems become inoperable due to extraordinary circumstances, the BSP can activate its existing EFTIS to allow the participants to send their interbank instructions to BSP for processing and settlement. All the ***PhilPaSS*** participants will be duly advised through SWIFT and PPS-FES message/advisories on the contingency plan(s) that the BSP will initiate in case the ***PhilPaSS'*** primary site is encountering technical problems.

In case a bank's SWIFT/PPS-FES computer-based terminals encounter connectivity problems with the ***PhilPaSS,*** the contingent procedure requires the bank concerned to accomplish a COB Manual Settlement Form; to be transmitted via fax to BSP-Payments and Settlements Office (PSO) for the manual processing and settlement of the payment instruction, if any. After processing and settlement (signature-verification, encoding and authorisation), the BSP-PSO shall inform the paying bank (via fax) that the requested manual settlement has been completed.

Since the ***PhilPaSS*** operates in a highly computerised environment, technological components that support its operation also expose the system to issues and challenges brought about by the effect of fast changing technology and the global standards and trends that the ***PhilPaSS*** should adhere to. To ensure the security and operational reliability of the ***PhilPaSS***, the BSP continues to keep itself abreast with the latest trends in technology and standards as well as to be vigilant in the proper management of the various risks that affect the operations of the system. In relation to this, the following arrangements were put in place:

- **Security Policy and Controls.** In addition to the built-in security measures for transaction processing, a User Profile is maintained by the BSP to ensure that access levels of users are defined in accordance with their functions. Adequate password controls and management are enforced to prevent unauthorised access to hardware, systems and data. Likewise, online participants are required to implement their own physical and logical security and management controls to protect their own hardware, software and data from unauthorised access.

- **Operational Reliability.** The ***PhilPaSS'*** reliability depends on the availability of LOGICA-CAS, SWIFT, cFAS and the communications networks. The ***PhilPaSS*** is considered unavailable when the participants cannot move funds into and out of their accounts because of a probem within the BSP's control, regardless of whether it emanates from an application system or communications network. The ***PhilPaSS'*** operational reliability standards

require that all systems be 99.5% available during operating hours. So far, the longest outage experience by the ***PhilPaSS*** occurred on 27 April 2007 when one of its SWIFT servers experienced a technical problem. The outage lasted 4 ½ hours. However, the strength of its business continuity procedures enabled the PSO to resume its operations and was able to complete the processing of its transactions on the same day.

Aside from complying with the terms and conditions of the Memorandum of Agreement entered into by other systemically important payment systems (SIPS) with the ***PhilPaSS***, the following additional risk management actions of other SIPS interfacing with ***PhilPaSS*** are observed:

3.4.1 Philippine Domestic Dollar Transfer System (PDDT)/Payment vs Payment (PvP) Facility

In PDDTS/PvP, funds move only against sufficient balance in the accounts. Finality of transfer is achieved real-time. To mitigate gridlock and settlement and liquidity risks, participants may request for a daylight overdraft facility from the USD settlement bank.

The participating banks have control on their USD account without any intervention from the PSSC or the USD settlement bank. The PSSC system is an internet-based system running over a network infrastructure with industry standard security features. Participants access the system via any computer with internet connection.

The use of the PDDTS is governed by the PDDTS Agreement signed among the Bankers Association of the Philippines (on behalf of its member-banks), the PSSC, PCHC and the USD Settlement Bank (currently Citibank Manila). Each participant signs a Participation Agreement which binds them to the Agreement. Use of the PvP is governed by the PvP Agreement signed by the BSP and the PDDTS agreement signatories.

Both the PDDTS and PvP are subject to the BSP Oversight as systematically important payment systems.

3.4.2 ATM Network Consortia

The ATM Network Consortia protect their respective ATM outsourcing facilities by using hardware security modules (HSMs) to ensure critical data protection and transaction security. The respective network ensures that

processes are completely safe from adversaries by employing a security systems that protect the integrity of highly sensitive data passed on from network to network during inter-bank ATM transactions including those of cryptographic keys, the process of encryption and decryption, and payment transactions, as well as card and PIN issuance and verification.

The ATM networks' operational, financial, reputational and legal risks are being managed by the quality assurance and risk management through the various programmes and processes, such as accreditation processes, enterprise risk management, internal audit, process reviews, and development of policies and procedures. Besides management level reviews, specific Board level committees, such as the Executive Committee, Audit Committee, and Corporate Governance Committee, have been organised and delegated with specific responsibilities to oversee risk management activities. To enhance their credit and liquidity risk management, MegaLink and BancNet crafted a written policy on loss sharing among member banks in case of credit pressures.

3.4.3 Philippine Clearing House Corporation (PCHC) Disaster Recovery Planning (DRP)/Business Continuity Planning (BCP

The PCHC DRP/BCP risk management focus is on hardware resiliency and data back-up provisions that feature auto failover and load balancing capability. Communication devices are described to be redundant with multi-connectivity options and back-to-back internet gateway with access points supplied by BayanTel and Eastern Telecoms. The PCHC is likewise equipped with EMC storage for hot pluggable disk back up/capacity, a data base redo and archive mechanism to allow point in time recovery. On top of these, end of day back up and daily productions are kept at both Makati and Manila site.

3.4.4 Philippine Depository and Trust Corporation (PDTC)

To minimise risks in securities transactions, the following measures are observed:

a) Asset Commitment Risk

For trades in PSE-listed stocks, settlement between broker and investor is typically via checque (for local clients) and direct credit to bank accounts for foreign clients while settlement between brokers is through the SCCP settlement system (Model 3). The processing of payment between brokers and their clients is FOP as payments do not pass through the Depository or the SCCP. The

uncertain degree of asset commitment risk can be partially reduced by arrangements between participants and the settlement banks whereby the cheque exposure is offset against intraday credit limits to ensure that the cheque has same day value.

Settlement of PDEx trades between direct market participants are all done on a trade-for-trade, RTGS basis (Model 1 DvP) using central bank money. This includes trades among dealers, brokers and qualified investors (including those under custodians). There is negligible asset commitment risk for these trades.

b) Liquidity Risk

Liquidity risk exposure is increased by the cash payment methods that transfer funds through cheque payments. However, the availability of credit facilities and market stock lending and a fails management arrangement via the SCCP help mitigate the liquidity risk exposure.

For settlement of PDEx trades, the general mode of settlement between clients and their brokers, which are mostly bank-owned or bank-affiliated, is via automatic debit/credit to the clients' accounts at the bank which minimises the liquidity risk exposure of the broker.

c) Counterparty Risk

The PDTC does not take on counterparty risk in either the equities or fixed income market. The SCCP assumes the role of central counterparty for all PSE-eligible trades and guarantees the settlement of these trades. For off-exchange trades, there is credit exposure between the buying and the selling members.

In the fixed income market, the PDEx participants trade with each other against bilateral counterparty limits, which are entered and monitored in the PDEx trading system. A multilateral counterparty limit system against pre-delivered collateral is planned for implementation by third quarter of 2011 to address the limitations of a purely bilateral counterparty limit system.

d) Asset Servicing Risk

The PDTC's responsibility for the completeness, accuracy and timeliness of corporate action information and the execution of corporate action instructions

is limited to gross negligence. The PDTC does not provide proxy voting or tax reclaim services. Otherwise, the PDTC offers an efficient and safe asset servicing facility; information is obtained from or verified with official sources and most communication is in electronic form.

e) Financial Risk

The PDTC does not act as a central counterparty, hence, it does not carry any credit risk. The depository assumes limited liability for losses incurred as a result of an operations failure or the loss of securities, for which it maintains third-party insurance cover. It is not exposed to defective broker lodgments nor is it exposed to clearing and settlement risks of broker trades since this responsibility is assigned to the SCCP.

f) Operational Risk

The PDTC maintains a comprehensive system of internal controls and procedures. The PDTC maintains a disaster recovery site for each of its production systems and are 18 kilometers away from each other. Data in each site is mirrored to the other on real time basis to allow for ease in recovery and resumption in the event of a contingency in one location.

The PDTC operates its own date centre in a secure facility using fault-tolerant and/or redundant computers. Control procedures exist to monitor changes to software, provide for disaster prevention mechanisms, data storage, retention of files, programme libraries and systems software. The internal audit function of the PDTC is handled by Isla Lipana & Company (a member of Price Waterhouse Coopers).

3.5 PSS Implications to MS, FS and Philippine Economic Development

The PSS plays a pivotal role in the economic and financial infrastructure of a country since it facilitates the exchange of goods and services between economic agents by allowing transactions to be completed safely and on time, hence making a key contribution to overall economic performance. A faster exchange of goods and services results in a faster flow of money which can be re-used to finance another payment. Likewise, the availability of faster, cheaper and safer payment system increases the velocity of money and reduces conflict in the economy. Hence, it expands the opportunities for commercial and financial transactions and supports higher investments and economic activity, thus leading to faster economic growth.

Over the years, the ***PhilPaSS*** has evolved from initially ensuring the safe and immediate settlement of critical high-value interbank transactions to providing the necessary facilities to settle similarly important retail and bulk payments. This has been accomplished by zealously determining the appropriate measures and solutions to facilitate and implement the linkage/interface of the ***PhilPaSS*** with the systems, processes/procedures of other SIPS operated by other payment institutions. Consequently, the country's payment system has become a necessary channel for economic efficiency, the transmission of monetary policy, and the promotion of financial stability.

Notwithstanding the financial turmoil brought about by the global financial crisis and the related global economic slowdown, the Philippine PSS infrastructure has held up well. Confidence in the system's ability to settle large volumes with little difficulty has remained intact, largely due to reforms adopted in the recent years to ensure the robustness of the major infrastructures and their resilience to major shocks. Hence, transactions processed through the ***PhilPaSS*** continued to remain robust to provide liquidity in an economy faced by a challenging external environment.

3.5.3 Volume and Value of PhilPaSS Transactions

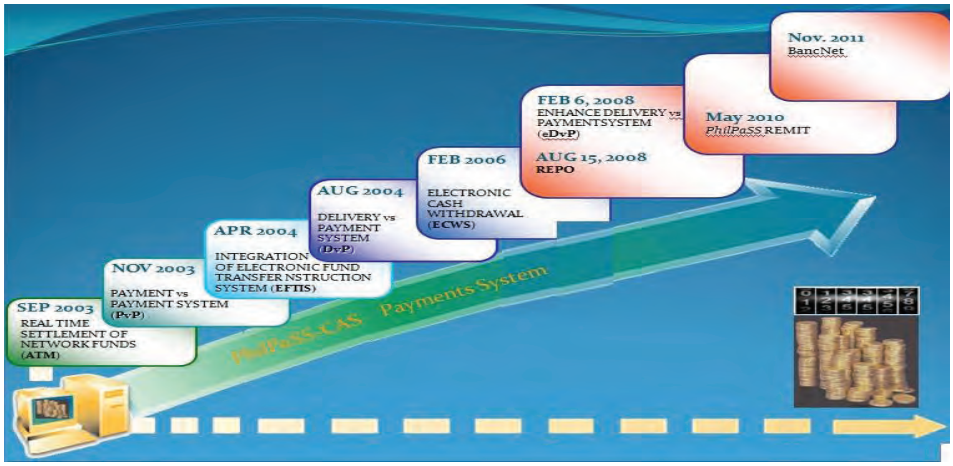
The overall PSS and financial markets have been working well since the ***PhilPaSS*** was created. The Philippine PSS runs stably and efficiently, with the continued rapid growth in both transaction and value. Not even the onset of the global financial crisis in 2007/2008 negatively affected the systemically important payment system of the country. Transactions continued to grow as other partners/ stakeholders in the financial system realised the fast and safe flow of payments using the ***PhilPaSS***. In addition, important critical retail payments settling through the system continued to increase.

The volume and value of financial transactions that are settled via the ***PhilPaSS*** showed an upward trend from 2003 to 2011, notwithstanding the onset of the global financial crisis in 2007. This is indicative of the participants' confidence in the use of the system. The smooth performance of payment systems amidst the financial market disturbances since 2007 can be attributed, in large part, to the underlying strengths that the payment systems have built up through the years as a result of fundamental reforms in the payment infrastructure.

The number of financial transactions processed and settled via the ***PhilPaSS*** has grown by a substantial 513% from 160,207 in 2003 to 1,141,587 by 2011, reflecting the increase in the transactions being settled through the ***PhilPaSS***

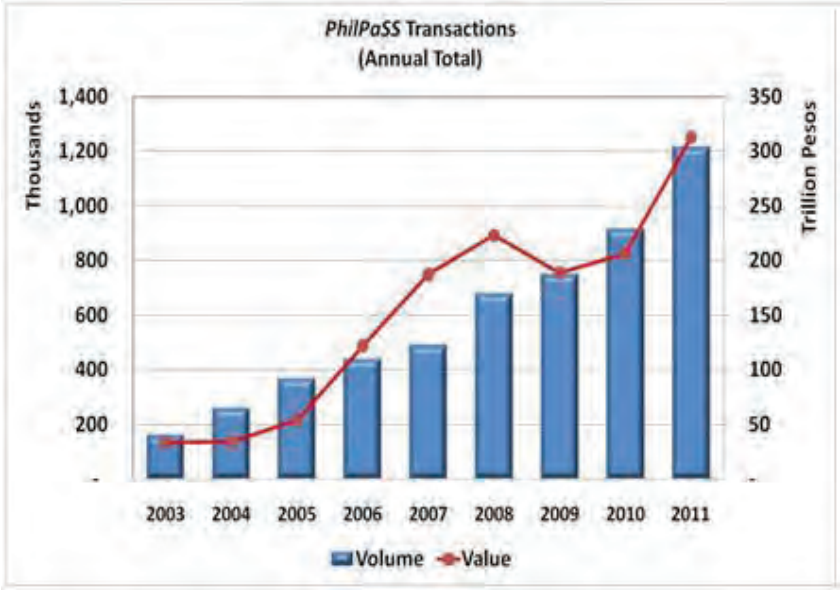
(Table 3). Initially, the largest number of transactions were accounted for by interbank transactions (59.5%) and transactions sent by the PCHC for cheque clearing (30%) in 2003. By 2011, banks' OF remittances via the ***PhilPaSS*** REMIT, interbank transactions, and PDS trade settlements via PvP accounted for majority of the volume of transactions processed through the ***PhilPaSS*** with 28.1%, 25.8% and 18.1%, respectively (Table 4a). The chart below shows the dates the different types of transactions began to be settled via the ***PhilPaSS***.

Figure 2
***PhilPaSS*- CAS Payment System**



Covering the same period, the value of transactions grew by 341% from ₱33.2 trillion in 2003 to ₱312.6 trillion in 2011. However, it should be noted that the value of transactions showed a year-on-year decline of 15.5% in 2009, notwithstanding the continued increase in the volume of transactions. This reflected the decline in global demand and subsequent slowdown in domestic economic activity.

Figure 3
***PhiPaSS* Transactions**



In terms of average daily turnover, the value of payments transacted daily via the ***PhilPaSS*** rose remarkably from ₱135 billion in 2003 or 3.0% of the country's Gross Domestic Product (GDP) to ₱1.3 trillion in 2011 or 13.0%. of GDP (Table 3). This reflected the growing role played by the country's PSS in domestic economic growth as a whole.

Classified by type of transaction, over 90.2% of the total payments processed through the ***PhilPaSS*** in 2003 was from interbank transactions, followed by the PCHC cheque clearing at 8.7% (Table 4b). By 2011, it was the treasury investments of the BSP-Treasury Department that accounted for nearly half of the total value of payments transacted via the ***PhilPaSS*** (48.9%), followed by interbank transactions (34.3%). OF remittances did not play such as large role in the value of the ***PhilPaSS*** transactions, comprising a minimal 0.004 %, of the total value of transactions.

3.5.2 Intraday Liquidity Facility and Overdraft Credit Line Availments

To ensure the continuous settlement of transactions and avoid any payment gridlock, the ***PhilPaSS*** participants availed of the liquidity tools offered by the BSP sporadically from the period 2002 to 2011. Availments of the ILF were

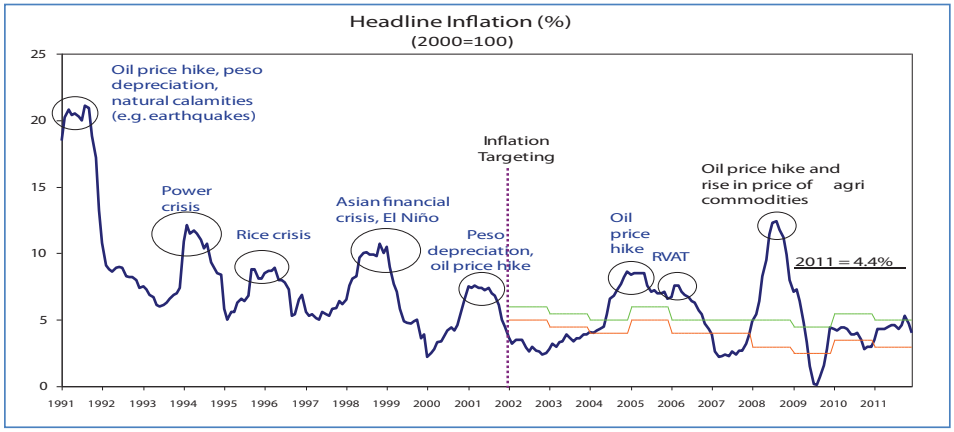
made by only a few banks starting in 2008 with ₱4.4 billion to 2011 with ₱97.4 billion (Table 5). Notwithstanding the substantial rise in availments, however, the ILF availments as a percentage of the total value of payments coursed through the ***PhilPaSS*** never reached 1% as they ranged from 0.002% – 0.03% only of the total transactions. Similarly, the OCL availments, which were higher in the early years of the ***PhilPaSS*** before tapering off in 2010-2011, also never reached 1% as a percentage of the total value of payments coursed through the ***PhilPaSS*** (Table 6).

3.5.3 Inflation and Market Interest Rates

In the Philippines, the automation of the PSS has led to a significant reduction in time lags between transactions, facilitating the transmission of monetary policy decisions to the financial markets. The development and introduction of the Philippine RTGS also allowed the BSP to get a more accurate estimate of monetary aggregates such as reserve money, base money and domestic liquidity, which helped in its assessment of broad money movements and in making better-informed monetary policy decisions.

Since the inflation targeting (IT) introduction in 2002, the BSP has maintained a prudent monetary policy stance to keep inflation in check and to allow market interest rates to decline to provide a conducive environment for businesses to expand. While the trend of inflation in the country has been erratic on the back of various external shocks that has struck the country, it should be noted that beginning with the adoption of IT as the monetary policy framework in the Philippines and the introduction of the ***PhilPaSS*** in 2002, the country's inflation rate has generally been lower relative to the pre-IT and pre-***PhilPaSS*** regime of the early 1990s.

Figure 4
Headline Inflation



Inflation only began to inch up anew in 2008, with inflation pressures stemming mainly from the surge in the international prices of oil and food commodities. While inflation followed an upward trajectory up to August, the subsequent collapse of global commodity prices, reflecting the downturn in global economic activity, complemented by supply and production responses and timely monetary policy actions (Table 1), brought down inflation in the last four months of 2008 up to 2010. In the later part of 2010, however, the impact of higher global crude oil prices on domestic pump prices of petroleum products saw inflation begin to inch up for fuel and transportation and communication services. Hence, the inflation rate for 2011 averaged higher than the 3.8% posted in 2010 at 4.8%, but still well within the government's target range of 3-5 % for the year. For the first eight months of 2012, inflation decelerated to an average of 3.2%, reflecting the 75 basis point cut in the BSP policy rates as well as the reduction in the reserve requirement ratio by 3 percentage points to 18% implemented this year.

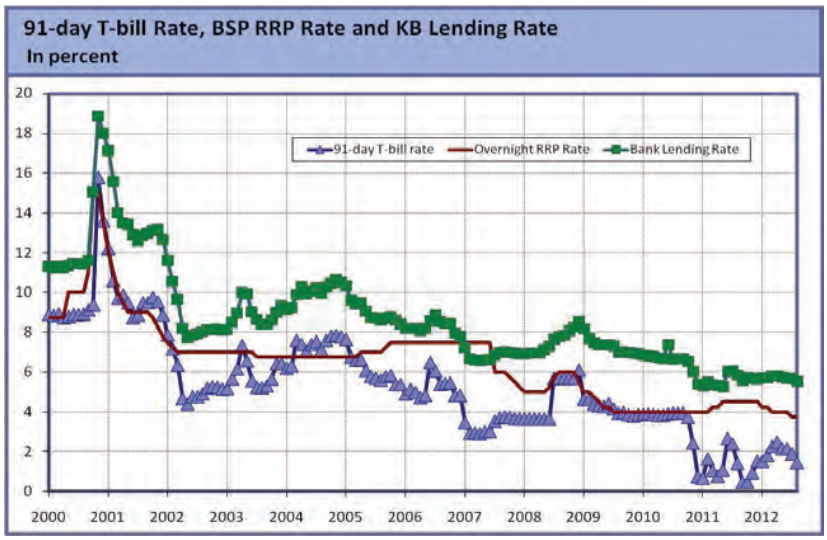
The reduction in the BSP policy rates and liquidity provision measures, combined with the continued improvement in the ***PhilPaSS*** operations, proved to be confidence-building moves that signaled the BSP's commitment to ensure ample money supply and keep interest rates low in order to support economic growth. The BSP has observed that the banks have followed the BSP's rate cuts as they have passed on the interest reductions to their borrowers, hence providing a conducive environment for businesses to expand. Specifically, there has been a noted reduction in market interest rates from 2001 onwards (Table 8).

- Benchmark 91-day T-bill rate eased from 9.9% in 2001 to 1.9% in July 2012;

- Average bank lending rates declined from peaks of 12.4% to 5.6% in June 2012; and

- Savings deposit rates fell from 7.5% in 2001 to 1.2% in June 2012.

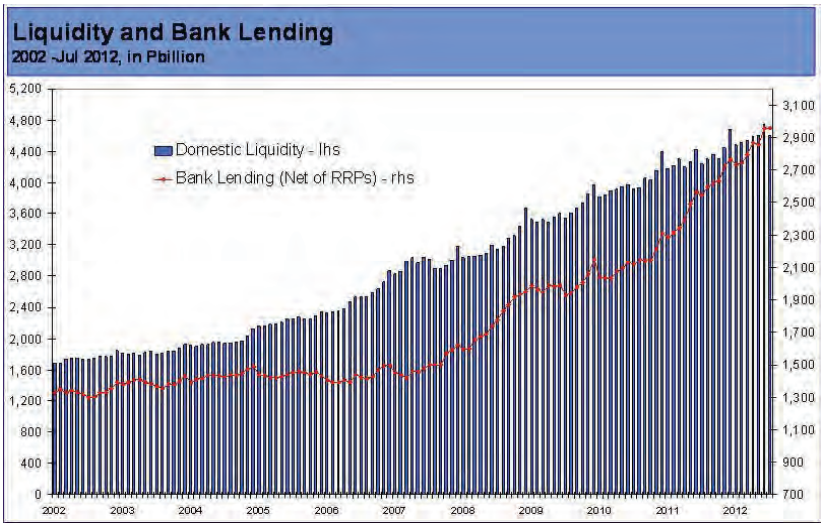
Figure 5
91-day T-bill, BSP RRP Rate & KB Lending Rate (%)



3.5.4 Liquidity and Credit Growth

The steady growth of domestic liquidity**,** as measured by M3, is another indication that liquidity in the financial system has remained ample to fund the economy's growth requirements. From ₱1.7 trillion in 2001, M3 has grown by 177.3% to reach ₱4.7 trillion in 2011 (Table 9). Double digit growths were posted since 2004 to 2008 and, then again, in 2010 as the overall liquidity condition was supported by steady foreign exchange inflows from overseas remittances and portfolio investments.

Figure 6
Liquidity and Bank Lending



However, beginning in late 2010 up to the first three months of 2012, the growth of domestic liquidity decelerated to single-digit levels. The slower expansion of domestic liquidity can be traced mainly to the sharp increase in banks' foreign liabilities coupled with a considerable reduction in their foreign assets as foreign liabilities expanded due to the higher placements and time deposits made by foreign banks to local banks. Notwithstanding the slowdown in the growth of domestic liquidity, however, it remained sufficient to ensure orderly market conditions and fund growth requirements as reflected in the robust growth of bank lending. In part, this can be traced to the efficiency and wider scope of coverage of the ***PhilPaSS***.

With relatively low interest rates, a healthy demand for credit and an efficient payment system, the outstanding loans of universal/commercial banks (net of reverse repurchase placements with the BSP) have grown steadily from ₱1.4 trillion in 2002 to ₱2.8 trillion in 2011 (Table 10). On average, domestic credit grew by 7.4% during the period, with growth turning double-digits beginning in 2008 up until 2011, ensuring that adequate support to domestic production, investment, and spending is provided amidst weaker global economic prospects. This robust credit growth can be attributed mainly to the positive expectations of businesses and consumers on the economy coupled with the improved profile of borrowers.

Figure 7
Growth Rate – M3 and Credit

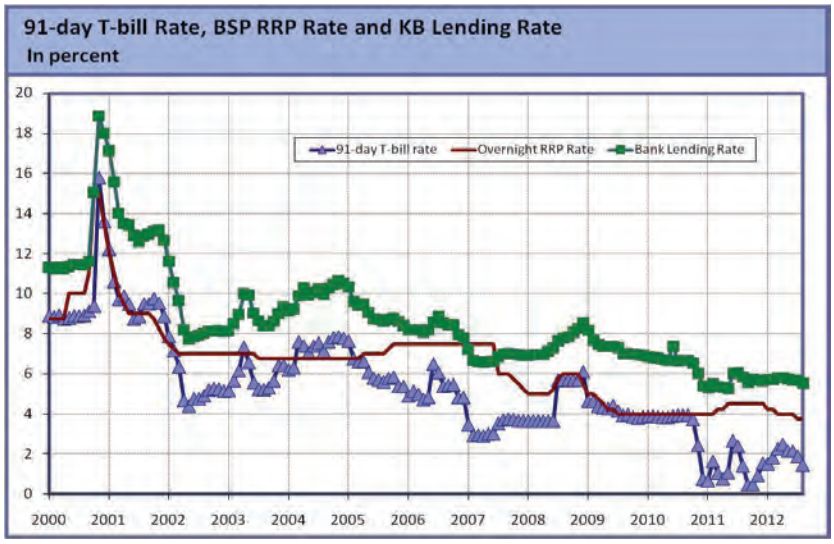
Period	Growth Rate (%)	
	M3	Credit
2002	9.5	1.1
2003	4.2	2.7
2004	10.3	-0.9
2005	10.3	1.0
2006	22.7	4.5
2007	10.6	8.3
2008	15.6	17.8
2009	8.3	10.0
2010	10.6	10.0
2011	6.3	19.9

In 2012, the growth of the outstanding loans of commercial bank (net RRPs) remained robust, reaching 14.0% in August. Loans for production activities, which typically comprised more than four-fifths of banks' total loan portfolio, grew by 14.1% in the same month.

3.5.5 GDP Growth

Mirroring the continued increase in bank credit, the domestic economy exhibited generally robust growth from the period 2004 to 2008. The slowdown in the global economy in 2008 and 2009, following the onset of the global financial crisis in 2007, also saw the Philippine real GDP growth slide. However, notwithstanding being buffeted by the spillovers from the global economic slowdown, the Philippine economy avoided a recession in 2009 as it posted a respectable GDP growth of 1.1%, buoyed by expansions in public and private consumption (Table 11). Providing support to the growth in consumer demand was the marked decline in inflation, which allowed the BSP to adopt an appropriately accommodative monetary policy stance during the period.

Figure 8
Real Gross Domestic Product & Real Gross National Income



In 2010, the Philippine economy emerged from the global economic turmoil with a solid performance as it rebounded by 7.6%, the highest growth recorded in 34 years, with expansion led by the services and industry sectors (Table 11a). On the demand side, exports and investments were the main growth drivers, supported by strong private consumption. (Table 11b). However, output expansion in 2011 decelerated to 3.9%, weighed down by weak trade activity due to challenging global conditions and below-target spending of the Philippine government.

In the first semester of 2012, the Philippine economy recovered with GDP growing by 6.1% compared to 4.2% for the same period last year. The above expectations growth benefitted from a regime of benign inflation and drew from the revitalised Services Sector, particularly from Trade and Other Services. It also got a big boost from the sustained growth of manufacturing and the rebound of construction.

3.5.6 Financial Stability

Notwithstanding the challenging external environment, particularly following the onset of the global financial crisis in 2007-2008, the Philippine banking system continued to exhibit resilience and fortitude. For one, the sound macroeconomic

policies and resulting conditions in the country have provided stability to the domestic financial markets amidst heightened uncertainties. The continuous reform efforts of the BSP, combined with banks' minimal exposure to structured products, have also allowed the financial system to avoid the worst difficulties encountered by other economies. In fact, the financial system's performance has been positively reviewed by third parties like the IMF during its most recent Financial Sector Assessment Programme (FSAP) visit to the Philippines in early 2010.

During the period 2002 to 2011, the total resources of the Philippine banking system grew by an average of 8.5% (Table 12). Asset quality ratios are at historic lows and, at 2.8% in 2011, the non-performing loan ratio is even lower than their previous -1997 Asian financial crisis level of around 4% (Table 13). Solvency ratios were also well-above regulatory and international standards, which provided local banks ample headroom to adjust to higher capital rules under BASEL III by 2014. Capital adequacy ratios (CARs) continued to grow and exceed the BSP's minimum ratio of 10% and the Basel Accord's standard ratio of 8% amid challenging global uncertainties, as a result of the higher growth rate of qualifying capital vis-à-vis that of risk weighted assets (RWA). The system-wide average CARs, for instance, stood at 16.7% on solo basis and 17.6% on consolidated basis as of end-December 2011. Similarly, the Tier 1 (T1) capital ratios remained well above international norms at 14.4% and 14.5% on solo and consolidated bases, respectively. Meanwhile, bank operations remained profitable with the Return on Assets (ROA) rising from 0.4% in 2001 to 1.5% in 2011 and the Return on Equity (ROE) jumping from 3.2% to 12.5% during the same period, providing positive returns to shareholders on account of cost efficient operations.

At present, a single aggregate measure of financial stability has not yet been developed for the Philippines although there are ongoing efforts to develop a single measure that could indicate the degree of financial fragility or stress. Thus far, what the BSP has developed is the Philippine Financial Stress Index (PFSI), which measures the degree of financial stress in the financial system.[9] However, this was designed mainly to help policymakers identify episodes of turmoil and financial market stress as they occur in the economy. Because it is a contemporaneous measure, the PFSI is limited to capturing increased financial

9. The PFSI was constructed using the principal components analysis (PCA), which extracts the factors responsible for the co-movement of a group of variables. This method assumes that financial stress is the primary factor influencing this co-movement, and by extracting this factor (the first principal component), provides an index that would measure financial stress.

stress during crisis periods, and is less suited to be used as an early-warning indicator of a financial crisis, i.e., it is not expected to help predict potential stress or future crises. At any rate, since the significant spike in October 2008 to March 2009, the PFSI trend has declined, showing that financial stress levels that are currently near the historical average.[10]

4. Assessment of Current PSS Framework

4.1 Compliance with BIS' 10 Core Principles for Systemically Important Payment Systems (CPSIPS)

In ensuring a safe, sound and efficient payments system, the ***PhilPaSS*** adheres to the 10 Core Principles for Systematically Important Payment System (SIPS) developed by the Committee on Payment and Settlement Systems (CPSS) of the ***CB***s of the Group of 10 countries.

In 2005, the IMF published a report on an assessment it made on the country's observance of international standards and codes on payment systems which was completed on 16 September 2002. However, this was before the introduction of the ***PhilPaSS*** in December 2002 and many of the findings/issues identified in the report have since been addressed.

In July 2007, the PSO conducted a self-assessment of its compliance with the core principles. The table below shows the results of the self-assessment on the ***PhilPaSS*** compliance, using the assessment rating mentioned below the table. The results disclosed that eight of the 10 core principles are observed by the ***PhilPaSS***, i.e., all of the assessment criteria of the eight principles are generally met without any significant deficiencies.

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10. A PFSI of more than 2 SDs would mean that financial stress is high enough to require policy attention. A positive PFSI indicates that financial stress is above the historical average, while a negative value signifies that financial stress is below the historical average of zero.

Figure 9
Results of the BSP-PSO's Assessment of *PhilPaSS* Compliance with the Core Principles

Core Principles	*Compliance*
1. The system should have a well-founded legal basis under all relevant jurisdictions.	Partially Observed
2. The system's rules & 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.	Observed
3. 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.	Observed
4. 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.	Observed
5. 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	Not applicable (to an RTGS System like ***PhilPaSS***)
6. 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.	Observed

Results of the BSP-PSO's Assessment of *PhilPaSS* Compliance with the Core Principles

Core Principles	*Compliance*
7. The system should ensure a high degree of security and operational reliability and contingency arrangements for timely completion of daily processing	Observed
8. The system should provide a means of making payments which is practical for its users and efficient for the economy	Observed
9. The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.	Observed
10. The system's governance arrangements should be effective, accountable and transparent	Observed

Notes:

Observed – when all assessment criteria are generally met without any significant deficiencies.
Broadly Observed – when only minor shortcomings are found, which do not raise major concerns and when corrective actions to achieve full observance of the Principles are scheduled and realistically achievable within a prescribed period of time.
Partially Observed – when shortcomings are sufficient to raise doubts about the ability to achieve observance within a reasonable time frame.
Not Observed – when major shortcomings are found in adhering to the assessment criteria.
Not applicable – when it does not apply given the structural, legal and institutional conditions.

However, for the two other core principles, CP1 and CP5, the status of compliance are as follows:

Core Principle No. 1 - that the payment system should have a well founded legal basis, is only <u>partially observed</u> pending the enactment of the Payments and Settlements System Act with the house of Congress.

Since safe and efficient payments is defined as the third pillar of central banking, it is imperative for the Philippines to have a payment system that is supported by a well founded legal basis. However, the regulation of payment system in the Philippines is still in a developmental stage due to lack of a legal framework that will govern or give the BSP the oversight authority and policies over the operations of payment systems in the country. Pending the enactment of the appropriate legislation, the responsibilities of the parties to a payment and settlement system are fragmented and found in various laws and agreements, as follows:

i) The New Central Bank Act (RA 7653) – the law that provides the BSP regulatory power in areas of money banking and credit. Pertinent provisions related to payment and settlements can be found in selected sections of the Act. For instance, Section 3 of the Act provides the BSP the supervisory powers over the operations of banks. However, the provisions in the Act are not adequate to provide the BSP with oversight power over payments systems that it does not operate.

Considering the BSP's mandate to promote and maintain monetary and banking stability, it is logical that the oversight function of the payment system be vested upon the BSP. Under R. A. No. 7653, however, the function of the BSP in helping to establish a stable and financial payment system is merely implied from or incidental to its express responsibilities of supervising banks and promoting and maintaining monetary stability. The provisions in Section 3 are not adequate to provide the BSP with the explicit oversight authority over payments systems that it does not operate. Hence, to address said inadequacy, the BSP crafted amendments to R.A. 7653 in order to include a statement in Section 3 of the Act, to read as – ***"it (BSP) shall likewise promote and maintain the stability of the financial and payment systems"***. The amendments have been submitted to the Congress for approval. Likewise, submitted to the Congress for approval is the (draft) Payments Act that will give the BSP the sufficient authority to effectively conduct, monitor, regulate and supervise (oversee) all the payment, clearing and settlement systems in the Philippines.

Section 30 - This contains provisions on payments of obligations of banks/ quasi-banks placed under receivership and liquidation.

Section 60 - Cheques representing demand deposits do not have legal tender power, but a cheque that has been cleared and credited to the account of the creditor shall be equivalent to delivery to the creditor of cash in an amount equal to the amount credited to his account.

Section 102 - Empowers the BSP to establish interbank clearing facilities and that the Monetary Board has the authority to prescribe rules and regulations with respect to such operation. This section also indicates that the deposit reserves of banks with the BSP shall serve as basis for the clearing of cheques and settlement of inter-bank transactions, subject to such rules as the Monetary Board may issue with respect to such operations.

ii) BSP Circulars. The BSP also issues a series of circulars for PSS rules and regulations.

iii) Memorandum of Agreements (MOA) and Participation Agreements. The BSP also entered into memorandum of agreements with payment system operators and participants in order to lay the responsibilities of systems operators/providers, parties and participants in the payment systems, especially those payment systems that interface with the ***PhilPaSS*** to facilitate settlement of interbank payment transactions.

iv) Electronic Commerce Act of 2000 (R. A. No. 8792). This provides electronic settlement among banks. In particular, Paragraph 2, Section 16 states that "electronic transactions made through networking among banks or linkages thereof with other entities or networks, and vice versa shall be deemed consummated upon the actual dispensing of cash or the debit of one account and the corresponding credit to another."

v) Negotiable Instruments Law (Act No. 2031). This legislation **c**ontains provisions on how negotiable instruments are issued, drawn and paid.

vi) **General Banking Law of 2000 (R.A. No. 8791).** In particular, Section 59 gives the BSP authority to regulate the electronic transactions of banks.

vii) **Civil Code of the Philippines (R.A. No. 386, as amended).** This contains provisions on obligations and contracts and concurrence and preference of credits.

viii) **The Insolvency Law (Act No 1956, as amended).** This law intends to cover the entire subject of insolvency and bankruptcy.

Core Principle No. 5 - regarding multilateral netting; is not applicable to real time gross settlement (RTGS) systems like the PhilPaSS, since these systems do not defer settlement but settle transactions as they come, depending on available balance of banks' Demand Deposit Account (DDA).

This principle in not applicable because in the RTGS systems, like the ***PhilPaSS***, the settlement is not deferred but settled as they come, depending on the available balances of the DDAs involved.

4.2 Compliance with CPSS-BIS Principles for Financial Market Infrastructures (FMI)

To enhance safety and efficiency in payment, clearing, settlement, and recording arrangements, and more broadly, to limit systemic risk and foster transparency and financial stability, the Committee on Payment and Settlement Systems (CPSS) and the International Organisation of Securities Commissions (IOSCO) issued new and more demanding international standards for payment, clearing and settlement systems, including central counterparties, in a report titled Principles for Financial Market Infrastructures (FMI) last April 2012. This report replaces the previous three sets of standards for these FMIs issued from 2001 to 2004, namely, the Core Principles (CPSS, 2001); the Recommendations for Securities Settlement Systems (CPSS-IOSCO, 2001); and the Recommendations for Central Counterparties (CPSS-IOSCO, 2004). Under the new principles, the CPSS and IOSCO have strengthened and harmonised these three sets of standards by raising the minimum requirements, providing more detailed guidance and broadening the scope of the standards to cover new risk-management areas and new types of FMIs.[11] (See Appendix B for the summary of the 24 FMI principles)

The FMI is defined as a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions.

The definition of an FMI includes five key types of FMIs: payment systems, CSDs, SSSs, and TRs. From the 24 principles/standards for FMIs published by the CPSS-IOSCO, only 18 principles are applicable to payment system.

The G20 countries have committed to gradually adopt new standards in compliance with the FMI principles before the end of year 2012. However, for Asian and developing countries like the Philippines, wherein regulation for payment systems, CSDs, SSSs and TRs are done by different regulatory bodies, compliance to the FMI principles needs more time. The regulatory bodies still need to consolidate and cooperate to establish a framework for the implementation of the FMI principle.

In the case of the Philippines, the BSP will initiate a move to meet with the Philippine Deposit Insurance Corporation, Philippine Insurance Commission, Securities and Exchange Commission, and Department of Finance to discuss the following: (a) FMI principles; (b) the assessment methodology for its compliance; (c) the responsibilities of each authorities/regulators as embodied in the said principles; and (d) framework on how to implement the principles.

Nevertheless, the authors attempt to make a personal assessment on the ***PhilPaSS*** compliance with the 19 FMI principles affecting payment system. The results of personal assessments are as follows:

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
1. Legal Basis	**Partially observed**

Same as in CPSS Principle 1. Pending approval of the amendment to R.A.7653, the Central Bank Act and the Payments Act by the Congress, the current legal framework supporting PSS are not fit enough to strengthen BSP oversight/authority functions on all core payment arrangements and payment system providers. As stated by the IMF in its MFD Report on Payment Systems dated 29 July 2005, the BSP's current payment system law is fragmented and is contained in a series of rules and regulations issued by means of circulars.

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
2. Governance	**Observed**

Same as in CPSS Principle 10. The issuance of MB Resolution No. 847.A approving the payments and settlements organisation set-up affirmed and strengthened the governance arrangement of the BSP's payment system. The objective of ensuring safety and efficiency of the PSS is clearly defined and is consistently achieved for the past 10 years since the ***PhilPaSS*** is implemented. The rules and regulations, roles, responsibilities and accountabilities of the members/participants in the payment system are embodied in the MOA and Participation Agreement entered into by and between BSP and the participants. Likewise, the PhilPaSS being subject to the audit of both the BSP's Internal Audit Office and Commission on Audit, reflects transparency of its governance arrangement.

3. Framework for Comprehensive Management of Risks	**Observed**

Same as in CPSS 3. The BSP has adapted certain measures/strategies to mitigate risks associated with credit, liquidity, settlement, operational and legal risks. (as discussed in Section 3.4 of this paper)

4. Credit Risk	**Observed**
5. Collateral	**Observed**
6. Margin	**Not Applicable in PS**

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
7. Liquidity Risk	**Observed**

FMI principles No. 4, 5 and 7 are similar to CPSS Principle 3. Settlement in the ***PhilPaSS*** are on trade-for-trade basis and with finality subject to available the DDA balance. The intraday liquidity tool provided by the BSP is covered by adequate government securities as collateral. Likewise, the ***PhilPaSS*** has built-in security features (i.e. DDA balance monitoring, queuing and prioritisation mechanism, and gridlock resolution) which can be used by the participants to manage their resources to prevent credit and liquidity risk.

8. Settlement Finality	**Observed**

Same as in CPSS 4. Transactions are settled with finality on same day as soon as the payment instructions are entered in the system. Its average time of settlement is 5 seconds. Payment instructions that were not settled on the day it is sent, due to some reasons, will be settled on the following day in the morning before opening of business day, value dated on the day it is sent.

9. Money Settlement	**Observed**

Same as in CPSS 6. In the ***PhilPaSS***, money used for settlement is through the bank's demand deposit account maintained with the BSP.

10. Physical Deliveries	**Not Applicable in PS**
11. Central Securities Depositories	**Not Applicable in PS**
12. Exchange-of-value Settlement Systems	**Observed**

FX transactions are settled in the ***PhilPaSS*** via PvP, in which the peso leg is settled first in the ***PhilPaSS***, and the USD leg with Citibank as the USD settlement bank. For GS transactions, it is settled in the ***PhilPaSS*** via DvP. Both FX and GS transactions are settled with finality on gross basis. The time lag between the confirmation of settlement of the FX currency leg and the Peso leg does not exceed one hour.

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
13. Participant-default Rules and Procedures	**Observed**

Same as in CPSS 2. The rules and regulations, roles, responsibilities and accountabilities of the members/participants in the payment system are embodied in the MOA and Participation Agreement entered into by and between the BSP and the participants. Likewise, the rules and procedures for availment of the BSP liquidity tools by the participants to cover their losses are clearly defined.

14. Segregation and Portability	**Not Applicable in PS**
15. General Business Risk	**Broadly Observed**

Same as in CPSS 7. The BSP continues to keep itself abreast with the latest trends in technology and standards as well as to be vigilant in the proper management of the various risks that affect the operations of the system. The built-in security controls on transaction validation, transaction verification, audit trails, queuing and prioritisation mechanism and gridlock resolution features ensure that the ***PhilPaSS*** operations are carried out with the highest degree of integrity and reliability. A well defined and tested contingency arrangement is in place for the timely completion of daily processing in case of disasters, power outages, and swift inoperability.

16. Custody and Investment Risk	**Observed**

The settlement assets of the participants are deposited in the demand deposit accounts, which are maintained with the BSP, the central monetary authority and operator of the ***PhilPaSS***. The participants can access on line anytime the balance and movement of their demand deposit account.

17. Operational Risk	**Broadly Observed**

Same as in CPSS 7, with adequate COB plans in placed. BSP recognises that the ***PhilPaSS*** operations are critically important, hence, business contingency measures are observed. The ***PhilPaSS*** has two back-up equipment and off-site locations that can be made operational in case the primary site is inoperable.

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
18. Access and Participation Requirements	**Observed**

Same as in CPSS 9. The requirements for participation in the ***PhilPaSS,*** the forms and other supporting documents that need to be submitted and other relevant information are published in the BSP Website. A copy of the ***PhilPaSS*** rules and regulations is provided with the participants for its guidance and reference.

19. Tiered Participation Agreements	**Broadly Observed**

Same as in CPSS 2,3 and 9. Third-party system providers interfacing with the ***PhilPaSS*** are covered by MOA and PA that stipulate the rules, procedures and accountabilities that are required to be observed and complied with.

20. FMI links	**Not Applicable in PS**
21. Efficiency and Effectiveness	**Observed**

Same as in CPSS 8. The ***PhilPaSS*** operates efficiently, providing high-quality and practical services to its participants. Complaints, if any, and other queries are immediately acted upon to ensure efficiency and effectiveness of services extended to them.

22. Communication Procedure and Standards	**Observed**

The SWIFT network is used as the standard messaging facility for the participants to transmit electronically their financial transactions to their counterparties. The BSP, through its IT sector, also developed a front-end system to enable non-SWIFT member banks transmit their financial transactions to their counterparties through the ***PhilPaSS***. Likewise, the BSP has recently purchased a Participant Browser, a web-based facility from LOGICA to further improve communication procedure and standards.

Figure 10
***PhilPass* Compliance with FMI Principles**

FMI PRINCIPLES	COMPLIANCE
23. Disclosure of Rules, Key Procedures and Market Data	**Observed**

Same as in CPSS 2,3,9. The requirements for admission of participants are published in the BSP website, including the required fees and forms that should be accomplished and submitted to the BSP for evaluation. The roles of the participants and the institutions where the participant is affiliated is also indicated in the website. Participants in the ***PhilPaSS*** are provided with a copy of the memorandum of agreement and participation agreement, enumerating the rules and regulations governing the ***PhilPaSS.***

24. Disclosure of Market Data by Trade Repositories	**Not Applicable in PS**

5. Policy Implications

The self-assessment undertaken by the BSP in 2007 revealed that specific oversight responsibilities and central bank powers over payment system operators are unclear. Specifically, the BSP does not have a strong legal underpinning since, under R. A. No. 7653, its function in helping to establish a stable and financial payment system is merely implied from or incidental to its expressed responsibilities of supervising banks and promoting and maintaining monetary stability. The provisions in Section 3 of the New Central Bank Act or the BSP charter are not adequate to provide the BSP with the explicit oversight authority over payments systems that it does not operate. Without a formal mandate that explicitly gives the BSP the power to oversee the PSS in the country, there is a higher risk of disruptions in the payment systems, which can result in the inefficient use of financial resources, inequitable risk-sharing among agents, financial losses to market participants and, eventually, a loss of confidence in the financial system as a whole. Hence, to address the said inadequacy, the BSP crafted amendments to R.A. No. 7653 in order to include a statement in Section 3 of the Act, to read as – ***"it (BSP) shall likewise promote and maintain the stability of the financial and payment systems"***. The amendments have been submitted to the Congress for approval.

In addition to the proposed BSP charter amendment, a Payments and Settlement System Act has also been drafted to give the BSP the necessary authority to effectively conduct, monitor, regulate and supervise (oversee) all the payment, clearing and settlement systems in the Philippines. In particular, the proposed legislation will provide the legal and regulatory framework for PSS and define the rights and obligations of the system operators, participants and regulators. This legal framework is critical to proper risk management of the system and will ensure the safety and soundness thereof, particularly during times of financial stress. While the BSP exercises regulation over the payment systems provided by banks and financial institutions under its supervision, the development of technology introduced means payment and settlement services can be provided by entities outside the BSP's jurisdiction, such as paypal and mobile payment systems. The non-regulation of these systems poses a great risk to the stability of the financial system. Under the proposed Act, the BSP shall exercise oversight and supervision over all activities of the payment and settlement systems. The proposed bill was drafted by the BSP and was submitted for sponsorship in the 15th Congress of the House of Representatives. To date, no counterpart bill on the same subject has been filed in the Senate of the Philippines.

In addition to these proposed legislative actions, the BSP's roadmap for a stable and efficient PSS will have it pursuing the following strategies:

- Explore and implement the appropriate available technologies to improve the extent of the ***PhilPaSS***' delivery of services to both internal (departments/ offices) and external (banks) clients in order to achieve a faster, more efficient, secure and reliable system that will address the needs of its users.

- Expand the use of electronic payments services for both retail and large value payments systems to all user groups. This will involve making electronic retail payment systems accessible to individual consumers and of the ***PhilPaSS*** to all banks and financial institutions maintaining DDA with the BSP, including banks' branches and regional offices, all ATM Network operators, and other payment systems systemically settling outside of central bank money.

- Encourage business and governmental institutions to settle their payments via the ***PhilPaSS***. Large business entities using high volume cheque payments as well as government agencies' payments to suppliers and third parties will be the targeted participants in the settlement operations of the ***PhilPaSS***.

- Coordinate with the PSE for the settlement of trades in the ***PhilPaSS***.

- Develop and continuously enhance the payments system risk monitoring and management measures in order to mitigate the risks and lessen their impact on the payment systems. Ensuring efficient liquidity management for all players of the payments system will promote the smooth operation of the payments system; thus, will increase public confidence in financial systems and institutions in the economy.

- Improve payment system oversight measures in order to ensure safe and reliable payment systems that are efficient and in accordance with local and international standards.

- Continue its study to improve the efficiency of the existing cheque processing and clearing operations through the introduction of the Cheque Truncation Technology and set up limits on the use of cheques as payment. So far, the BSP has already drafted a law on cheque truncation, specifying the standard requirements and features of cheques that will be subject for truncation. This was submitted to Congress for approval.

6. Conclusion

The Philippine PSS remains a work-in-progress, continuously evolving to take into account the challenges posed by new technologies that enable financial innovation and the increasing integration of the world economy. The resilience of the PSS infrastructure, despite new operational and financial shocks, is vital to the BSP's successful pursuit of monetary and financial stability. This is why the evolution of international standards and best practices as detailed in the old Core Principles and the new FMI Principles is of great interest to central banks, particularly those who operate payment systems themselves like the BSP.

In relation to the 10 core principles and the 19 FMI principles affecting payment systems, the BSP recognises the fact that the Philippine PSS only partially complies with the CP-1 or the FMI-1 on having a well-founded legal basis. To address this inadequacy, the BSP drafted amendments to its charter and submitted the said draft amendment to the Congress for approval. Moreover, as noted in the previous section, a Payments and Settlement System Act has also been drafted to provide the legal and regulatory framework for PSS and define the rights and obligations of the system operators, participants and regulators like the BSP.

Going forward, the BSP will continue to work towards ensuring the continued stability, efficiency, and reliability of the country's PSS in recognition of the pivotal role it plays in the smooth functioning of the financial system and the economy as a whole.

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Table 1- BSP Policy Rates*/ and Reserve Requirement Ratio (RRR)

(in percent)

Period	2001		2002		2003		2004		2005		2006	
	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR
January	12,00	16,00	7,50	16,00	7,00	16,00	6,75	17,00	6,75	19,00	7,50	21,00
February	11,00	16,00	7,25	16,00	7,00	16,00	6,75	19,00	6,75	19,00	7,50	21,00
March	10,00	16,00	7,00	16,00	7,00	17,00	6,75	19,00	6,75	19,00	7,50	21,00
April	9,50	16,00	7,00	16,00	7,00	17,00	6,75	19,00	7,00	19,00	7,50	21,00
May	9,00	16,00	7,00	16,00	7,00	17,00	6,75	19,00	7,00	19,00	7,50	21,00
June	9,00	16,00	7,00	16,00	7,00	17,00	6,75	19,00	7,00	19,00	7,50	21,00
July	9,00	18,00	7,00	16,00	6,75	17,00	6,75	19,00	7,00	21,00	7,50	21,00
August	9,00	20,00	7,00	16,00	6,75	17,00	6,75	19,00	7,00	21,00	7,50	21,00
September	9,00	20,00	7,00	16,00	6,75	17,00	6,75	19,00	7,25	21,00	7,50	21,00
October	8,75	20,00	7,00	16,00	6,75	17,00	6,75	19,00	7,50	21,00	7,50	21,00
November	8,25	20,00	7,00	16,00	6,75	17,00	6,75	19,00	7,50	21,00	7,50	21,00
December	7,75	18,00	7,00	16,00	6,75	17,00	6,75	19,00	7,50	21,00	7,50	21,00

Period	2007		2008		2009		2010		2011		2012	
	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR	RRP	RRR
January	7,50	21,00	5,00	21,00	5,00	19,00	4,00	19,00	4,00	19,00	4,25	21,00
February	7,50	21,00	5,00	21,00	5,00	19,00	4,00	19,00	4,00	19,00	4,25	21,00
March	7,50	21,00	5,00	21,00	4,75	19,00	4,00	19,00	4,25	19,00	4,00	21,00
April	7,50	21,00	5,00	21,00	4,50	19,00	4,00	19,00	4,25	19,00	4,00	18,00
May	7,50	21,00	5,00	21,00	4,25	19,00	4,00	19,00	4,50	19,00	4,00	18,00
June	7,50	21,00	5,25	21,00	4,25	19,00	4,00	19,00	4,50	20,00	4,00	18,00
July	6,00	21,00	5,75	21,00	4,00	19,00	4,00	19,00	4,50	20,00	3,75	18,00
August	6,00	21,00	6,00	21,00	4,00	19,00	4,00	19,00	4,50	21,00		
September	6,00	21,00	6,00	21,00	4,00	19,00	4,00	19,00	4,50	21,00		
October	5,75	21,00	6,00	21,00	4,00	19,00	4,00	19,00	4,50	21,00		
November	5,50	21,00	6,00	19,00	4,00	19,00	4,00	19,00	4,50	21,00		
December	5,25	21,00	5,50	19,00	4,00	19,00	4,00	19,00	4,50	21,00		

**/ Overnight RRP Rate*

Source: BSP-Advisory Committee Technical Secretariat

Table 2 - Number of PhilPaSS Participants

By type of institution

Type of Institutions	2004	2005	2006	2007	2008	2009	2010	2011
Commercial Banks	39	39	37	35	35	35	35	35
Specialized Government Banks	3	3	3	3	3	3	3	3
Thrift/Savings Banks	45	39	40	38	36	38	39	42
Rural Banks	1	1	1	1	1	11	25	30
Non-Bank with Quasi Banking Functions	9	10	11	10	10	12	13	14
Third Party System Providers	4	4	4	4	4	4	4	5
Others:								
BSP Departments/Offices		2	2	2	3	3	3	4
Bureau of Treasury								1
PDTC					2	2	2	2
Total	**101**	**98**	**98**	**93**	**94**	**108**	**124**	**136**

Source: BSP-PSO

Table 3 - Annual PhilPaSS Transactions

Period	Volume of Transactions	Value of Transactions			Annual Growth Rate (%)	
		Total (₱ trillion)	Ave. Daily (₱ trillion)	Ave Daily as % to GDP	Volume	Value
2003	160,207	33.24	0.13	2.96	-	-
2004	259,221	33.64	0.14	2.66	61.8	1.2
2005	368,138	53.92	0.22	3.86	42.0	60.3
2006	439,028	121.98	0.49	7.87	19.3	126.2
2007	491,584	187.13	0.77	11.13	12.0	53.4
2008	679,571	223.01	0.91	11.74	38.2	19.2
2009	749,591	188.48	0.78	9.66	10.3	-15.5
2010	916,304	206.61	0.85	9.40	22.2	9.6
2011	1,214,995	312.61	1.26	12.95	32.6	51.3

Source: BSP-Payments and Settlements Office (PSO)

Table 4a - PhilPaSS Volume of Transactions
2003 -2011

Type of Transaction	Level								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bank Initiated Transactions:	95,272	94,874	109,057	133,943	166,055	205,472	242,547	403,416	652,298
interbank	95,272	68,296	72,907	97,339	129,876	168,931	203,365	252,677	294,574
bank cash withdrawal w/ BSP via ECWS	-	-	-	3,517	4,413	5,167	5,041	4,798	5,280
Bank's Taxes/Customs Duties Collections via EFTIS	-	26,578	36,150	33,087	31,766	31,374	34,141	33,305	31,603
Bank's OF Remittances via PhilPaSS REMIT	-	-	-	-	-	-	-	112,636	320,841
Transactions sent via Third Party Service Providers:	64,935	164,347	259,081	285,621	279,052	305,015	319,676	340,436	314,720
BTr/Bank to Bank GS Transactions via DvP	-	1,665	17,034	24,320	20,798	20,063	21,114	34,787	29,036
Megalink - ATM Network Funds	12,604	42,120	47,353	39,655	34,430	35,233	28,137	18,695	14,440
Bancnet - ATM Network Funds	-	-	-	-	-	-	-	-	1,435
PCHC - Check clearing results	48,122	54,349	64,282	69,915	67,749	66,613	65,014	63,094	53,099
PDS $ Trade Settlements via PvP	4,209	66,213	130,412	151,731	156,075	173,957	192,791	208,741	206,635
PDS Person to Person GS Trades via eDvP	-	-	-	-	-	9,026	12,315	14,313	9,850
PDS Interbank repo transactions	-	-	-	-	-	123	305	806	225
BSP Departments Initiated Transactions:	0	0	0	19,464	46,477	169,084	187,368	172,452	174,569
Treasury investments of TD	-	-	-	19,464	46,364	62,581	38,275	38,582	40,412
e-Rediscounting of DLC	-	-	-	-	113	460	774	1,282	1,215
Supervisory Fees of SES	-	-	-	-	-	86	189	102	121
bank cash deposits w/ BSP with CD	-	-	-	-	-	400	8,973	10,397	12,009
bank's availment of Intraday Liquidity Facility	-	-	-	-	-	8	6	136	398
cFAS of FAD	-	-	-	-	-	105,549	139,151	121,953	120,414
Total	160,207	259,221	368,138	439,028	491,584	679,571	749,591	916,304	1,141,587

Type of Transaction	Growth Rate (%)								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bank Initiated Transactions:	-	-0.4	14.9	22.8	24.0	23.7	18.0	66.3	61.7
interbank	-	-28.3	6.8	33.5	33.4	30.1	20.4	24.2	16.6
bank cash withdrawal w/ BSP via ECWS	-	-	-	-	25.5	17.1	-2.4	-4.8	10.0
Bank's Taxes/Customs Duties Collections via EFTIS	-	-	36.0	-8.5	-4.0	-1.2	8.8	-2.4	-5.1
Bank's OF Remittances via PhilPaSS REMIT	-	-	-	-	-	-	-	-	184.8
Transactions sent via Third Party Service Providers:	-	153.1	57.6	10.2	-2.3	9.3	4.8	6.5	-7.6
BTr/Bank to Bank GS Transactions via DvP	-	-	923.1	42.8	-14.5	-3.5	5.2	64.8	-16.5
Megalink - ATM Network Funds	-	234.2	12.4	-16.3	-13.2	2.3	-20.1	-33.6	-22.8
Bancnet - ATM Network Funds	-	-	-	-	-	-	-	-	-
PCHC - Check clearing results	-	12.9	18.3	8.8	-3.1	-1.7	-2.4	-3.0	-15.8
PDS $ Trade Settlements via PvP	-	1473.1	97.0	16.3	2.9	11.5	10.8	8.3	-1.0
PDS Person to Person GS Trades via eDvP	-	-	-	-	-	-	36.4	16.2	-31.2
PDS Interbank repo transactions	-	-	-	-	-	-	148.0	164.3	-72.1
BSP Departments Initiated Transactions:									
Treasury investments of TD	-	-	-	-	138.2	35.0	-38.8	0.8	4.7
e-Rediscounting of DLC	-	-	-	-	-	307.1	68.3	65.6	-5.2
Supervisory Fees of SES	-	-	-	-	-	-	119.8	-46.0	18.6
bank cash deposits w/ BSP with CD	-	-	-	-	-	-	2143.3	15.9	15.5
bank's availment of Intraday Liquidity Facility	-	-	-	-	-	-	-25.0	2166.7	192.6
cFAS of FAD		-	-	-	-	-	31.8	-12.4	-1.3
Total	-	61.8	42.0	19.3	12.0	38.2	10.3	22.2	24.6

Source: BSP-PSO

Table 4b - PhilPaSS Value of Transactions
2003 -2011

Type of Transaction	Level (Php)								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bank Initiated Transactions:	29,969,536,424,658	24,639,640,310,240	37,616,529,169,930	59,693,840,199,151	86,446,614,073,341	95,059,242,529,073	73,708,039,454,386	78,434,119,020,547	108,863,912,594,300
interbank	29,969,536,424,658	23,885,489,200,144	36,459,806,965,335	58,094,781,770,333	84,320,955,043,058	92,477,245,307,155	71,345,724,252,009	76,449,156,125,857	107,254,657,859,871
bank cash withdrawal w/ BSP via ECWS	-	-	-	284,652,092,500	379,928,333,600	385,517,614,250	353,949,367,500	405,321,407,200	473,062,660,550
Bank's Taxes/Customs Duties Collections via EFTIS	-	754,151,110,096	1,156,722,204,595	1,314,406,336,318	1,745,730,696,683	2,196,479,607,669	2,008,365,834,877	1,575,637,988,760	1,123,563,032,342
Bank's OF Remittances via PhilPaSS REMIT	-	-	-	-	-	-	-	4,003,498,731	12,629,041,537
Transactions sent via Third Party Service Providers:	3,267,069,036,055	8,997,051,247,719	16,304,859,597,779	24,078,859,208,691	32,817,341,525,482	35,078,759,666,506	38,656,687,164,971	46,513,315,836,700	42,408,391,109,711
BTr/Bank to Bank GS Transactions via DvP	-	83,599,074,965	1,038,567,446,162	1,681,353,242,842	1,909,527,854,715	1,674,172,452,957	1,942,865,223,101	4,692,379,739,856	3,586,151,256,202
Megalink - ATM Network Funds	5,547,738,335	42,794,456,136	57,217,962,015	62,437,111,981	90,432,018,140	91,130,637,900	89,605,653,420	93,801,305,079	94,849,485,003
Bancnet - ATM Network Funds	-	-	-	-	-	-	-	-	42,548,832,176
PCHC - Check clearing results	2,893,453,648,013	3,384,840,217,065	3,770,248,138,940	2,672,698,784,898	3,378,180,041,968	3,057,916,368,006	3,209,409,112,788	3,420,253,824,210	3,697,672,954,755
PDS $ Trade Settlements via PvP	368,067,649,707	5,485,817,499,553	11,438,826,050,663	19,662,370,068,971	27,439,201,610,659	30,064,427,455,160	32,946,312,373,075	37,824,099,097,193	34,593,274,132,795
PDS Person to Person GS Trades via eDvP						177,088,723,353	378,139,061,103	404,630,029,421	369,006,444,989
PDS Interbank repo transactions						14,024,029,129	90,355,741,484	78,151,840,942	24,888,003,791
BSP Departments Initiated Transactions:	0	0	0	38,204,561,069,038	67,862,842,289,013	92,873,157,873,056	76,116,775,268,540	81,665,930,954,091	161,334,061,099,514
Treasury investments of TD				38,204,561,069,038	67,862,775,959,513	92,466,486,306,399	75,611,127,005,585	81,053,677,030,174	152,938,375,600,886
e-Rediscounting of DLC					66,329,500	346,974,900	793,051,100	1,327,183,500	1,068,777,300
Supervisory Fees of SES						1,728,816,949	3,807,013,842	1,601,816,116	2,493,395,536
bank cash deposits w/ BSP with CD						12,549,775,000	311,743,447,950	390,488,370,500	431,707,496,060
bank's availment of Intraday Liquidity Facility						4,428,998,254	5,760,368,618	94,271,102,254	97,359,167,989
cFAS of FAD						387,617,001,553	183,544,381,445	124,565,451,547	7,863,056,661,743
Total	33,236,605,460,713	33,636,691,557,959	53,921,388,767,709	121,977,260,476,880	187,126,797,887,836	223,011,160,068,636	188,481,501,887,897	206,613,365,811,337	312,606,364,803,526

Type of Transaction	Growth Rate (%)								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bank Initiated Transactions:	-	-17.8	52.7	58.7	44.8	10.0	-22.5	6.4	38.8
interbank	-	-20.3	52.6	59.3	45.1	9.7	-22.9	7.2	40.3
bank cash withdrawal w/ BSP via ECWS	-	-	-	-	33.5	1.5	-8.2	14.5	16.7
Bank's Taxes/Customs Duties Collections via EFTIS	-	-	53.4	13.6	32.8	25.8	-8.6	-21.5	-28.7
Bank's OF Remittances via PhilPaSS REMIT	-	-	-	-	-	-	-	-	215.5
Transactions sent via Third Party Service Providers:	-	175.4	81.2	47.7	36.3	6.9	10.2	20.3	-9.8
BTr/Bank to Bank GS Transactions via DvP	-	-	1142.3	61.9	13.6	-12.3	16.0	141.5	-23.6
Megalink - ATM Network Funds	-	671.4	33.7	9.1	44.8	0.8	-1.7	4.7	1.1
Bancnet - ATM Network Funds	-	-	-	-	-	-	-	-	-
PCHC - Check clearing results	-	17.0	11.4	-29.1	26.4	-9.5	5.0	6.6	8.1
PDS $ Trade Settlements via PvP	-	1390.4	108.5	71.9	39.6	9.6	9.6	14.8	-8.5
PDS Person to Person GS Trades via eDvP	-	-	-	-	-	-	113.5	7.0	-8.8
PDS Interbank repo transactions	-	-	-	-	-	-	544.3	-13.5	-68.2
BSP Departments Initiated Transactions:	-	-	-	-	77.6	36.9	-18.0	7.3	97.6
Treasury investments of TD	-	-	-	-	77.6	36.3	-18.2	7.2	88.7
e-Rediscounting of DLC	-	-	-	-	-	423.1	128.6	67.4	-19.5
Supervisory Fees of SES	-	-	-	-	-	-	120.2	-57.9	55.7
bank cash deposits w/ BSP with CD	-	-	-	-	-	-	2384.1	25.3	10.6
bank's availment of Intraday Liquidity Facility	-	-	-	-	-	-	30.1	1536.5	3.3
cFAS of FAD	-	-	-	-	-	-	-52.6	-32.1	6212.4
Total	-	1.2	60.3	126.2	53.4	19.2	-15.5	9.6	51.3

Source: BSP-PSO

Table 5 - ILF AVAILMENTS
2002-2011

YEAR	Total Number of Availment Transactions	Total Value of ILF Availment (in Php)	As percent of the Total Value of PhilPaSS Transactions (in %)
2002	0	0	-
2003	0	0	-
2004	0	0	-
2005	0	0	-
2006	0	0	-
2007	0	0	-
2008	8	4,428,998,254	0.002
2009	4	5,760,368,618	0.003
2010	136	94,271,102,254	0.046
2011	396	97,359,167,989	0.031

Source: BSP-Financial Accounting Department

Table 6 - OCL AVAILMENTS
2002-2011

YEAR	No. of Banks that Availed	Total Number of Availment Transactions	Total Value of OCL Availment (in Php)	As percent of Total Value of PhilPaSS Transactions (in %)
2002	6	52	615,054,209.20	-
2003	6	116	404,549,214.07	0.00122
2004	4	104	944,106,259.13	0.00281
2005	4	9	89,848,906.31	0.00017
2006	2	3	18,468,494.54	0.00002
2007	0	0	-	-
2008	0	0	-	-
2009	1	1	91,006,264.11	0.00005
2010	0	0	-	-
2011	1	1	49,177,000.00	0.00002

Source: BSP-Financial Accounting Department

Table 7 - Inflation Rates

(2006 = 100)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Average	**5.3**	**2.7**	**2.3**	**4.8**	**6.5**	**5.5**	**2.9**	**8.3**	**4.1**	**3.9**	**4.6**
January	5.8	3.3	1.9	2.9	7.3	5.9	3.8	4.6	7.1	3.9	4.0
February	5.8	2.9	2.3	2.9	7.3	6.5	2.9	5.1	7.2	3.9	4.7
March	5.8	3.3	2.1	3.1	7.1	6.6	2.6	5.9	6.5	3.9	4.9
April	5.5	3.4	2.2	3.2	7.2	6.3	2.6	7.3	5.6	4.0	4.7
May	5.5	3.2	2.2	3.6	7.3	6.0	2.6	8.3	4.4	3.9	4.9
June	5.9	2.6	2.8	4.1	6.7	5.9	2.7	9.4	3.1	3.6	5.2
July	6.0	2.5	2.3	5.5	6.0	5.5	2.9	10.2	2.1	3.8	4.9
August	5.7	2.7	2.2	5.7	6.1	5.2	2.7	10.5	1.7	4.1	4.6
September	5.7	2.5	2.2	6.2	6.0	4.9	2.9	10.1	2.2	3.8	4.7
October	5.2	2.3	2.3	6.3	6.2	4.7	2.9	9.7	2.8	3.3	5.2
November	4.2	2.1	2.4	6.8	6.2	4.2	3.1	9.1	3.6	3.7	4.7
December	3.7	2.1	2.5	7.1	5.9	4.1	3.7	7.7	4.4	3.6	4.2

Note: Monthly inflation rates when averaged do not tally with the annual inflation rates computed from the Consumer Price Index in the Philippines.

Source: National Statistics Office

Table 8 - Philippine Selected Domestic Interest rates

weighted averages in percent per annum

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Treasury Bill Rates												
91 - Day	9.86	9.86	5.43	6.03	7.34	6.36	5.35	3.41	5.39	4.19	3.73	1.37
182 - Day	10.84	11.18	7.83	6.95	8.32	7.67	6.15	4.18	6.19	4.40	3.97	1.69
364 - Day	11.80	11.98	6.82	7.49	9.22	8.68	6.96	4.92	6.49	4.59	4.26	2.26
All Maturities	10.90	11.05	6.04	6.65	8.13	7.53	6.20	4.21	6.36	4.46	4.03	1.87
Time Deposit Rates												
S - T < 360 days	8.03	9.48	5.00	5.25	6.26	5.18	4.93	3.43	4.07	2.68	3.06	2.91
L - T > 360 days	10.49	10.76	9.18	8.03	8.18	6.03	5.01	3.06	3.96	2.50	2.07	2.03
Savings Deposit Rates [1]	7.37	7.52	4.24	4.21	4.26	3.76	3.55	2.20	2.22	2.07	1.60	1.62
Bank Average Lending Rates [2]	10.86	12.40	8.90	9.48	10.07	10.15	9.71	8.68	8.76	8.54	7.67	6.63
Lending Rates [3]												
High	15.57	15.31	10.43	10.75	12.08	11.06	10.15	8.59	9.45	9.25	8.70	7.75
Low	12.87	13.67	8.69	8.92	10.07	9.05	8.30	6.85	7.54	7.31	6.55	5.62
Manila Reference Rates [4]												
60	9.50	9.88	6.19	5.56	7.13	6.19	6.00	4.94	4.44	4.38	4.00	3.81
90	8.81	10.13	6.38	9.75	9.50	8.94	8.13	8.25	7.50	7.31	6.88	6.69
180	9.06	9.56	7.88	8.69	10.44	9.88	9.31	8.63	7.69	7.50	7.00	6.81
All Maturities	9.44	9.88	6.75	7.25	8.13	7.06	6.75	6.19	5.31	5.25	4.81	4.81
RP Rates												
Overnight	14.59	11.31	9.25	9.10	9.00	9.31	9.75	8.00	7.80	6.61	6.00	6.25
Term	14.36	12.52	9.39	9.17	9.08	9.23	9.81	8.40	7.88	6.68	n.t.	n.t.
RRP Rates												
Overnight	10.45	9.72	7.06	6.87	6.75	7.04	7.50	6.77	5.44	4.39	4.00	4.35
Term	10.16	10.19	7.21	6.96	6.84	7.07	7.59	7.19	5.70	4.45	4.10	4.56
Interbank Call Loan Rates	10.64	10.03	7.20	7.01	7.05	7.34	7.81	6.86	5.43	4.81	4.22	4.56
Special Deposit Account Rates	10.14	10.86	7.37	7.07	6.85	7.22	7.78	6.88	5.90	4.59	4.10	4.41
PHIBOR Rates (All Mats.)	12.01	12.41	7.06	8.02	7.92	7.08	7.39	6.36	5.78	4.57	3.83	2.82

[1] Refer to the annual percentage equivalent of commercial banks' actual monthly interest expenses on peso-savings deposits to the total outstanding levels of these deposits.

[2] Monthly rates reflect the annual percentage equivalent of all commercial banks' actual monthly interest income on their peso-denominated loans to the total outstanding levels of their peso-denominated loans, bills discounted, mortgage contract receivables and restructured loans.

[3] Average of all high/low values.

[4] Refer to New MRRs computed based on promissory notes and time deposit transactions of sample commercial banks pursuant to Circular No. 1911 dated 23 November 1988 effective 13

n.t. - No transactions n.i. - No. issue n.a. - Not available

Table 9 - Depository Corporations Survey

as of periods indicated
in million pesos

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. NET FOREIGN ASSETS	**352,800**	**493,102**	**597,668**	**677,664**	**911,651**	**1,366,258**	**1,659,261**	**1,930,644**	**2,419,919**	**2,849,243**	**3,251,134**
A. Bangko Sentral ng Pilipinas	**456,042**	**550,203**	**636,989**	**689,251**	**846,112**	**1,077,033**	**1,364,929**	**1,685,738**	**2,027,592**	**2,710,724**	**3,287,478**
Net International Reserves	587,301	691,632	781,781	819,183	937,032	1,127,726	1,397,378	1,717,014	2,053,768	2,732,391	3,307,099
Foreign Assets	806,643	868,884	948,151	913,110	981,465	1,128,401	1,397,665	1,789,184	2,053,965	2,732,539	3,307,207
Foreign Liabilities	219,342	177,252	166,370	93,927	44,433	675	287	72,170	197	148	108
Medium & Long-Term Foreign Liabilities	131,259	141,429	144,792	129,932	90,920	50,693	32,449	31,276	26,176	21,667	19,621
B. Other Depository Corporations	**-103,242**	**-57,102**	**-39,321**	**-11,587**	**65,539**	**289,225**	**294,332**	**244,906**	**392,327**	**138,519**	**-36,345**
Foreign Assets	390,749	441,106	459,632	563,983	675,756	792,182	746,458	696,311	759,533	690,804	599,087
Foreign Liabilities	493,991	498,207	498,953	575,570	610,217	502,958	452,126	451,405	367,206	552,285	635,431
2. NET DOMESTIC ASSETS	**2,002,526**	**2,067,695**	**2,120,078**	**2,306,673**	**2,299,648**	**2,444,787**	**2,421,539**	**2,738,011**	**2,640,268**	**2,651,665**	**2,494,637**
A. Net Claims on Residents (Net Domestic Credits)	**2,363,068**	**2,478,116**	**2,624,827**	**2,849,197**	**2,804,251**	**3,006,570**	**3,161,647**	**3,691,351**	**3,965,129**	**4,310,447**	**4,945,411**
Net Claims on the Public Sector (Public Sector)	684,344	763,648	862,286	1,000,181	960,179	1,039,651	1,027,410	1,199,165	1,269,483	1,379,769	1,554,354
Claims on Other Sectors (Private Sector)	1,678,724	1,714,469	1,762,542	1,849,016	1,844,072	1,966,919	2,134,237	2,492,186	2,695,646	2,930,678	3,391,056
B. Net Other Items	**-360,542**	**-410,421**	**-504,750**	**-542,524**	**-504,602**	**-561,783**	**-740,108**	**-953,340**	**-1,324,861**	**-1,658,781**	**-2,450,774**
3. LIQUIDITY AGGREGATES (TOTAL LIQUIDITY)	**2,355,327**	**2,560,796**	**2,717,745**	**2,984,338**	**3,211,300**	**3,811,044**	**4,080,800**	**4,668,655**	**5,060,188**	**5,500,908**	**5,745,770**
A. M4	**2,284,823**	**2,489,788**	**2,619,091**	**2,908,006**	**3,126,729**	**3,722,087**	**3,925,410**	**4,610,405**	**4,999,903**	**5,446,777**	**5,680,347**
Broad-Money Liabilities (M3)	1,685,662	1,846,142	1,923,637	2,121,392	2,339,012	2,869,568	3,174,365	3,668,433	3,973,970	4,396,811	4,674,258
Currency Outside Depository Corporations and Transferable Deposits (Narrow Money)	392,133	476,728	517,604	564,841	616,668	768,895	886,040	1,070,833	1,216,918	1,345,935	1,492,404
Other Deposits (Quasi-Money)	1,285,999	1,362,096	1,399,299	1,544,313	1,698,742	2,057,843	2,243,005	2,541,080	2,672,653	2,960,294	3,093,925
Securities Other Than Shares Included in Broad Money (Deposit Substitutes)	7,530	7,318	6,734	12,238	23,602	42,830	45,320	56,521	84,400	90,583	87,929
Transferable and Other Deposits in Foreign Currency (FCD-Residents)	599,161	643,646	695,454	786,614	787,716	852,520	751,045	941,972	1,025,933	1,049,965	1,006,089
B. Liabilities Excluded from Broad-Money (Other Liabilities)	**70,504**	**71,009**	**98,655**	**76,332**	**84,571**	**88,957**	**155,390**	**58,250**	**60,284**	**54,131**	**65,423**

Note: Details may not add up to total due to rounding off.

Table 10 - Loans Outstanding of Universal and Commercial Banks[1]

as of periods indicated

	Levels (in million pesos)											
	2001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A. For Production by Economic Activity	1,399,644	1,326,935	1,328,594	1,359,792	1,340,441	1,338,083	1,380,571	1,478,294	1,748,206	1,921,667	2,115,283	2,541,159
1. Agriculture, Hunting & Forestry [2]	65,457	61,603	78,563	86,276	117,871	132,818	150,748	202,087	309,279	333,787	378,551	236,149
2. Fishing	5,394	4,810	4,194	4,772	5,799	5,965	5,774	6,889	3,934	3,460	3,717	5,993
3. Mining and Quarrying	21,166	19,890	14,448	14,111	12,211	11,387	9,683	10,342	6,890	5,237	15,783	25,263
4. Manufacturing	404,224	372,906	379,405	367,538	419,380	412,539	376,824	373,154	392,794	327,010	386,653	510,911
5. Electricity, Gas & Water	75,398	70,359	71,372	64,608	77,123	70,055	75,483	122,534	112,599	144,244	166,602	257,413
6. Construction	46,949	42,151	35,390	36,013	29,890	26,084	25,875	25,204	34,485	25,046	28,943	35,397
7. Wholesale & Retail Trade	201,233	197,889	188,653	190,228	190,537	165,374	183,362	178,879	228,716	239,290	255,491	403,082
8. Transportation, Storage & Communication	91,913	72,967	58,323	63,686	61,320	48,334	50,455	55,542	81,017	150,046	144,695	173,411
9. Financial Intermediation	144,820	133,958	137,278	123,769	51,743	111,407	116,471	153,366	130,560	189,936	193,068	225,599
10. Real Estate, Renting & Bus. Services	214,197	202,746	203,146	214,915	203,484	199,887	221,188	217,208	282,880	317,592	356,267	445,928
11. Public Administration and Defense	13,256	21,913	21,243	31,825	35,403	32,333	41,586	37,810	52,704	66,314	67,420	79,638
12. Education	7,406	8,903	8,564	9,136	10,514	9,269	9,526	9,359	10,341	9,825	9,912	8,785
13. Health and Social Work	5,373	4,179	5,285	5,711	7,286	6,398	6,718	7,084	8,364	10,527	10,630	9,432
14. Other Community, Social & Personal Services	88,180	96,048	106,176	132,035	100,919	93,508	94,226	64,256	72,592	71,131	63,404	87,404
15. Undifferentiated Production Activities of Private Households	0	0	0	0	0	0		0	0	0	0	0
16. Hotels and Restaurants	14,678	16,613	16,554	15,168	16,962	12,726	12,653	14,580	21,051	28,222	34,147	36,756
B. For Household Consumption	22,117	49,545	63,408	69,728	76,355	92,189	114,198	140,330	159,066	176,616	192,329	225,566
1. Credit Card	0	24,835	35,126	40,822	47,069	55,997	72,416	89,545	107,943	114,979	119,755	130,557
2. Auto Loans	7,740	10,101	13,624	14,116	14,116	20,889	24,841	32,189	35,560	45,446	56,603	71,555
3. Others	14,377	14,609	14,658	14,790	15,169	15,303	16,940	18,596	15,563	16,191	15,971	23,454
C. Under RRPs Arrangement	27,780	22,495	40,314	58,178	109,130	109,130	200,518	238,082	230,083	232,157	252,353	224,235
TOTAL LOANS OUTSTANDING (Resident)												
Gross of RRPs	1,449,541	1,398,974	1,432,316	1,487,698	1,525,926	1,539,402	1,695,286	1,856,706	2,137,355	2,330,440	2,559,965	2,990,960
Net of RRPs	1,421,761	1,376,479	1,392,002	1,429,520	1,416,796	1,430,272	1,494,768	1,618,624	1,907,272	2,098,283	2,307,612	2,766,725
D. Non-Resident [3]	1,963	262	347	49	23	4	1	0	43,762	48,454	30,991	23,974
TOTAL LOANS OUTSTANDING (Resident and Non-resident)												
Gross of RRPs	1,451,504	1,399,236	1,432,663	1,487,747	1,525,949	1,539,406	1,695,287	1,856,706	2,181,117	2,378,894	2,590,956	3,014,935
Net of RRPs	1,423,724	1,376,741	1,392,349	1,429,569	1,416,819	1,430,276	1,494,769	1,618,624	1,951,034	2,146,737	2,338,603	2,790,700

[1] The old series (2001-2006) covered all Other Depository Corporations that included, apart from universal/commerical banks, thrift banks and rural banks.

[2] Data may include loans to other sectors integrated with agriculture such as trading of agricultural and fishery products and manufacturing of agri-and fishery-based commodities.

[3] In the old series, loans to nonresidents were lodged together with those of residents and classified according to economic sector. Since the old database did not provide for a separate category on loans to non-residents, the 2007 data of the present series were based on the reports of a few banks which could readily identify and estimate the non-resident account.

Source : Department of Economic Statistics

Table 11a - Gross National Income (GNI) By Industrial Origin

at constant 2000 prices

Item	2004	2005	2006	2007	2008	2009	2010	2011	First Semester 2011	First Semester 2012
					Levels (in million pesos)					
I. Agriculture, Fishery and Forestry	**583,629**	**596,727**	**618,457**	**647,687**	**668,550**	**663,744**	**662,665**	**680,445**	**332,097**	**334,895**
II. Industrial Sector	**1,406,338**	**1,465,272**	**1,532,814**	**1,621,226**	**1,699,171**	**1,666,601**	**1,859,515**	**1,901,401**	**939,717**	**986,119**
A. Mining and Quarrying	37,631	43,624	43,535	51,649	50,926	59,130	65,898	70,509	43,987	40,285
B. Manufacturing	1,011,618	1,062,612	1,106,052	1,145,529	1,194,921	1,137,534	1,264,523	1,324,330	647,409	679,759
C. Construction	198,404	198,154	217,637	249,379	266,751	284,994	325,820	302,014	148,885	159,403
D. Electricity, Gas and Water	158,685	160,882	165,591	174,670	186,572	184,943	203,274	204,547	99,437	106,672
III. Service Sector	**2,286,974**	**2,419,280**	**2,564,959**	**2,759,375**	**2,869,379**	**2,966,895**	**3,179,359**	**3,342,564**	**1,631,111**	**1,759,002**
A. Transportation, Storage and Communication	337,039	360,885	376,398	408,076	423,952	423,398	427,766	446,026	228,501	250,498
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	698,830	740,311	784,443	851,892	863,732	875,616	948,743	980,514	444,280	477,817
C. Financial Intermediation	232,730	257,301	287,793	317,104	322,672	340,329	374,716	394,371	201,783	217,756
D. Real Estate, Renting and Business Activities	392,961	419,523	446,975	482,493	526,116	547,866	588,947	643,459	314,220	340,033
E. Public Administration and Defense; Compulsory Social Security	210,720	212,055	219,563	222,665	227,223	241,009	255,087	255,776	131,948	134,357
F. Other Services	414,694	429,205	449,788	477,145	505,683	538,677	584,100	622,418	310,380	338,540
Gross Domestic Product	**4,276,941**	**4,481,279**	**4,716,231**	**5,028,288**	**5,237,101**	**5,297,240**	**5,701,539**	**5,924,409**	**2,902,926**	**3,080,016**
Net Primary Income	985,406	1,148,645	1,195,082	1,247,725	1,352,909	1,691,527	1,859,847	1,878,607	945,563	974,921
Gross National Income (GNI)	**5,262,348**	**5,629,924**	**5,911,313**	**6,276,013**	**6,590,009**	**6,988,767**	**7,561,386**	**7,803,016**	**3,848,489**	**4,054,938**
Gross National Income (Million U.S. Dollars) [1]	119,074	127,392	133,759	142,011	149,116	158,139	171,096	176,564	87,082	91,754
Per Capita GNI (U.S. Dollars) [1]	1,425	1,494	1,538	1,601	1,648	1,737	1,848	1,875	928	962
					Percent to GNI					
I. Agriculture, Fishery and Forestry	**11.09**	**10.60**	**10.46**	**10.32**	**10.14**	**9.50**	**8.76**	**8.72**	**8.63**	**8.26**
II. Industrial Sector	**26.72**	**26.03**	**25.93**	**25.83**	**25.78**	**23.85**	**24.59**	**24.37**	**24.42**	**24.32**
A. Mining and Quarrying	0.72	0.77	0.74	0.82	0.77	0.85	0.87	0.90	1.14	0.99
B. Manufacturing	19.22	18.87	18.71	18.25	18.13	16.28	16.72	16.97	16.82	16.76
C. Construction	3.77	3.52	3.68	3.97	4.05	4.08	4.31	3.87	3.87	3.93
D. Electricity, Gas and Water	3.02	2.86	2.80	2.78	2.83	2.65	2.69	2.62	2.58	2.63
III. Service Sector	**43.46**	**42.97**	**43.39**	**43.97**	**43.54**	**42.45**	**42.05**	**42.84**	**42.38**	**43.38**
A. Transportation, Storage and Communication	6.40	6.41	6.37	6.50	6.43	6.06	5.66	5.72	5.94	6.18
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	13.28	13.15	13.27	13.57	13.11	12.53	12.55	12.57	11.54	11.78
C. Financial Intermediation	4.42	4.57	4.87	5.05	4.90	4.87	4.96	5.05	5.24	5.37
D. Real Estate, Renting and Business Activities	7.47	7.45	7.56	7.69	7.98	7.84	7.79	8.25	8.16	8.39
E. Public Administration and Defense; Compulsory Social Security	4.00	3.77	3.71	3.55	3.45	3.45	3.37	3.28	3.43	3.31
F. Other Services	7.88	7.62	7.61	7.60	7.67	7.71	7.72	7.98	8.06	8.35
Gross Domestic Product	**81.27**	**79.60**	**79.78**	**80.12**	**79.47**	**75.80**	**75.40**	**75.92**	**75.43**	**75.96**
Net Primary Income	18.73	20.40	20.22	19.88	20.53	24.20	24.60	24.08	24.57	24.04
Gross National Income	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Percent to GDP					
I. Agriculture, Fishery and Forestry	**13.65**	**13.32**	**13.11**	**12.88**	**12.77**	**12.53**	**11.62**	**11.49**	**11.44**	**10.87**
II. Industrial Sector	**32.88**	**32.70**	**32.50**	**32.24**	**32.44**	**31.46**	**32.61**	**32.09**	**32.37**	**32.02**
A. Mining and Quarrying	0.88	0.97	0.92	1.03	0.97	1.12	1.16	1.19	1.52	1.31
B. Manufacturing	23.65	23.71	23.45	22.78	22.82	21.47	22.18	22.35	22.30	22.07
C. Construction	4.64	4.42	4.61	4.96	5.09	5.38	5.71	5.10	5.13	5.18
D. Electricity, Gas and Water	3.71	3.59	3.51	3.47	3.56	3.49	3.57	3.45	3.43	3.46
III. Service Sector	**53.47**	**53.99**	**54.39**	**54.88**	**54.79**	**56.01**	**55.76**	**56.42**	**56.19**	**57.11**
A. Transportation, Storage and Communication	7.88	8.05	7.98	8.12	8.10	7.99	7.50	7.53	7.87	8.13
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	16.34	16.52	16.63	16.94	16.49	16.53	16.64	16.55	15.30	15.51
C. Financial Intermediation	5.44	5.74	6.10	6.31	6.16	6.42	6.57	6.66	6.95	7.07
D. Real Estate, Renting and Business Activities	9.19	9.36	9.48	9.60	10.05	10.34	10.33	10.86	10.82	11.04
E. Public Administration and Defense; Compulsory Social Security	4.93	4.73	4.66	4.43	4.34	4.55	4.47	4.32	4.55	4.36
F. Other Services	9.70	9.58	9.54	9.49	9.66	10.17	10.24	10.51	10.69	10.99
Gross Domestic Product	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Growth Rates in Percent					
I. Agriculture, Fishery and Forestry	**4.32**	**2.24**	**3.64**	**4.73**	**3.22**	**-0.72**	**-0.16**	**2.68**	**6.26**	**0.84**
II. Industrial Sector	**5.23**	**4.19**	**4.61**	**5.77**	**4.81**	**-1.92**	**11.58**	**2.25**	**2.66**	**4.94**
A. Mining and Quarrying	-4.84	15.93	-0.20	18.64	-1.40	16.11	11.45	7.00	17.35	-8.41
B. Manufacturing	5.24	5.04	4.09	3.57	4.31	-4.80	11.16	4.73	6.92	5.00
C. Construction	5.92	-0.13	9.83	14.58	6.97	6.84	14.33	-7.31	-13.37	7.06
D. Electricity, Gas and Water	7.00	1.38	2.93	5.48	6.81	-0.87	9.91	0.63	-1.05	7.28
III. Service Sector	**8.26**	**5.79**	**6.02**	**7.58**	**3.99**	**3.40**	**7.16**	**5.13**	**4.66**	**7.84**
A. Transportation, Storage and Communication	12.09	7.08	4.30	8.42	3.89	-0.13	1.03	4.27	4.22	9.63
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	7.43	5.94	5.96	8.60	1.39	1.38	8.35	3.35	2.66	7.55
C. Financial Intermediation	7.01	10.56	11.85	10.18	1.76	5.47	10.10	5.25	9.13	7.92
D. Real Estate, Renting and Business Activities	9.57	6.76	6.54	7.95	9.04	4.13	7.50	9.26	7.35	8.21
E. Public Administration and Defense; Compulsory Social Security	7.49	0.63	3.54	1.41	2.05	6.07	5.84	0.27	-2.05	1.83
F. Other Services	6.54	3.50	4.80	6.08	5.98	6.52	8.43	6.56	5.49	9.07
Gross Domestic Product	**6.70**	**4.78**	**5.24**	**6.62**	**4.15**	**1.15**	**7.63**	**3.91**	**4.18**	**6.10**
Net Primary Income	8.99	16.57	4.04	4.40	8.43	25.03	9.95	1.01	-0.64	3.10
Gross National Income	**7.12**	**6.99**	**5.00**	**6.17**	**5.00**	**6.05**	**8.19**	**3.20**	**2.95**	**5.36**
Gross National Income (Million U.S. Dollars)	7.12	6.99	5.00	6.17	5.00	6.05	8.19	3.20	2.95	5.36

Note: Data on Real GDP and its components are based on 2000 prices. The use of terminology Gross National Income (GNI) in place of Gross National Product (GNP) has been adopted in the revised/rebased Philippine System of National Accounts (PSNA) in accordance with the 1993/1998 System of National Accounts prescribed by the United Nations.

[1] Derived by dividing peso value at constant 2000 prices by Pesos/US$1 rate in 2000.

Totals may not add up due to rounding.

Source: National Statistical Coordination Board (NSCB)

Table 11b - GROSS NATIONAL INCOME (GNI) BY EXPENDITURE SHARES

at constant 2000 prices

Item	2004	2005	2006	2007	2008	2009	2010	2011	First Semester 2011	First Semester 2012
					Levels (in million pesos)					
I. Personal Consumption Expenditures	3,161,890	3,301,789	3,439,876	3,598,443	3,730,861	3,817,908	3,945,827	4,194,513	2,009,628	2,117,777
II. General Government Consumption Expenditures	408,469	416,869	461,108	492,947	494,370	548,297	570,208	575,824	309,449	347,552
III. Gross Domestic Capital Formation	917,875	945,024	802,113	798,328	984,810	899,333	1,183,650	1,279,682	595,823	517,063
A. Fixed Capital Formation	862,985	883,344	930,966	979,749	1,010,616	992,947	1,182,206	1,184,018	595,052	630,777
B. Changes in Inventories	54,889	61,680	-128,852	-181,421	-25,807	-93,614	1,444	95,664	771	-113,714
IV. Exports of Goods and Services	2,108,406	2,212,822	2,491,585	2,659,711	2,588,548	2,385,812	2,886,133	2,764,877	1,473,640	1,613,913
V. Less: Imports of Goods and Non-Factor Services	2,319,697	2,395,226	2,478,452	2,521,141	2,561,488	2,354,109	2,884,280	2,890,486	1,476,425	1,485,991
VI. Statistical Discrepancy	0	0	0	0	0	0	0	0	-9,189	-30,298
Expenditures on Gross Domestic Product	**4,276,941**	**4,481,279**	**4,716,231**	**5,028,288**	**5,237,101**	**5,297,240**	**5,701,539**	**5,924,409**	**2,902,926**	**3,080,016**
Gross Domestic Product (Million U.S. Dollars) [1]	96,777	101,401	106,717	113,778	118,503	119,864	129,012	134,055	65,686	69,693
Net Primary Income	985,406	1,148,645	1,195,082	1,247,725	1,352,909	1,691,527	1,859,847	1,878,607	945,563	974,921
Expenditures on Gross National Income	**5,262,348**	**5,629,924**	**5,911,313**	**6,276,013**	**6,590,009**	**6,988,767**	**7,561,386**	**7,803,016**	**3,848,489**	**4,054,938**
Gross National Income (Million U.S. Dollars) [1]	119,074	127,392	133,759	142,011	149,116	158,139	171,096	176,564	87,082	91,754
					Percent to GNI					
I. Personal Consumption Expenditures	60.09	58.65	58.19	57.34	56.61	54.63	52.18	53.76	52.22	52.23
II. General Government Consumption Expenditures	7.76	7.40	7.80	7.85	7.50	7.85	7.54	7.38	8.04	8.57
III. Gross Domestic Capital Formation	17.44	16.79	13.57	12.72	14.94	12.87	15.65	16.40	15.48	12.75
A. Fixed Capital Formation	16.40	15.69	15.75	15.61	15.34	14.21	15.63	15.17	15.46	15.56
B. Changes in Inventories	1.04	1.10	-2.18	-2.89	-0.39	-1.34	0.02	1.23	0.02	-2.80
IV. Exports of Goods and Services	40.07	39.30	42.15	42.38	39.28	34.14	38.17	35.43	38.29	39.80
V. Less: Imports of Goods and Non-Factor Services	44.08	42.54	41.93	40.17	38.87	33.68	38.14	37.04	38.36	36.65
VI. Statistical Discrepancy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.24	-0.75
Expenditures on Gross Domestic Product	**81.27**	**79.60**	**79.78**	**80.12**	**79.47**	**75.80**	**75.40**	**75.92**	**75.43**	**75.96**
Net Primary Income	18.73	20.40	20.22	19.88	20.53	24.20	24.60	24.08	24.57	24.04
Expenditures on Gross National Income	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Percent to GDP					
I. Personal Consumption Expenditures	73.93	73.68	72.94	71.56	71.24	72.07	69.21	70.80	69.23	68.76
II. General Government Consumption Expenditures	9.55	9.30	9.78	9.80	9.44	10.35	10.00	9.72	10.66	11.28
III. Gross Domestic Capital Formation	21.46	21.09	17.01	15.88	18.80	16.98	20.76	21.60	20.52	16.79
A. Fixed Capital Formation	20.18	19.71	19.74	19.48	19.30	18.74	20.73	19.99	20.50	20.48
B. Changes in Inventories	1.28	1.38	-2.73	-3.61	-0.49	-1.77	0.03	1.61	0.03	-3.69
IV. Exports of Goods and Services	49.30	49.38	52.83	52.89	49.43	45.04	50.62	46.67	50.76	52.40
V. Less: Imports of Goods and Non-Factor Services	54.24	53.45	52.55	50.14	48.91	44.44	50.59	48.79	50.86	48.25
VI. Statistical Discrepancy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.32	-0.98
Expenditures on Gross Domestic Product	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Growth Rates in Percent					
I. Personal Consumption Expenditures	5.97	4.42	4.18	4.61	3.68	2.33	3.35	6.30	5.74	5.38
II. General Government Consumption Expenditures	2.00	2.06	10.61	6.90	0.29	10.91	4.00	0.98	-4.57	12.31
III. Gross Domestic Capital Formation	-2.24	2.96	-15.12	-0.47	23.36	-8.68	31.61	8.11	11.00	-13.22
A. Fixed Capital Formation	2.16	2.36	5.39	5.24	3.15	-1.75	19.06	0.15	1.13	6.00
IV. Exports of Goods and Services	12.76	4.95	12.60	6.75	-2.68	-7.83	20.97	-4.20	1.93	9.52
V. Less: Imports of Goods and Non-Factor Services	6.19	3.26	3.47	1.72	1.60	-8.10	22.52	0.22	4.62	0.65
Expenditures on Gross Domestic Product	**6.70**	**4.78**	**5.24**	**6.62**	**4.15**	**1.15**	**7.63**	**3.91**	**4.18**	**6.10**
Net Primary Income	8.99	16.57	4.04	4.40	8.43	25.03	9.95	1.01	-0.64	3.10
Expenditures on Gross National Income	**7.12**	**6.99**	**5.00**	**6.17**	**5.00**	**6.05**	**8.19**	**3.20**	**2.95**	**5.36**
Gross National Income (Million U.S. Dollars)	7.12	6.99	5.00	6.17	5.00	6.05	8.19	3.20	2.95	5.36

Note: Data on Real GDP and its components are based on 2000 prices. The use of terminology Gross National Income (GNI) in place of Gross National Product (GNP) has been adopted in the revised/rebased Philippine System of National Accounts (PSNA) in accordance with the 1993/1998 System of National Accounts prescribed by the United Nations.

[1] *Derived by dividing peso value at constant 2000 prices by Pesos/US$1 rate in 2000.*

Totals may not add up due to rounding.

Source: National Statistical Coordination Board (NSCB)

Table 11b - Gross National Income (GNI) By Industrial Origin

at constant 2000 prices

Item	2004	2005	2006	2007	2008	2009	2010	2011	First Semester 2011	First Semester 2012
					Levels (in million pesos)					
I. Agriculture, Fishery and Forestry	**583,629**	**596,727**	**618,457**	**647,687**	**668,550**	**663,744**	**662,665**	**680,445**	**332,097**	**334,895**
II. Industrial Sector	**1,406,338**	**1,465,272**	**1,532,814**	**1,621,226**	**1,699,171**	**1,666,601**	**1,859,515**	**1,901,401**	**939,717**	**986,119**
A. Mining and Quarrying	37,631	43,624	43,535	51,649	50,926	59,130	65,898	70,509	43,987	40,285
B. Manufacturing	1,011,618	1,062,612	1,106,052	1,145,529	1,194,921	1,137,534	1,264,523	1,324,330	647,409	679,759
C. Construction	198,404	198,154	217,637	249,379	266,751	284,994	325,820	302,014	148,885	159,403
D. Electricity, Gas and Water	158,685	160,882	165,591	174,670	186,572	184,943	203,274	204,547	99,437	106,672
III. Service Sector	**2,286,974**	**2,419,280**	**2,564,959**	**2,759,375**	**2,869,379**	**2,966,895**	**3,179,359**	**3,342,564**	**1,631,111**	**1,759,002**
A. Transportation, Storage and Communication	337,039	360,885	376,398	408,076	423,952	423,398	427,766	446,026	228,501	250,498
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	698,830	740,311	784,443	851,892	863,732	875,616	948,743	980,514	444,280	477,817
C. Financial Intermediation	232,730	257,301	287,793	317,104	322,672	340,329	374,716	394,371	201,783	217,756
D. Real Estate, Renting and Business Activities	392,961	419,523	446,975	482,493	526,116	547,866	588,947	643,459	314,220	340,033
E. Public Administration and Defense; Compulsory Social Security	210,720	212,055	219,563	222,665	227,223	241,009	255,087	255,776	131,948	134,357
F. Other Services	414,694	429,205	449,788	477,145	505,683	538,677	584,100	622,418	310,380	338,540
Gross Domestic Product	**4,276,941**	**4,481,279**	**4,716,231**	**5,028,288**	**5,237,101**	**5,297,240**	**5,701,539**	**5,924,409**	**2,902,926**	**3,080,016**
Net Primary Income	985,406	1,148,645	1,195,082	1,247,725	1,352,909	1,691,527	1,859,847	1,878,607	945,563	974,921
Gross National Income (GNI)	**5,262,348**	**5,629,924**	**5,911,313**	**6,276,013**	**6,590,009**	**6,988,767**	**7,561,386**	**7,803,016**	**3,848,489**	**4,054,938**
Gross National Income (Million U.S. Dollars) [1]	119,074	127,392	133,759	142,011	149,116	158,139	171,096	176,564	87,082	91,754
Per Capita GNI (U.S. Dollars) [1]	1,425	1,494	1,538	1,601	1,648	1,737	1,848	1,875	928	962
					Percent to GNI					
I. Agriculture, Fishery and Forestry	**11.09**	**10.60**	**10.46**	**10.32**	**10.14**	**9.50**	**8.76**	**8.72**	**8.63**	**8.26**
II. Industrial Sector	**26.72**	**26.03**	**25.93**	**25.83**	**25.78**	**23.85**	**24.59**	**24.37**	**24.42**	**24.32**
A. Mining and Quarrying	0.72	0.77	0.74	0.82	0.77	0.85	0.87	0.90	1.14	0.99
B. Manufacturing	19.22	18.87	18.71	18.25	18.13	16.28	16.72	16.97	16.82	16.76
C. Construction	3.77	3.52	3.68	3.97	4.05	4.08	4.31	3.87	3.87	3.93
D. Electricity, Gas and Water	3.02	2.86	2.80	2.78	2.83	2.65	2.69	2.62	2.58	2.63
III. Service Sector	**43.46**	**42.97**	**43.39**	**43.97**	**43.54**	**42.45**	**42.05**	**42.84**	**42.38**	**43.38**
A. Transportation, Storage and Communication	6.40	6.41	6.37	6.50	6.43	6.06	5.66	5.72	5.94	6.18
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	13.28	13.15	13.27	13.57	13.11	12.53	12.55	12.57	11.54	11.78
C. Financial Intermediation	4.42	4.57	4.87	5.05	4.90	4.87	4.96	5.05	5.24	5.37
D. Real Estate, Renting and Business Activities	7.47	7.45	7.56	7.69	7.98	7.84	7.79	8.25	8.16	8.39
E. Public Administration and Defense; Compulsory Social Security	4.00	3.77	3.71	3.55	3.45	3.45	3.37	3.28	3.43	3.31
F. Other Services	7.88	7.62	7.61	7.60	7.67	7.71	7.72	7.98	8.06	8.35
Gross Domestic Product	**81.27**	**79.60**	**79.78**	**80.12**	**79.47**	**75.80**	**75.40**	**75.92**	**75.43**	**75.96**
Net Primary Income	18.73	20.40	20.22	19.88	20.53	24.20	24.60	24.08	24.57	24.04
Gross National Income	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Percent to GDP					
I. Agriculture, Fishery and Forestry	**13.65**	**13.32**	**13.11**	**12.88**	**12.77**	**12.53**	**11.62**	**11.49**	**11.44**	**10.87**
II. Industrial Sector	**32.88**	**32.70**	**32.50**	**32.24**	**32.44**	**31.46**	**32.61**	**32.09**	**32.37**	**32.02**
A. Mining and Quarrying	0.88	0.97	0.92	1.03	0.97	1.12	1.16	1.19	1.52	1.31
B. Manufacturing	23.65	23.71	23.45	22.78	22.82	21.47	22.18	22.35	22.30	22.07
C. Construction	4.64	4.42	4.61	4.96	5.09	5.38	5.71	5.10	5.13	5.18
D. Electricity, Gas and Water	3.71	3.59	3.51	3.47	3.56	3.49	3.57	3.45	3.43	3.46
III. Service Sector	**53.47**	**53.99**	**54.39**	**54.88**	**54.79**	**56.01**	**55.76**	**56.42**	**56.19**	**57.11**
A. Transportation, Storage and Communication	7.88	8.05	7.98	8.12	8.10	7.99	7.50	7.53	7.87	8.13
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	16.34	16.52	16.63	16.94	16.49	16.53	16.64	16.55	15.30	15.51
C. Financial Intermediation	5.44	5.74	6.10	6.31	6.16	6.42	6.57	6.66	6.95	7.07
D. Real Estate, Renting and Business Activities	9.19	9.36	9.48	9.60	10.05	10.34	10.33	10.86	10.82	11.04
E. Public Administration and Defense; Compulsory Social Security	4.93	4.73	4.66	4.43	4.34	4.55	4.47	4.32	4.55	4.36
F. Other Services	9.70	9.58	9.54	9.49	9.66	10.17	10.24	10.51	10.69	10.99
Gross Domestic Product	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
					Growth Rates in Percent					
I. Agriculture, Fishery and Forestry	**4.32**	**2.24**	**3.64**	**4.73**	**3.22**	**-0.72**	**-0.16**	**2.68**	**6.26**	**0.84**
II. Industrial Sector	**5.23**	**4.19**	**4.61**	**5.77**	**4.81**	**-1.92**	**11.58**	**2.25**	**2.66**	**4.94**
A. Mining and Quarrying	-4.84	15.93	-0.20	18.64	-1.40	16.11	11.45	7.00	17.35	-8.41
B. Manufacturing	5.24	5.04	4.09	3.57	4.31	-4.80	11.16	4.73	6.92	5.00
C. Construction	5.92	-0.13	9.83	14.58	6.97	6.84	14.33	-7.31	-13.37	7.06
D. Electricity, Gas and Water	7.00	1.38	2.93	5.48	6.81	-0.87	9.91	0.63	-1.05	7.28
III. Service Sector	**8.26**	**5.79**	**6.02**	**7.58**	**3.99**	**3.40**	**7.16**	**5.13**	**4.66**	**7.84**
A. Transportation, Storage and Communication	12.09	7.08	4.30	8.42	3.89	-0.13	1.03	4.27	4.22	9.63
B. Trade and Repair of Motor Vehicles, Motorcycles, Personal and Household Goods	7.43	5.94	5.96	8.60	1.39	1.38	8.35	3.35	2.66	7.55
C. Financial Intermediation	7.01	10.56	11.85	10.18	1.76	5.47	10.10	5.25	9.13	7.92
D. Real Estate, Renting and Business Activities	9.57	6.76	6.54	7.95	9.04	4.13	7.50	9.26	7.35	8.21
E. Public Administration and Defense; Compulsory Social Security	7.49	0.63	3.54	1.41	2.05	6.07	5.84	0.27	-2.05	1.83
F. Other Services	6.54	3.50	4.80	6.08	5.98	6.52	8.43	6.56	5.49	9.07
Gross Domestic Product	**6.70**	**4.78**	**5.24**	**6.62**	**4.15**	**1.15**	**7.63**	**3.91**	**4.18**	**6.10**
Net Primary Income	8.99	16.57	4.04	4.40	8.43	25.03	9.95	1.01	-0.64	3.10
Gross National Income	**7.12**	**6.99**	**5.00**	**6.17**	**5.00**	**6.05**	**8.19**	**3.20**	**2.95**	**5.36**
Gross National Income (Million U.S. Dollars)	7.12	6.99	5.00	6.17	5.00	6.05	8.19	3.20	2.95	5.36

Note: Data on Real GDP and its components are based on 2000 prices. The use of terminology Gross National Income (GNI) in place of Gross National Product (GNP) has been adopted in the revised/rebased Philippine System of National Accounts (PSNA) in accordance with the 1993/1998 System of National Accounts prescribed by the United Nations.

[1] *Derived by dividing peso value at constant 2000 prices by Pesos/US$1 rate in 2000.*

Totals may not add up due to rounding.

Source: National Statistical Coordination Board (NSCB)

Table 12 - Total Resources of the Philippine Financial System[1]

as of periods indicated
levels in billion pesos

	Grand Total	Banks				Non - Banks [4]
		Total	Universal and Commercial Banks [2]	Thrift Banks	Rural Banks	
2001	**4,159.69**	**3,403.23**	3,070.47	259.00	73.76	756.46
2002	**4,416.18**	**3,608.48**	3,250.19	274.77	83.52	807.70
2003	**4,714.58**	**3,810.70**	3,425.59	292.72	92.39	903.88
2004	**5,175.85**	**4,182.99**	3,760.60	317.89	104.50	992.86
2005	**5,619.47**	**4,464.09**	3,985.98	357.83	120.28	1,155.38
2006	**6,257.12**	**4,985.61**	4,392.59	453.75	139.27	1,271.51
2007	**6,613.79**	**5,244.70**	4,578.33	501.78	164.59	1,369.09
2008	**7,384.35**	**5,946.32**	5,282.58	499.86	163.88	1,438.03
2009	**8,201.57**	**6,511.82**	5,779.06	554.55	178.21	1,689.75
2010	**9,081.56** [r]	**7,230.23** [r]	6,423.67	626.43	180.13 [r]	1,851.33 [r]
2011	**9,593.98** [p]	**7,642.24** [p]	6,833.02	623.58	185.64 [a]	1,951.74 [p]

[1] *Excludes the Bangko Sentral ng Pilipinas; amount includes allowance for probable losses*

[2] *Based on the new Financial Reporting Package that was implemented beginning March 2008, asset is valued gross of amortization, depreciation and allowance for probable losses; prior to 2008, data were based on Consolidated Statement of Condition which valued asset gross of allowance for probable losses and net of amortization and depreciation.*

[3] *Beginning February 1996, specialized government banks were consolidated with commercial banks.*

[4] *Includes Investment Houses, Finance Companies, Investment Companies, Securities Dealers/Brokers, Pawnshops, Lending Investors, Non-Stock Savings and Loan Assns., Venture Capital Corps., and Credit Card Companies which are under BSP supervision; also includes Private and Government Insurance Companies (i.e., SSS and GSIS).*

[a] *As of end-September 2011*

[p] *Preliminary*

[r] *Revised*

Notes: (1) Data on Universal, Commercial Banks and Thrift Banks are based on the new Financial Reporting package (FRP) beginning March 2008.
(2) Data on Non-Banks are based on Consolidated Statement of Condition (CSOC).
(3) Data on Rural Banks are based on CSOC up to September 2010. Data from October 2010 onwards are based on FRP for some banks and CSOC for other banks.
(4) Details may not add up to total due to rounding off.

Source: Bangko Sentral ng Pilipinas

Table 13 – Philippine Banking System: Selected Performance Indicators

Indicators	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011 p/
Liquidity (%)											
Cash & Due from Banks to deposits	13.6	14.1	11.5	11.6	13.0	18.1	20.5	19.9	18.8	25.9	25.3
Liquid assets to deposits 1/	44.4	47.7	48.0	53.2	53.1	52.1	51.9	52.5	52.7	59.7	56.4
Loans (gross) to deposits	82.4	78.9	80.1	73.3	72.4	69.3	70.9	69.7	68.1	64.4	70.0
Asset Quality (%)											
NPL ratio	16.9	14.6	13.7	12.6	8.4	6.1	5.0	4.1	3.7	3.6	2.8
NPL ratio (net of IBL)	19.0	16.6	16.0	14.5	10.0	7.5	5.8	4.5	4.1	3.8	3.0
NPL coverage ratio	45.3	50.2	52.2	58.0	72.9	75.0	81.5	86.0	93.1	98.7	103.9
NPA ratio	14.6	13.4	13.1	11.8	8.8	6.9	5.8	5.1	4.5	3.9	3.3
NPA coverage ratio	29.6	30.1	31.1	33.2	38.4	37.3	39.8	45.0	48.7	53.0	57.2
ROPA to Gross Assets Ratio	5.6	6.0	6.0	5.8	4.8	4.0	3.4	3.1	2.6	2.3	1.9
ROPA Coverage Ratio	4.4	5.2	6.6	7.4	9.8	9.4	10.0	17.5	18.2	19.6	22.2
Distressed Assets ratio	28.4	27.7	27.0	25.0	19.1	15.1	12.5	10.8	9.3	8.8	7.0
Capital Adequacy (%)											
CAR1/ - Solo Basis 2/	14.5	15.5	16.0	17.4	16.4	16.9	14.7	14.7	14.9	16.0	16.3.
Total capital to total assets 3/	13.6	13.4	13.1	12.1	12.0	11.7	11.7	10.9	11.1	11.7	12.6
Profitability (%)											
Earning Asset Yield 4/	10.2	7.7	7.5	7.7	8.2	8.3	7.9	7.7	7.0	5.9	5.6
Funding Cost 5/	6.2	3.9	3.8	3.8	3.9	3.9	3.3	3.2	2.6	2.1	2.0
Interest Spread 6/	4.0	3.8	3.7	3.9	4.3	4.4	4.6	4.5	4.5	3.8	3.6
Net Interest Margin 7/	3.8	3.8	3.8	4.1	4.3	4.3	4.4	4.3	4.4	3.9	3.8
Net Interest Income to Total Operating Income	35.6	41.1	53.6	65.4	65.9	60.4	59.8	68.4	66.4	62.7	62.3
Cost-to-income ratio 8/	80.7	71.4	62.6	68.1	65.5	64.0	65.2	74.0	65.8	63.4	64.3
Return on assets (ROA) 9/	0.4	0.8	1.2	0.9	1.1	1.3	1.3	0.8	1.2	1.4	1.5
Return on equity (ROE) 9/	3.2	5.8	9.0	7.1	8.8	10.6	10.7	6.9	10.8	12.2	12.5

Source: BSP

1/ Liquid Assets refers to Cash and Due from Banks plus Financial Asset, net of amortization (net of financial assets in equity securities)

2/ Based on the new framework provided for under Circular No. 280 dated 29 March 2001 which was formally adopted starting 1 July 2001. Universal and Commercial banks are required to report their CARs based on combined credit and market risk under Circular No. 360 dated 3 December 2002, which took effect on 1 July 2003. Under Circular No. 538 dated 4 August 2006 effective 1 July 2007, U/KBs are to incorporate operational risk in addition to credit and market risks.

3/ Total capital accounts includes redeemable preferred shares.

4/ Earning Asset Yields refers to the ratio of interest income to average earnings assets.

5/ Funding Cost refers to the ratio of interest expenses to average interest-bearing liabilities.

6/ Interest spread refers to the difference between earning asset yield and funding cost.

7/ Net Interest Margin refers to the ratio of net interest income to average earnings assets.

8/ Cost-to-income ratio refers to the ratio of non-interest expenses to total operating income.

9/ ROA and ROE refers to the ration of annualized net profit to average assets and capital, respectively.

Chapter 9

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL SYSTEM STABILITY IN SRI LANKA[1]

By
Gayal Rupasinghe[2]

1. Introduction

The Payment and Settlement System (PSS), which is constantly evolving, is complex in structure and functions throughout the world. The integrity of PSS worldwide has made financial institutions to be interdependent and externally exposed to shocks in the global environment.

Payment is a transfer of value. A payment system is a mechanism agreed upon by two or more parties, i.e. buyers and sellers in transferring value between them to accomplish a particular transaction. Certainty and smooth settlement of payments would reduce risks, i.e. exchange rate risk, credit risks, settlement risks and improve liquidity management. In turn, this will enhance the transaction certainty for the financial institutions and facilitate timely availability of critical information for supervisors and monetary authorities. Simultaneously, prompt and smooth financial settlements will further enhance the effectiveness of monetary policy transmission and the overall conduct of monetary policy. An efficient payment and settlement system is therefore a critical infrastructure to the success of attaining monetary and financial stability.

The standard unit of monetary value in Sri Lanka is the Sri Lanka rupee. The Central Bank of Sri Lanka (CBSL) has the sole authority to issue banknotes and coins on behalf of the Government of Sri Lanka. Currency issued by the CBSL is the legal tender in Sri Lanka and can be used for the payment of any amount. Banknotes and coins are the most popular retail payment medium among individuals and business entities to make "face to face" payments for goods and

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1. The views and opinions expressed therein are those of the author and do not necessarily represent the views of the Central Bank of Sri Lanka (CBSL) or The SEACEN Centre.
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services. The CBSL operates number of payments systems; it supervises banks that are the participants in the system. CBSL is the formal regulator in payment clearing and settlement system in Sri Lanka and exercise a substantial influence on the design and overall functioning of the systems.

Prior to implementation of RTGS system, the high value payments were settled through the Current Account System (CAS), via Central bank cheques, on a deferred net settlement basis. Each commercial bank maintained a single current account with the CBSL that served both for settlements as well as to meet requirement to hold statutory reserves. Under this net settlement system payments are accumulated over a day. At the end of the day offsetting bilateral and multilateral payments were netted and only the resulting balances were settled in central bank money.

Before the introduction of RTGS System in 2003, there was no payment instrument which provided immediate payment/settlement as and when required (timeliness), reliability, security and accuracy for settlement of business-to-business large value and time critical payments in Sri Lanka. Similarly individual customers of banks had no instrument to transfer funds in an account of his bank to a client's account in another bank during the day to pay an obligation as and when required. The only option then available was to make the large or urgent payment on a cash withdrawal/deposit basis. To overcome the liquidity, credit and settlement risks, CBSL introduced the Real Time Gross Settlement System (RTGS) in September2003. With the new implementation, customers of banks such as government, other financial institutions, corporate and individuals have a payment instrument i.e. RTGS to make their payments instantaneously. Since these transactions are made between RTGS settlement accounts at the Central Bank of Sri Lanka (CBSL) with assurance of finality, recipients can receive funds and re-use immediately.

The CBSL is statutorily responsible for the implementation of a PSS policy and has wider powers to supervise, oversee and regulate PSS. In its modernization programme which commenced in 2001, the CBSL refocused on its core objectives, i.e. the economic and price stability and the financial system stability. The financial system stability objective encompasses a wide range of subjects of which, the establishment of a safe and sound payment system was seen crucial for the development of the financial sector, which is also complementary to the maintenance of price stability. In this context, the CBSL examined the adequacy and the efficiency of the payment system to satisfy the needs of an evolving economy and decided to undertake comprehensive payment reforms. The broader objectives of the reforms were to reduce transaction costs, increase efficiency,

ensure safety and reduce credit, liquidity and systemic risks. As such, the CBSL acts as the apex body in the institutional framework.

In early 2000s, there had been a rapid acceleration in fundamental reforms to national payment systems worldwide, although the pace of implementation of reforms in different countries had been uneven. Planned outcomes had not always been achieved in terms of expected use, benefits or costs of payment system reform projects and many planned reforms had been unexpectedly slow to complete. In line with that, Payment and Settlement Systems of Sri Lanka experienced a rapid development since 2003 and it is a culmination of reforms brought in under the modernization project of the CBSL. The implementation of the LankaSettle System under this Project is a landmark in the development of PSS, as it introduced a very well integrated two systems i.e. The RTGS System which settles payments in real time gross basis and the LankaSecure System which settles securities transactions on Delivery versus Payment (DvP) basis. Further, as a part of the CBSL Modernization Project, the CBSL devolved its clearing functions to the LankaClear (Pvt) Ltd (LCPL) in 2002. Accordingly, all major retail payment clearing systems are operated by the LCPL. Having considered the complexity of PSS and the involvement of a large number of stakeholders, in 2006 the CBSL formed the National Payment Council to obtain the assistance of representatives of all PSS stakeholders in making policy decisions. The CBSL plays a pivotal role in Sri Lanka's payment and settlement systems, for both large-value and retail payments.

The changes over from cash to non-cash payments in Sri Lanka are gradual but steady. The Real Time Gross Settlement (RTGS) system and the Cheque Imaging & Truncation (CIT) system, which accounted for 99 per cent of the total value of non-cash payments, continued to be the main contributors to the non-cash payments of the country. RTGS system, which is operated by the CBSL, settled 267,289 transactions with a total value of Rs. 57,790 billion during the 2011. Cheques are the most widely used paper based non cash retail payment instrument and have shown a continuous growth of about 10 per cent per year during the period of 2005-2011. Retail credit transfers in the Sri Lanka Interbank Payment System (SLIPS) recorded a significantly high annual growth of 40% since 2004 mainly due to the increase usage of the system for payment of salaries and wages of the public sector and private sector institutions. The LCPL upgraded the system to accommodate, T+0 settlement i.e. same day settlements, the growth in volumes and to improve its security. Credit Cards and ATM cards have exhibited strong and continuous growth of about 51 per cent and 174 per cent respectively from 2005 to 2011.

Many banks offer internet banking services in Sri Lanka, which include access to account information as well as funds transfers between accounts and bill payments and online securities trading. The growth in the number of internet users and the widening reach of internet services will impact significantly on the way credit transfers are carried out. Broader usage of mobile phones has encouraged banks and non-banks to develop new payment services for their customers and Mobile phone based payment applications are explored by the financial industry, as an option to provide electronic payment services in Sri Lanka. In fact, few banks have already commenced providing the banking services to their customers through mobile phones. Owing to the precautions that need to be taken particularly on the security of such financial transactions, the CBSL have issued a set of guidelines to be adopted by licensed commercial banks on mobile payments. Recent products launched by a few banks in cooperation with mobile service providers, facilitating the use of the mobile phone as a delivery channel, have increased the scope of this mode of payment.

1.1 Role of CBSL in PSS

At present, monetary policy management in Sri Lanka is based on a monetary targeting framework which is operated through a monetary programme. The final target of this framework is price stability, is achieved by influencing changes in broad money supply which is linked to reserve money through a multiplier. Reserve money is the operating target of monetary policy. The Central Bank of Sri Lanka takes into account economic factors such as the expected fiscal and balance of payments developments, economic growth, desired levels of growth in credit and inflation when preparing the monetary programme. Based on these factors, the monetary programme sets out the desired path for monetary growth and determines the quarterly reserve money targets necessary to achieve this monetary growth. The Bank would then conduct its Open Market Operations (OMO) within a corridor of interest rates formed by its policy rates namely the repurchase rate and the reverse repurchase rate, to achieve the reserve money target. Policy rates are periodically reviewed and adjusted appropriately, if necessary, to bring the reserve money to the targeted path.

The monetary policy stance by the Central Bank of Sri Lanka during the last years was aimed at reducing the inflationary pressures while facilitating the growth momentum of the economy. The inflation was managed at mid-single digit level and an overall market liquidity level was maintained in line with expected monetary developments. Market interest rates remained stable although a slight increase in rates was witnessed towards the end of the 2011. Excess liquidity in the market remained high at the beginning of the year and considering its

adverse impact on future monetary expansion and inflation, the CBSL raised the Statutory Reserve Ratio (SRR) on all rupee deposit liabilities of commercial banks by 1 percentage point to 8.0 per cent in April 2011 and absorbed permanently about Rs. 18 billion. By the end of 2011, the market liquidity declined below Rs.10 billion. The Central Bank commenced overnight reverse repurchase auctions towards year-end to contain pressure on market interest rates and uneven distribution in market liquidity among banks. Considering the improved investment climate, the government issued Treasury bonds with different maturities which enabled to reconstruct the term structure of interest rates in. The Central Bank continued to facilitate an inclusive growth within the financial sector, particularly through policies that would support a financial system of a US dollars 100 billion economy by 2016.

A number of techniques to identify and analyse systemic risk in the financial sector were also developed by the CBSL. Stress testing of the banking sector was carried out to measure its resilience to shocks relating to credit risk, market risk, and liquidity risks. Macro stress testing commenced in 2011 with the adoption of a credit risk model to assess the impact of macroeconomic variables on the asset quality of the banking sector. The Banking Soundness Indicator (BSI), an aggregate indicator with variables relating to capital, credit quality, earnings, liquidity and sensitivity to market risk, measures the level of soundness of the banking sector. The Financial Stress Indicator (FSI) was constructed last year measures the level of stress in financial markets and the banking sector. The variables included in the FSI represent the money market, the bond market, the foreign exchange market, the stock market and the banking sector.

As a measure to promote financial intermediation and broaden the permissible activities undertaken by Off-shore Banking Units (OBUs) of the licensed commercial banks, residents were permitted to transfer funds between Exporters' Foreign Currency Accounts (EFCAs) and accounts maintained by non-residents in OBUs. This helps smoothen exports and import related payments while reducing intermediary costs and improving trade relationships. The Central Bank also declared the Chinese Renminbi (RMB) as a designated currency for foreign exchange transactions of commercial banks considering China's importance as an investor, lender and trading partner of Sri Lanka. Strong customer-bank relationship is considered as the key to promoting financial inclusion and financial system stability.

In this context, the adoption of minimum standards and norms for the banking sector, specifying the responsibilities of banks towards their customers and the customers' responsibility towards banks was seen as necessary to safeguard

the interests of both banks and customers. Accordingly, the 'Customer Charter of Licensed Banks', specifying rights and obligations of banks and customers was issued as a Directive mandating a 'Code of Conduct' in banking operations.

With the view to enhancing the Central Bank's authority and necessary regulatory powers to discharge its responsibility for ensuring financial system stability, a number of amendments have been brought in to the Banking Act, taking into account new developments in the domestic and international financial markets.

During the past few years the financial market infrastructure in Sri Lanka underwent major reforms. Accordingly Central Bank of Sri Lanka performs three key roles in the PSS. They are (1) Overseeing the payment, clearing and settlement system, (2) Operating systemically important payment and settlement systems, (3) Formulating a national payments policy and developing the payment systems.[3] Sri Lankan payment system consists of both large value payment systems and retail payment systems. The LankaSettle System, operated by the Central Bank of Sri Lanka and the CITS, operated by LankaClear (Pvt.) Ltd (LCPL), are the two Systematically Important Payment Systems (SIPS) in Sri Lanka.

The Central Bank takes measures to strengthen the payment and settlement infrastructure in the country to ensure safety, efficiency, competitiveness and stability of the Payment and Settlement System (PSS) to foster financial system stability.

One major objective is to promote electronic retail payment systems in the country. Therefore, the Central Bank initiates action to provide a safe and secure environment while regulating such systems to ensure customer protection. Accordingly, with the increased interest shown by bank and non-bank entities in the recent past in providing mobile payment systems, the Central Bank issued two mobile banking guidelines to regulate such systems. To ensure compliance of credit card issuers to the credit card operational guidelines, the Central Bank examines the self- evaluation reports prepared by them. Furthermore, supervision is also carried out to ensure that the credit card issuers comply with the web disclosure requirements stipulated in the credit card operational guideline. The Central Bank assists credit card issuers to prepare a code of conduct which will

3. Central Bank of Sri Lanka, Financial System Stability: Monitoring and Surveillance, Available at:<http://www.cbsl.gov.lk/htm/english/05_fss/f_3.html#9>

be the benchmark service standard in their dealings with individual customers. As per a decision taken at the National Payments Council (NPC), service providers of payment cards who are functioning as financial acquirers are instructed to migrate to line encryption technology to protect electronic payment cards used in Sri Lanka. As a result, payment card service providers commenced the applying of encryption technology in 2011.

As per a decision taken by the NPC, Lanka Clear (Pvt) Ltd. took steps to establish the Common Card and Payment Switch (CCAPS) under the guidance of the Central Bank to reduce the cost of ATM and Card transactions by sharing payment infrastructure and the Central Bank designated CCAPS as the National Payments Switch in Sri Lanka.

Having considered the increased usage of internet banking services to settle financial transactions and risks associated with such systems, the Central Bank has drafted a guideline to regulate Internet banking services. Measures are also taken with the support of the Treasury to encourage several departments to effect payments through electronic payment mechanisms whenever possible. Accordingly, the Treasury issued a circular to government departments instructing them to use electronic payment systems to make payments higher than Rs. 100 million.

1.2 Objective and Scope of the Study

The main objective and scope of the paper is to study the role of payment and settlement system in monetary policy and financial system stability. Paper also presents a general evaluation of the national payments and settlements system (NPSS) of Sri Lanka and proposes the necessary recommendations for its strategy of the modernization of the NPSS. According, the document includes global concepts that include the generalities of a payment and settlement system, the link of said system with the monetary policy, the role that a Central Bank must play in the system, as well as liquidity and the inherent risks of the payment systems. On the other hand, reference is made to the basic principles on the Systemically Important Payment Systems, carried out by the Bank of International Settlements (BIS).

The objectives of this study are as follows:

- Assess payment and settlement system standards, both on the retail and wholesale levels;

- Identify key challenges and issues to improve the efficiency of the payment and settlement system in Sri Lanka;
- Identify areas where payment and settlement system directly influence domestic monetary and financial stability;
- Assess efforts to further develop and improve payment and settlement system in Sri Lanka;
- Take stock of regional cooperation(s) on the areas of payment and settlement system involving SEACEN economies and evaluate the outcome and shortcoming;
- Identify key areas of cooperation across SEACEN members.

1.3 General Outline of the Paper

This Report is organized into 7 sections. Firstly, Section 1 provides background information to the study. This contains development of PSS, brief explanation of the condition of Monetary Policy, Financial Stability in Sri Lanka, role of Central Bank of Sri Lanka in PSS, and objectives and expected results of this study.

Secondly, Section 2 presents a review of literature, mainly summarizing theoretical and empirical literature on identifying vulnerability and risk of PSS related to Monetary Policy and Financial Stability.

Section 3 contains the policy framework and position of PSS in Monetary Policy and Financial Stability, Financial stability describes in detail the structure of the financial system and components of the financial system in Sri Lanka and the importance of an efficient payment and settlement system. However, there is lack of empirical studies, with special focus on Sri Lanka.

The next section, Section 4 focuses on Sri Lanka payments and settlements system. It covers the payments and settlements regulatory framework, payment instruments and infrastructure.

Section 5 focuses on the assessment of current PSS framework in the country. Finally, Section 6 examines the policy implications related to safety and efficient PSS, possible risk, risk mitigation specific to Monetary Policy and Financial Studies, crisis management protocol and possible needed developments. Section 7 concludes the research study.

2. Literature Review

The type of payments and settlements systems adopted in countries varies, but the Real-Time Gross Settlement (RTGS) has become the foremost system for the settlement of high-value payments in developed economies (BIS, 1997). During the past decade a number of countries, i.e. emerging and developing countries, have introduced RTGS systems for large-value funds transfers and many countries are also considering introducing such systems. The majority of RTGS systems around the world are operated by Central Banks and settlement takes place using central bank money (World Bank Group 2008).

In a World Bank Group (2008) survey in 142 central banks about their national payment systems, 112 of the 142 central bank respondents indicated that an RTGS system is a feature of their national payment systems. The survey results suggested that central bank operational principles and practices vary greatly across these systems in the areas of access, liquidity and credit, and costing and pricing.

Peter Allsopp, Bruce Summers and John Veale (2008), in their paper have revealed that, there are number of benefits which are provided by the RTGS system to the economy and financial sector. Firstly, RTGS systems offer a rich set of banking-related services that provide value throughout the financial and real sectors of the economy. Bank and non-bank financial institutions, commercial and industrial firms, and even individuals benefit from the use of RTGS services. The terms and conditions under which access to RTGS services is granted have an important bearing on how effectively and efficiently an RTGS system supports the financial and real sectors of the economy. Moreover, the terms of access affect the abilities of the providers and users of RTGS services to manage their payment system risks. These ideas were also assured by Wilhelmina C., Agnes M. Yap and MagnoTorreja in their paper "RTGS and its implication on Central Banking" by saying, the payments system, which consists of the set of institutions, instruments, rules, procedures, standards and technical mechanisms for the transfer of money, is an essential part of the financial infrastructure in a market economy.

They have further elaborated that 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. Developments in the payments system have implications for the conduct of monetary policy through their influence on the functioning of financial markets. The payment and settlement system greatly influence the speed, financial

risks, reliability and cost of transacting when financial market participants make payments. The more developed the payments system, the more liquid the assets traded in financial markets become and the lower the associated risks and the transaction costs. Payment system's technical efficiency determines the effectiveness with which transaction money is used in the economy, and the risks associated with its use. Meanwhile, the reduction in transaction time resulting from reforms in the payments system (e.g., the implementation of an RTGS system) could prevent the occurrence of large float. This, in turn, could result in a more accurate measure of monetary aggregates (such as reserve money, base money and domestic liquidity) and could contribute to the more effective implementation of monetary policies.

The rationale behind the trend towards RTGS has been the perceived need to reduce the risk potentially found in Deferred Net Settlement (DNS), the predominant system for settling high-value payments previously. RTGS entails payments being settled on a gross basis in real time. As a consequence, credit risk and settlement risk between settlement banks are eliminated. But RTGS does not dominate DNS in all respects. With payments settled on a gross basis, settlement banks' liquidity needs under RTGS are greater than those under DNS (Matthew Willison, 2004).

The design of all payment arrangements must reflect a trade-off between cost and risk. As noted in BIS (2005), "if a system was so costly or burdensome that no one used it, the system would have no effect on risks no matter how extensive its risk controls." This applies as much to RTGS systems as to any other system design, for while addressing the counterparty credit risks associated with Deferred Net Settlement (DNS) systems, real-time gross settlement of payments can be a significant, and costly, drain on a bank's liquidity (Kahn and Roberds (2001). To alleviate this burden, central banks also typically offer intraday credit / liquidity to payment system participants. In the absence of such credit, users would have to pre-fund their settlement accounts at the central bank, thereby incurring a substantial opportunity cost of holding liquidity. (Chakravorti, 2000).

2.1 Role of the Central Bank in a Payment System

As stated by Mark Manning and Daniela Russo at the conference on Payments and monetary and financial stability in Frankfurt on 12-13 November 2007, the typical objectives of Central Banks monetary and financial stability have grown from their early roles in the field of payment systems. Today, Central Banks around the world continue to provide the ultimate settlement asset and

strengthen their influence via a role in ownership, operation or oversight of key components of the financial infrastructure. The status of a Central Bank at the top of the hierarchy derived from the fact that it was perceived to be "safe" – that is, an institution with a large capital base, holding high-quality assets. Such a central bank would also need to be concerned about its own soundness. This led the Central Bank to be careful about to whom it should provide settlement accounts and to monitor these banks.

Borio et al. (1992) define the payment system as "that set of arrangements for the discharge of the obligations assumed by economic agents whenever they acquire control over real or financial resources".

Huang and Wright (2005) set out a theoretical model of the transition from an early monetary economy to one with financial institutions and payment systems. They establish conditions for the introduction of payment systems, noting that it will more likely be the case that the cheaper it is to use such a system, the greater the risk of theft in a cash-only world, and the higher the gains from trade. Lester (2005) and Millard and Willison (2006) have further built on this model, incorporating settlement and operational risks in the use of payment systems, and investigating welfare implications.

2.2 Monetary Policy and Payments

Payment systems affect the daily demand for liquidity of commercial banks / financial institutions and may therefore affect the level of money market interest rates. The Central Bank will need to establish appropriate arrangements for liquidity provision to the banking system. It will also pay attention to the mechanisms by which it carries out such operations, ensuring the safety, resilience and efficiency of the payment and settlement systems. In the past decade, there has been a marked shift away from deferred net settlement to RTGS in large-value payment systems. This implies heightened intraday liquidity demands on payment system participants, which are typically met via the provision of credit by the Central Bank (Kahn and Roberds, 2007)

Millard, Speight and Willison (2007) argue that the difference reflects a tension between different aspects of the central bank's monetary stability objective: on the one hand, a central bank sets overnight rates to meet its price stability objective; on the other, it may be prepared to inject intraday liquidity into an RTGS payment system at a very low cost to ensure that banks do not have an incentive to delay payments and risk settlement failure.

Central Banks provide liquidity for different purposes. To achieve their primary objective of price stability, monetary authorities supply base money to the economy. By matching the demand for base money with the supply that they control, central banks steer short-term interbank interest rates, which, via the transmission mechanism of monetary policy, have an impact on the price level. (Kahn and Roberds, 2007)

2.3 Payments and Financial Stability

A financial stability objective lies within a broadly interpreted monetary stability objective. Millard and Saporta (2007) capture the dual objectives of price stability and smooth functioning of interbank payment systems in a broad definition of the pursuit of monetary stability: "ensuring that money can perform its functions of unit of account, store of value, medium of exchange and means of deferred payment in all states of the world."

In its role as the lender of the last resort Central Bank will try to reduce the systemic risk that could arise. Systemic risk can be defined in terms of the risk of losses in the wider economy which are not considered by individual system members when they make their decisions. Some of these threats may derive from the design and operation of payment systems themselves, particularly when the dependence on such systems is high.

Jenkinson and Manning (2007) and Millard and Saporta (2007) identify two principal sources of systemic risk arising from payment and settlement activity: single point of failure risk; and risk arising from strategic interaction between payment system participants.

Box 1 - Theoretical Relationship of the Payment System to Money Supply

The relationship between money supply and economic activity can be expressed as;

$$MV = PT$$

Where;
(M)Money Supply, (V) Velocity, (P) Price Level, (T) Number of Transactions.

In this equation "PT" represents some aggregate level of economic activities. The efficiency of the payments system is reflected in the money turnover rate, which indicates how many times 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 payments system improves, payments will take a 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 conditions remain constant.

Accordingly, the payments system links economic activity and money. In this regard, the float that normally results from payment processing inefficiencies as well as malfunctions in the clearing and settlement process can affect monetary policy.

Therefore, Central banks have a strong interest in promoting safety and improving efficiency in payments and settlements system as part of their overall concern with financial stability. Central banks play a key role in the domestic payments system because it is their liquid liabilities. In recognising safe and efficient payments and settlements system is critically important for deepening and broadening the financial markets, the CBSL in 2006, formed the National Payment Council (NPC), the highest decision making body of the country with regard to the PSS in Sri Lanka. This provides an industry wide framework represented by all relevant stakeholders to take forward the modernization of PSS.

3. Policy Framework

Professor Charles Goodhart (2010)[4] noted Central Banks have generally had three main objectives or functional roles. These have been (i) to maintain price stability, subject to the monetary regime in current operation, for example the gold standard, a pegged exchange rate or an inflation target; (ii) to maintain financial stability, and to foster financial development more broadly; and (iii) to support the state's financing needs at times of crisis, but in normal times to constrain misuse of the state's financial powers. Naturally the balance between these three objectives has shifted over time, with support for state financing becoming prominent during war-times.

3.1 Central Bank of Sri Lanka

The Central Bank of Ceylon was set up by the post-independence Government in recognition of the importance of an active monetary policy regime and a dynamic financial sector to support and promote economic growth. Prior to the establishment of the Central Bank, functions relating to central banking were conducted by the Currency Board System that was set up under the Paper Currency Ordinance No.32 of 1884. After gaining political independence, the Currency Board System was considered inadequate and unsuitable for meeting the needs of a developing country and an independent nation. Therefore, in July 1948, the Government of Ceylon requested the United States Government for technical expertise to set up a central bank, which resulted in Mr. John Exter[5], an economist from the Federal Reserve Board of the USA being appointed to carry out this task. The Exter Report[6] on the rationale and the legal framework for the Central Bank was presented to the Government of Ceylon in November 1949 and led to its formation. The Central Bank of Ceylon was established by the Monetary Law Act (MLA) No.58 of 1949 and commenced operations on August 28, 1950. It was renamed the Central Bank of Sri Lanka in 1985. Similar to many central banks especially in developing economies, the objectives of the Central Bank of Sri Lanka were stabilization of the domestic value of the rupee, stabilization of the external value of the rupee, and promotion of the economic growth.[7] Since then Central Bank's focus and functions have evolved since its

4. 9th BIS Annual Conference, The Future of Central Banking under Post-Crisis Mandates, 24-25 June 2010, Lucerne, Switzerland, The Future Role and Mandate of Central Banks.

5. John Exter was an American economist, member of the Board of Governors of the United States Federal Reserve System, and founder of the Central Bank of Sri Lanka.

6. Report on the Establishment of a Central Bank for Ceylon, November 1949.

7. Amarasekara, C., (2008), "The Impact of Monetary Policy on Economic Growth and Inflation in Sri Lanka," ***Central Bank of Sri Lanka Staff Studies***, 38, pp 1-44.

formation, in response to the changing economic environment. Meanwhile, a consensus had developed internationally that a central bank's primary goal should be the maintenance of price stability since it is crucially dependent on stable macroeconomic conditions. Furthermore, as the experience of other countries has demonstrated, the stability of the financial system is crucial in improving the resilience of the economy. Therefore, in keeping with trends in central banking, the objectives of the Central Bank were streamlined by amending the Monetary Law Act (MLA) in 2002, to focus more on the stabilization objectives than the development objectives enabling the Central Bank of Sri Lanka to pursue its core objectives and to free it of the multiple objectives that were originally assigned to it. Therefore, in accordance with the international trends in central banking new objectives were stated as (i) maintaining economic and price stability and (ii) maintaining financial system stability.

3.2 Monetary Policy Framework in Sri Lanka

The CBSL has gradually moved away from direct controls towards more market oriented policy tools with the liberalization of the economy in 1977. While credit controls were gradually eliminated and the administratively determined bank rate was gradually abandoned, the CBSL has increasingly utilised open market operations for the conduct of monetary policy. The floating of the exchange rate in 2001 has added to the operational independence of monetary policy.[8]

At present, monetary management in Sri Lanka is based on a monetary targeting framework. In this framework, the final target, price stability, is to be achieved by influencing changes in broad money supply which is linked to reserve money through a multiplier. Reserve money is the operating target of monetary policy**.** The monetary targeting framework is operated through a monetary programme prepared by the Central Bank of Sri Lanka. A monetary programme is prepared considering the economic outlook of the country and projections based on the desired rate of monetary expansion to achieve a target rate of inflation, consistent with the projected rate of economic growth, balance of payments forecast and expected fiscal operations of the government. Accordingly, a reserve money target is established, which is the operating target for monetary policy.[9]

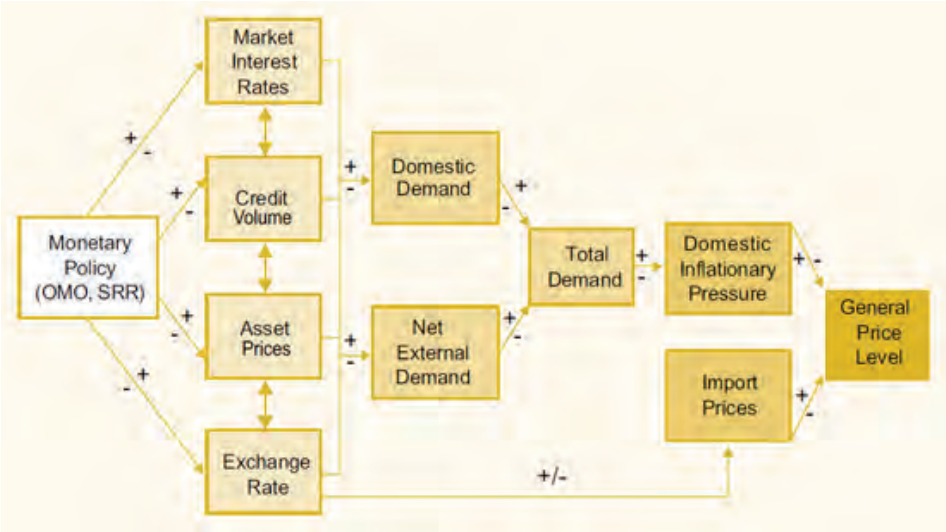
8. Amarasekara, C., (2008), "The Impact of Monetary Policy on Economic Growth and Inflation in Sri Lanka," ***Central Bank of Sri Lanka Staff Studies***, 38, pp 1-44.

9. Jayamaha, R.; H.N. Thenuwara; P.N. Weerasinghe; B.D.W.A. Silva; C.P.A. Karunathilake; H.P.G.S. Ratnasiri; P.H.O. Chandrawansa; R.A. Perera and S. Gunaratne, S., (2001/02), "Feasibility of Inflation Targeting in Sri Lanka," ***Central Bank of Sri Lanka Staff Studies***, 31-32, pp 15-58.

The Bank would then conduct its Open Market Operations (OMO) within a corridor of interest rates formed by its policy rates i.e. the repurchase rate and the reverse repurchase rate, to achieve the reserve money target. These policy rates, which are the Bank's signalling mechanism on its monetary policy stance are periodically reviewed and adjusted appropriately, if necessary, to bring the reserve money to the targeted path. A daily auction is conducted either to absorb liquidity through repurchase transactions, if there is excess liquidity, or to inject liquidity through reverse repurchase transactions, if there is a shortage of liquidity and thereby to maintain overnight interest rates stable around a level considered consistent with the path of reserve money targets. Standing facilities are available for those participating institutions which were unable to obtain their liquidity requirements at the daily auction.

Outright transactions are conducted at the discretion of the CBSL to address long term liquidity issues. There also exists another policy rate known as the Bank Rate. The Statutory Reserve Ratio (SRR) also has been widely used to influence money supply in the past. However, the reliance on SRR as a daily monetary management measure has been gradually reduced with a view to enhancing market orientation of monetary policy and also reducing the implicit cost of funds which the SRR would entail on commercial banks.

Figure 1
Transmission Mechanism of Monetary Policy



3.3 Financial System Stability in Sri Lanka

Financial system stability means a safe and secure financial system which is able to withstand external and internal shocks. A stable financial system creates a favourable environment for depositors and investors, encourages financial institutions and markets to function effectively and efficiently, and hence, promotes investment and economic growth. The Central Bank discharges this role by establishing the required legal framework, regulating and supervising key categories of financial institutions, maintaining stability in key financial markets, overseeing the payments and settlements system, acting as lender of last resort and by regular surveillance of the entire financial system, including insurance and stock market activities. It further means creating a trust-worthy and enabling environment favourable to savers and investors helping the transmission of monetary policy, thereby assisting the attainment of price stability, encouraging efficient financial intermediation, which eventually promotes investment and growth, and encouraging effective and efficient operation of markets and improving distribution of resources in the economy.

3.3.1 Structure of the Financial System

The financial system in Sri Lanka comprises the major financial institutions, namely the Central Bank of Sri Lanka, licensed commercial banks (LCBs), licensed specialized banks (LSBs), licensed finance companies (LFCs), specialized leasing companies (SLCs), primary dealers (PDs), pension and provident funds, insurance companies, rural banks, stock brokers, securities market intermediaries, unit trusts and thrift and credit co-operative societies; the major financial markets, such as the foreign exchange market, money market, capital market and the informal financial market; and the financial infrastructure which is the legal framework related to the financial system and the payment and settlement.

Banks play a central role within the financial system, as they have the capacity to provide liquidity to the entire economy. Banks are also responsible for providing payment services, thereby facilitating all entities to carry out their financial transactions. On the other hand, banks can create vulnerabilities of systemic nature, partly due to a mismatch in maturity of assets and liabilities. Therefore, the soundness of banks is important, as it contributes towards maintaining confidence in the financial system and any failure may have the potential to impact on activities of all other financial and non-financial entities.

The banking sector in Sri Lanka, which comprises 24 LCBs and 9 LSBs, dominates the financial system and accounted for 55 per cent of the total assets

of the financial system as at end 2011.Even though a large number of LCB exist in the country, the stability of the financial system is primarily dependent on the performance and financial strength of the six largest LCBs, consisting of the two state banks and the four largest domestic private commercial banks. These six banks, which are generally referred to as the Systemically Important Banks (SIBs), represented 76 per cent of the LCB sector assets and 64 per cent of the banking sector assets.

In terms of the asset base and the magnitude of services provided, the LCBs are the single most important category of financial institution within the banking sector. As at end 2011, the LCBs dominated the financial system with a market share of 46 per cent of the entire financial system's assets and 84 per cent of the banking sector's assets. The LSB sector represented 9 per cent and 16 per cent of the entire financial system's assets and banking sector's assets, respectively. The systemic importance of the LSB sector is relatively low in comparison to the LCBs, both in terms of size and their impact on the financial system, as it does not play an intermediary role in the payment cycle. Table 1 indicates the total assets of the major financial institutions in Sri Lanka as of end 2011.

Table 1
Total Assets of the Major Financial Institutions

	2010(a)		2011(b)	
	Rs. Bn	Share in Total %	Rs. Bn	Share in Total %
Banking Sector	**4,527.3**	**68.8**	**5,367.8**	**69.7**
Central Bank	976.7	14.8	1,123.4	14.6
Licensed Commercial Banks	2,974.6	45.2	3,575.3	46.4
Licensed Specialized Banks	576.0	8.8	669.1	8.7
Other Deposit Taking Financial Institutions	**295.0**	**4.5**	**427.0**	**5.5**
Licensed Finance Companies	233.6	3.6	352.0	4.6
Co-operative Rural Banks	54.7	0.8	67.6	0.9
Thrift and Credit Co-operative Societies	6.7	0.1	7.4	0.1
Other Specialized Financial Institutions	**354.3**	**5.4**	**340.8**	**4.4**
Specialized Leasing Companies	154.1	2.3	137.7	1.8
Primary Dealers	125.8	1.9	135.3	1.8
Stock Brokering Companies	13.2	0.2	11.3	0.1
Unit Trust / Unit Trust Management Companies	23.0	0.3	23.7	0.3
Market Intermediaries (c) (d)	37.0	0.6	31.2	0.4
Venture Capital Companies	1.1	-	1.5	-
Credit Rating Agencies	0.2	-	0.2	-
Contractual Savings Institutions	**1,400.9**	**21.3**	**1,569.0**	**20.4**
Insurance Companies	222.2	3.4	263.3	3.4
Employees' Provident Fund	899.7	13.7	1,020.1	13.2
Employees; Trust Fund	125.9	1.9	140.6	1.8
Approved Private Provident Funds	126.2	1.9	115.1	1.5
Public Service Provident Fund	26.9	0.4	29.9	0.4
Total	**6,577.5**	**100.0**	**7,704.6**	**100.0**

3.3.2 Components of the Financial System in Sri Lanka

The financial system consists of the Central Bank, as the apex financial institution, other regulatory authorities, financial institutions, markets, instruments, a payment and settlement system, a legal framework and regulations. The financial system carries out the vital financial intermediation function of borrowing from surplus units and lending to deficit units. The legal framework and regulators

are needed to monitor and regulate the financial system. The payment and settlement system is the mechanism through which transactions in the financial system are cleared and settled.

3.3.2.1 Regulatory Authorities

i) Central Bank of Sri Lanka

The regulation and supervision of banking institutions is mainly governed by the Monetary Law Act No.58 of 1949, the Banking Act No.30 of 1988 and the Exchange Control Act No. 24 of 1953. The regulation and supervision of finance companies is undertaken in terms of the Finance Business Act, No 42 of 2011. The regulation and monitoring of finance leasing establishments is conducted under the Finance Leasing Act No.56 of 2000. The regulation of supervision of primary dealers in government securities is carried out in terms of the Local Treasury Bills Ordinance No.8 of 1923 and the Registered Stocks and Securities Ordinance No.7 of 1937.

ii) Securities and Exchange Commission

The Securities and Exchange Commission (SEC) is responsible for licensing and regulating stock exchanges, stock-brokers, stock dealers and unit trust companies, in terms of the Securities and Exchange Commission of Sri Lanka Act No. 36 of 1987. The SEC also registers underwriters, margin providers, credit rating agencies, investment managers and securities clearing houses. In order to co-ordinate financial stability issues, the Central Bank is a member of the Board of Directors of the SEC and the Deputy Governor in charge of Financial System Stability represents the Central Bank on the SEC Board.

iii) Insurance Board of Sri Lanka

The Insurance Board of Sri Lanka (IBSL) regulates and supervises the insurance industry - insurance companies and their agents and insurance brokers, under the Regulation of Insurance Industry Act No.43 of 2000 to safeguard the interests of policy-holders. The Central Bank is a member of the IBSL and is represented on it by the Deputy Governor in charge of Financial System Stability.

3.3.2.2 Financial Institutions regulated by the Central Bank of Sri Lanka

i) Licensed Commercial Banks (LCBS) & Licensed Specialized Banks (LSBs)

The Central Bank issues banking licenses for two categories of banks, namely Licensed Commercial Banks and Licensed Specialized Banks (which are savings and development banks). The main difference between a Licensed Commercial Bank and a Licensed Specialized Bank, is that the former is permitted to accept demand deposits from the public (operate current accounts for customers) and is an Authorized Dealer in foreign exchange which entitles it to engage in a wide-range of foreign exchange transactions, whereas the latter is permitted to limited engagements in foreign exchange with Central Bank's approvals. The regulatory and supervisory function relating to banks licensed by the Monetary Board is carried out by the Bank Supervision Department of the Central Bank. The supervision of banks is based on the internationally accepted standards for bank supervision set out by the Basel Committee for Banking Supervision.

During the year 2011, two more banks came into operation resulting in the number of banks in the sector reaching 33. Accordingly, the banking sector consists of 12domestic LCBs, including 02 state owned banks, 12 foreign banks and 09LSBs. One of the new banks was established to offer Islamic banking services in Sri Lanka and is expected to introduce new mechanisms to further increase financial inclusion. The banking network increased to 6,122 outlets (including 12 overseas outlets) and 2,240 automated teller machines (ATMs). The total network expanded by 201 outlets. Table 2 indicates the distribution of Banks and Bank branches in Sri Lanka as of end 2011.

Table 2
Distribution of Banks and Bank Branches

	End 2010(a)	End 2011(b)
Licensed Commercial Banks (LCBs)		
1. Total No. of LCBs	**22**	**24**
Domestic banks	11	12
Foreign banks	11	12
2. Total No. of LCB Branches and Other Outlets	**5,164**	**5,347**
Branches	**1,470**	**1,581**
Domestic Bank Braches	1,424	1,533
Foreign Branches	46	48
Extension Offices	**905**	**978**
Domestic Banks	735	807
Foreign Banks	170	171
Student Savings Units and Other Outlets	**2,789**	**2,788**
Automated Teller Machines	**1,862**	**2,082**
Licensed Specialized Banks (LSBs)		
1. Total No. of LSBs	9	9
Regional Development Banks (c)	1	1
National Level Savings Banks	2	2
Long-term Lending Institutions	2	2
Housing Finance Institutions	2	2
Private Savings and Development Banks	2	2
2. Total No. of LSB Branches and Other Outlets	**757**	**775**
Branches	**500**	**511**
Regional Development Banks (c)	230	233
National Level Savings Banks	173	179
Long-term Lending Institutions	23	24
Housing Finance Institutions	28	29
Private Savings and Development Banks	46	46
Extension Offices	**69**	**76**
Student Savings Units and Other Outlets	**188**	**188**
Automated Teller Machines	**158**	**158**
Total No. of Bank Branches and Other Outlets	**5,921**	**6,122**
Total No. of Automated Teller Machines (ATM's)	**2,020**	**2,240**
Total No. of Electronic Fund Transfer Facilities at the Point of Sale Machines (EFTPOS)	**27,588**	**27,073**
Banking Density: No. of Bank Branches Per 100,000 Persons	9.5	10

An Internal Supervisory Rating system of banks is in place, taking into consideration of quantitative measures such as Capital Adequacy, Asset Quality, Management, Earnings and Liquidity (i.e. CAMEL model components) and other qualitative measures such as assessment of bank's compliance with statutory requirements, applicable laws and regulations, internal controls and the standards of corporate governance, in order to categorise them under different risk ratings and take necessary regulatory and supervisory actions to improve the positions of weaker banks.

ii) Licensed Finance Companies (LFCs) and Specialized Leasing Companies (SLCs)

The Non-Bank Financial (NBF) sector consisting of Licensed Finance Companies (LFCs) and Specialised Leasing Companies (SLCs).

The regulation and supervision of LFCs is governed by the Finance Business Act No. 42 of 2011 which was enacted in November 2011 to strengthen the regulation of finance companies. The new law which replaces the Finance Companies Act has broadened the definition of "deposits" and "finance business" and has empowered the regulator with more investigative powers and enhanced penalties for offences. The regulation and monitoring of SLCs is conducted under the Finance Leasing Act No. 56 of 2000.

The Department of Supervision of Non-Bank Financial Institutions of the CBSL carries out the regulatory and supervisory functions in respect of LFCs and SLCs, with the objective of ensuring that these institutions comply with the minimum prudential requirements stipulated by the Central Bank. These functions are carried out mainly through off-site surveillance and on-site examinations. Table 3 indicates the Composition of assets and liabilities of NBFIs sector in Sri Lanka as of end 2011.

Table 3
Composition of Assets and Liabilities of NBFIs Sector

Item	2010 (a)		2011 (a)	
	Rs. bn	Share (%)	Rs. bn	Share (%)
Assets				
Accommodation	265.5	68.4	388.4	79.3
Finance Leasing	87.5	22.6	166.1	33.9
Hire Purchase	96.0	24.7	118.4	24.2
Investments	25.2	6.5	13.5	2.8
Others	97.2	25.1	88.0	18.0
Liabilities				
Total Deposits	146.1	37.7	186.0	38.0
Total Borrowings	**138.9**	**35.8**	**171.6**	**35.0**
Capital Elements	**48.1**	**12.4**	**77.0**	**15.7**
Total Funds	**333.2**	**85.9**	**434.6**	**88.7**
Other	54.7	14.1	55.3	11.3
Total Assets/Liabilities	**387.9**	**100**	**489.9**	**100**

Source: Central Bank of Sri Lanka Annual Report 2011.
(a) Revised
(b) Provisional

iii) Authorized Primary Dealers (PDs)

There are two categories of institutions that are eligible to be Authorized PDs - LCBs and Dedicated Primary Dealers Companies. The supervision of PDs is carried out to ensure an efficient, sound and safe primary dealer system, to promote the stability of the government securities market and to safeguard the interests of investors. The main Directions issued to Primary Dealers cover Minimum Capital Requirement, Capital Adequacy, Special Risk Reserve, Segregation of Securities Accounts, Custodial Holdings of Securities, Market Valuation, Repurchase Agreements, Forward Rate Agreements and Interest Rate Swaps, Financial statements, Dividend Declaration and Diversification. The Public Debt Department supervises Authorized Primary Dealers through off-site surveillance and on-site examinations.

3.3.2.3 Institutions Not Regulated by the Central Bank of Sri Lanka

Certain financial institutions are not regulated by CBSL. These include Stock Broking / Dealing Companies, Unit Trust Companies and Investment Management Companies, which come under the purview of the SEC, Insurance Companies and Insurance Brokers which are regulated by the Insurance Board of Sri Lanka (IBSL), and Venture Capital Companies, Pension and Provident Funds and Micro-Finance Institutions.

3.3.2.4 Financial Markets

The Financial Market, which is the market for credit and capital, can be divided into the Money Market and the Capital Market. The Money Market is the market for short-term interest-bearing assets with maturities of less than one year, such as Treasury bills, commercial paper, and certificates of deposits. The major task of the Money Market is to facilitate the liquidity management in the economy.

The Capital Market is the market for trading in assets for maturities of greater than one year, such as Treasury bonds, private debt securities (bonds and debentures) and equities (shares). The main purpose of the Capital Market is to facilitate the raising of long-term funds.

The Financial Market can be also be classified according to instruments, such as the debt market and the equity market. The debt market is also known

as the Fixed Income Securities Market and its segments are the Government Securities Market (Treasury bills and bonds) and the Private Debt Securities Market (commercial paper, private bonds and debentures).

The Central Bank through its conduct of monetary policy influences the different segments of the Financial Market in varying degrees. The Central Bank's policy interest rates have the greatest impact on a segment of the Money Market called the inter-bank call money market and a segment of the Fixed Income Securities Market, i.e. the Government Securities Market. The Central Bank may also intervene in the inter-bank Foreign Exchange Market, which is closely connected to the Money Market.

i) Inter-bank Call Money Market

The inter-bank call money market is the first step in the transmission of the Central Bank's monetary policy signals to the economy. Hence, the Central Bank closely monitors the inter-bank market and makes a daily assessment of the liquidity in the banking system. Under the current open-market operations system, the Central Bank will conduct either a Repo or Reverse Repo auction for a determined amount, in order to reduce large fluctuations in the inter-bank call money market interest rate. If there is excess liquidity in the market, the Central Bank will conduct a Repo auction to mop-up the surplus money. Likewise, if there is a shortage of liquidity in the market, the Central Bank will conduct a Reverse Repo auction to inject money into the market. The magnitude of the Central Bank intervention depends on the overall liquidity excess or shortfall, prevailing interest rate environment and perfect interest rate level. In 2011, the excess liquidity in the inter-bank money market that was brought forward from the previous year gradually declined. The daily inter-bank call money market transactions averaged Rs.10.1 billion in 2011.

Table 4
Money Market Transactions

Market	Volume (Rs. bn)			Interest/Yield Rates		
	2009	2010	2011	2009	2010	2011
Call Money	2040	996	2434	8.58-15.54	7.83-9.43	7.57-9.40
Inter-bank repo	1,162.0	1,128.0	1,099.0	8.29-15.01	7.05-8.53	6.88-8.34
Central Bank repo	1,786.0	10,723.0	14,490.0	7.50-10.90	7.25-8.25	7.00-7.58
Central Bank reverse repo	907.0	-	141.0	9.75-19.00	9.75-9.00	7.25-9.00
Central Bank Securities	1,781.0	1,467.0	-	7.50-9.62	7.25-8.85	-

Source: Central Bank of Sri Lanka Annual Report 2011.

ii) Fixed Income Securities Market

The Treasury bill market is another segment of the Money Market. Treasury bills are highly liquid money market instruments that provide financial institutions with an alternate source of liquidity and investment. Furthermore, interest rate movements in the Treasury bill market provide a benchmark for the short-term credit market. Hence, changes in the volumes and rates in the Treasury bill market affect the cost, profitability and liquidity of financial institutions.

Table 5
Market Volumes of Government Securities

Item	Rs. billion		
	2009	2010	2011
Issued in the Primary Market	1,522.6	1,508.6	1,767.5
Treasury bills	821.2	1,000.1	1,164.6
Treasury Bonds	701.4	508.6	603.0
Trading in the Secondary Market (as recorded in LankaSecure)	20,542.5	41,250.0	53,679.1
Treasury bills	8,048.6	21,379.7	25,679.1
Treasury Bonds	12,493.9	19,870.3	28,655.4
No. of Investor Accounts at LankaSecure	64,680.0	73,396.0	76,286.0

Source: Central Bank of Sri Lanka Annual Report 2011.

iii) Domestic Foreign Exchange Market

One of the main purposes of the domestic foreign exchange market is to obtain foreign currency funds for the purchase of imports of goods and services and to service loan repayments. The foreign exchange market consists of the spot market and the forward market. The foreign exchange market in Sri Lanka consists of two tiers, the client or retail market and the inter-bank or wholesale market. The transactions in the inter-bank market partly result from transactions that banks have had with their customers in the retail market. The inter-bank market is mainly organized among Authorized Dealers in foreign exchange, which comprise all commercial banks and plays an important role in the Sri Lankan financial system by redistributing liquidity within the banking system.

As the floating exchange rate system was adopted in January 2001, the price of the Sri Lanka Rupee, in terms of foreign currencies, is determined by market forces of demand and supply. The US Dollar / SL Rupee exchange rate is determined in the inter-bank foreign exchange market. The Central Bank intervention in the foreign exchange market is mainly to prevent excessive volatility

in the exchange rate and to maintain a comfortable level of external reserves. However, with effect from 10th February 2012, the Central Bank decided to limit its intervention in the FOREX market.

The total value of inter-bank foreign exchange transactions in 2011 increased to US dollars 16,442 million as against US dollars11,066 million in 2010. The daily average volume of inter-bank foreign exchange transactions was US dollars 68.5 million in 2011 as against US dollars46.30 million in 2010, resulting in an increase of 48per cent. The rupee depreciated slightly against the US dollar in 2011.

3.3.2.5 Financial Instruments Used in Sri Lanka

i) Deposits

Deposits are sums of money placed with a financial institution, for credit to a customer's account. There are three types of deposits - demand deposits, savings deposits and fixed or time deposits. Demand deposits are mainly used for transaction purposes and for the safekeeping of funds. Funds can be withdrawn on demand. Demand deposits do not earn interest, but banks provide a number of services to demand deposit- holders like cheque facilities, standing orders, Automated Teller Machine (ATM) cards and debit cards to facilitate withdrawals and payments. Savings deposits earn interest, which may be calculated on a daily, weekly, monthly or annual basis. Financial institutions issue pass-books or statements detailing transactions to savings deposit holders and also provide services such as ATM and debit cards. Fixed or time deposits are funds placed at financial institutions for a specified period or term. Fixed / time deposits earn a higher rate of interest than savings deposits. Fixed / time deposits can be for short, medium or long term. Funds can only be withdrawn before the maturity date with prior notice and a penalty may be imposed. A fixed / time deposit holder has a facility to borrow funds from the financial institution using the deposit as collateral.

ii) Loans

A loan is a specified sum of money provided by a lender, usually a financial institution, to a borrower on condition that it is repaid, either in instalments or all at once, on agreed dates and at an agreed rate of interest. In most cases, financial institutions require some form of security for loans.

iii) Treasury Bills and Bonds

Treasury bills are government securities that have a maturity period of up to one year. Treasury bills are issued by the Public Debt Department of the Central Bank, on behalf of the Government of Sri Lanka, under the provisions of the Local Treasury Bills Ordinance. Treasury bills are issued in maturities of 91 days, 182 days and 364 days. Treasury bills are zero coupon securities and are sold at a discount to face value, which is paid at maturity. Treasury bonds are medium and long-term government securities and are issued in maturities ranging from 2 years to 20 years. Treasury bonds are issued by the Public Debt Department of the Central Bank, on behalf of the Government of Sri Lanka, under the provisions of the Registered Stocks and Securities Ordinance. Treasury bonds are interest-bearing securities, with interest paid bi-annually. Treasury bills and bonds are guaranteed by the Government and are the safest of all investments, as they are default risk free. Treasury bills and bonds are tradable securities which are sold by auction to Primary Dealers, who in turn market the securities to the public. The yields on Treasury bills and bonds are market determined and the market is both active and liquid. From 2004, Treasury bills and bonds are issued in scrip-less (paperless) form and transactions are recorded electronically in the "LankaSecure" system of the Central Bank.

iv) Repurchase Agreements

Repurchase agreements (Repo) are arrangements which involve the sale, for cash, of securities (usually government securities) at a specified price with a commitment to repurchase the same or similar securities at a fixed price on a specified future date. The difference between the sale price and the repurchase price is the interest income. The agreement is called reverse repo when viewed from the perspective of the securities buyer. A repo is similar to a loan that is collateralized by the securities underlying the agreement. Most repos are very short-term money market instruments.

v) Commercial Paper

Commercial papers (CPs) are short-term, non-collateralized (unsecured) debt securities issued by private sector companies to raise funds for their own use, by banks and other financial intermediaries. CPs are generally issued by creditworthy (high-rated) institutions in large denominations and have additional bank guarantees of payment. CPs are usually sold at a discount, although some are interest bearing.

vi) Corporate Bonds and Debentures

Corporate bonds are medium or long-term securities of private sector companies which obligate the issuer to pay interest and redeem the principal at maturity. Corporate bonds that are not backed by a specific asset are called debentures.

Debentures are unsecured, medium or long term, interest-bearing bonds issued by private sector companies, banks and other financial institutions that are backed only by the general credit of the issuer. Debentures are usually issued by large, well-established institutions. The holders of debentures are considered creditors and are entitled to payment before shareholders in the event of the liquidation of the issuing company.

vii) Asset-backed Securities

Asset-backed securities (ABS) are bonds collateralized (secured) by mortgages, loans, or other receivables. Typically, the issuing institution sells mortgages, loans, instalment credit, credit card or other receivables to a trust or a special purpose vehicle (SPV) that in turn sells ABSs to the public. ABSs are interest- bearing instruments and are often enhanced through the use of guarantees or insurance.

viii) Financial Leases

Financial leases are accommodations provided to finance the purchase of capital or durable equipment in which the legal owner (lessor) lends the equipment to the lessee for payments that cover the full principal and interest cost. The lessee receives all benefits from the use of the asset and incurs the costs associated with its ownership, such as maintenance, insurance and taxes. Legal ownership of the equipment passes to the lessee when the loan principal and interest payments are settled in full.

ix) Shares

Shares are securities representing a portion of the ownership of a company that are a claim on the company's earnings and assets. Shareholders are paid dividends which are a percentage of the profits of the company.

x) Financial Derivatives

A financial derivative is a financial instrument that is linked to another specific financial instrument, indicator or commodity and through which specific financial risks (such as interest rate risk, foreign exchange risk, equity and commodity price risk) can in their own right, be traded in financial markets. The value of a financial derivative comes from the price of an underlying item such as an asset or index. Financial derivatives can be used for risk management, hedging (protecting) against financial losses on commercial transactions and financial instruments and arbitrage between markets and speculation. There are two distinct classes of financial derivatives - forwards and related instruments, and options. The most common forward instruments are forward contracts, futures contracts, forward rate agreements (FRAs) and interest rate swaps (IRS). Financial derivatives are traded over- the- counter, in which case they are customized and can be purchased from financial institutions or are standardized products which are traded on organized exchanges. Although, financial derivatives are still not widely used in Sri Lanka, the market for forward contracts, FRAs and IRS is starting to develop.

3.4 Efficient Payments and Settlements System

A payment and settlement system can be described as a system which consists of a particular group of institutions and a set of instruments and procedures, designed to ensure the circulation of money and speed up interbank and other settlements resulting from the various economic transactions either within a country or between countries.[10]

This system is supported by the country's banking system, which allows all players in the economy to come together and interact in a payment system through the use of their instruments and procedures that enable, people to effect payments and move their funds as and when necessary. The final settlement of payment transfers takes place across the accounts which banks hold with the central bank that plays the role to facilitate the functioning of the economy as a whole.

One of the most important functions of the financial system is to ensure safety and efficiency in payments and securities transactions. Financial

10. Jayamaha, Ranee, (2007), Modernization of the National Payment System, Central Bank of Sri Lanka, Available at: www.cbsl.gov.lk/pics_n_docs/05_fss/_docs/article1.pdfý

infrastructure refers to the different systems that provide for the execution of both large-value and small-value payments. Payment and settlement systems enable the transfer of money in the accounts of financial institutions to settle financial obligations between individuals and institutions.

Payment systems affect the daily demand for liquidity of commercial banks and financial institutions and may therefore affect the level of money market interest rates. Therefore, smooth functioning of payment systems becomes a precondition for

- Efficient and safe execution of monetary policy operations
- Smooth functioning of the money markets

The objectives of payment and settlement system policy can be listed as,

1. Protecting transmission channel for monetary policy,
2. Maintaining systemic stability,
3. Ensuring efficient payment and settlement systems, and
4. Maintaining public confidence in systems, instruments and currency

4. Sri Lanka Payments and Settlements System

In the modernization programme which commenced in 2001, the Central Bank of Sri Lanka refocused on its core objectives, i.e. economic and price stability and the financial system stability. The establishment of a safe and sound payment system therefore is seen crucial for the development of the financial sector. In this context, the Central Bank examined the adequacy and the efficiency of the payment system to satisfy the needs of an evolving economy and decided to undertake comprehensive payment reforms. These reforms aimed at reducing transaction costs, increasing efficiency, ensuring safety and reducing credit, liquidity and systemic risks.

Sri Lanka's payment instruments and their clearing and settlement processes are wide ranging. Cash is the common mode of payment, because it has finality in settlement of a transaction and is readily and legally acceptable as a medium of exchange. However, the inconvenience of carrying cash and increased security threats has encouraged the use of other payment instruments. Even though non-cash payment instruments are considered to be more secure, paper based

instruments like cheques, drafts and travellers cheques are not so convenient or efficient instruments. In the recent past, card and electronic payments are treated as the most convenient and safer instruments, although they too are subject to certain risks, card frauds in particular and technology related issues.

There are three systemically important payment systems in Sri Lanka.[11] They are:

(i) The high value and time critical payments and settlement system used by banks, primary dealers, the Central Bank for inter-bank and inter-market transactions.

(ii) The cheque-based retail payment system used by all segments of the population.

(iii) The Automated Trading System operated by the Colombo Stock Exchange (CSE) which settles stocks and shares.

Any disruptions to these three payment systems can result in financial system-wide impacts leading to financial system instability. These critical payment, clearing and settlement systems that are in operation today are backed by a strong institutional, legal and regulatory framework. The key elements include:

(i) The payment and settlement services

(ii) Legal and regulatory framework

(iii) Mechanisms for consultation with stakeholders

(iv) Catalyst and oversight roles of the payment system

4.1 Payments and Settlements Regulatory Framework

4.1.1 Laws and Regulations

The Central Bank of Sri Lanka was established in 1950 under the Monetary Law Act No 58 of 1949 and is the apex institution in the financial sector. Since inception, the Central Bank has been responsible for regulating the financial system of the country. Several key legislative enactments provide powers to the

11. Jayamaha, Ranee, (2007), Modernization of the National Payment System, Central Bank of Sri Lanka, Available at: www.cbsl.gov.lk/pics_n_docs/05_fss/_docs/article1.pdfý

Central Bank to carry out its functions to achieve its primary objectives of economic and price stability and financial system stability. Under these powers, the Central Bank issues directions for the establishment and operations of all categories of financial institutions under its supervisory and regulatory purview.

4.1.2 Legislative Enactments

The financial system of the country is regulated by several legislative enactments. The key Acts relevant to the regulatory role of the Central Bank are the Monetary Law Act, the Local Treasury Bills Ordinance, Registered Stocks and Securities Ordinance, Exchange Control Act, Banking Act, Finance Business Act, Finance Leasing Act, Financial Transactions Reporting Act and Payment and Settlement Systems (PSS) Act.

PSS enable the transfer of money in the accounts of financial institutions to settle financial obligations between individuals and institutions. In a systemically important PSS, a significant proportion of transactions in terms of value consist of transactions conducted in financial markets. Although disruptions to operations of such systemically important PSS are rare, the potential consequences of such a disruption are substantial and widespread and could lead to a systemic disruption and financial shock even beyond the system and its participants, which could adversely affect the stability of the financial sector. Therefore, the safety and efficiency of the PSS, particularly systemically important ones, is critical for the effective functioning and stability of the financial system.

The legal and regulatory environment in Sri Lanka is conducive to the growth of electronic payment systems. In this regard, Parliament of Sri Lanka has enacted the Payment and Settlement Act, No 28 of 2005 (PSSA), which was certified on 20th September 2005, The objective of the above Act is as follows:

(i) To provide for regulation, supervision and monitoring of payments, clearing and settlement system.
(ii) To provide for the disposition of securities in securities accounts maintained at the Central Bank.
(iii) To provide for the regulation, supervision and monitoring of providers of money services, and
(iv) To facilitate the electronic presentments of cheques.

The Act also states that the Central Bank be the authority for the preparation of a plan for a national payment system. According to PSSA the Central Bank performs three key roles in the PSS namely,

1. Overseeing the payment, clearing and settlement system
2. Operating systemically important payment and settlement systems, and
3. Formulating a national payments policy and developing the payment systems

Electronic Transactions Act, No. 19 of 2006 which encourages the use of reliable form of electronic commerce also strengthens growth of electronic systems in the country. The banks that intend to provide SMS based payment solutions are safeguarded by the Act. The objective of this Act is as follows:

1. To facilitate domestic and international electronic commerce by eliminating legal barriers and establishing legal certainty.
2. To encourage the use of reliable forms of electronic commerce.
3. To facilitate electronic filing of documents with government and to promote efficient delivery of government services by means of reliable forms of electronic communication, and
4. To promote public confidence in the authenticity, integrity and reliability of data message, electronic documents, electronic records or other communications.

The Government of Sri Lanka having created necessary legal environment for popularizing electronic payment system also went few steps ahead of all the other countries in South–East Asia by enacting special legislation for punishing perpetrators of frauds using these payment systems. The legislation enacted by the Parliament of Sri Lanka is cited as the Payment Devices Frauds Act, No. 30 of 2006 which was certified on 12th September 2006. The main objectives of this Act are as follows:

1. To create offences connected with the possession or use of unauthorized payment devices
2. To protect persons lawfully issuing and using such payment devices, and
3. To make provision for investigation, prosecution and punishment of offenders.

The Computer Crimes Act, No. 24 of 2007 which was enacted by Parliament and was certified on 09th July 2007 also supplements the above Act in mitigating

payment card frauds related to electronic payment systems. The objectives of this Act are:

1. To provide for the identification of computer crime, and
2. To provide the procedure for investigation and prevention of such crimes.

4.1.3 Regulations, Directions, Rules, Guidelines, Circulars and Operating Instructions

Some departments of the Central Bank have been empowered to carry out functions directly by statute, while other departments carry out functions and duties imposed by statute on the Central Bank itself. Accordingly, powers are vested with those departments to issue regulations through the Minister and directions, guidelines, circulars and operating instructions from time to time to achieve its objective of financial system stability.

The guidelines and directions issued by Central Bank in pursuance of the Payment and Settlement Act, No.5 of 2005 has laid down the operational procedures, system integrity and safety required for introducing an electronic payment system in the country. Regulations made by the President in terms of the Payment and Settlement Act, No.28 of 2005 is cited as the Service Providers of Payment Card Regulations No.1 of 2009. The main highlights of these regulations are:

1. The appointment of the Central Bank as the supervisory authority responsible for the regulation and monitoring of service providers of payment cards.
2. No person shall engage in or function or cause another person to be engaged in or function as a service provider of payment cards except under the authority and in accordance with the terms and conditions of a license issued by the authority.
3. The following persons shall be eligible to apply for a license to be engaged in or to function as a service provider of payment cards.

    - any licensed commercial bank,
    - any licensed specialized bank,
    - any registered finance company,
    - any public company having an unimpaired capital of at least rupees seventy five (75) million.

Having considered the recent developments in the field of payment system interest of banks and non-banks service provider in electronic payment mechanism and requirement of providing a secure and safe environment for innovative payment instrument with diversified economic activities, The Central Bank of Sri Lanka in order to regularize electronic payment methods such as policy making licensing monitoring and supervision with the collaboration of others who are engaged in the payment and settlement related activities took the initiative to issue Service Providers of Payment Card Regulation No.1 of 2009, which covers almost all the electronic fund transfer mechanisms. The Central Bank issued Credit Card Guidelines No 01/2010 on 31 July 2009 in terms of the Service Providers of Payment Card Regulations No.1 of 2009. These guidelines cover the following areas of credit cards business:

1) Marketing of credit cards
2) Issue of credit cards
3) Interest and other charges
4) Billing process
5) Collection /recovery
6) Confidentiality and protection of customer rights
7) Dispute resolution
8) Outsourcing of marketing / recovery function and other operations
9) Right to impose non-compliance
10) Legal provisions
11) Business continuity, internal control and compliance
12) General conditions

The rapid expansion of mobile phone networks and users in the country over the last few years prompted, commercial banks, other financial institutions and mobile operators to seek permission from Central Bank to introduce innovative mobile based payment products resulting in the issuance of mobile payment guidelines to ensure security, safety and reliability of these products.

National Payment Council established by CBSL which represents all stakeholders of payment industry also identified and recommended the necessity of issuing these guidelines with the objective of promoting safety and effectiveness of phone based payment services and thereby enhancing the

confidence of such services and safeguarding the stability of the national payment system.

The salient features of these guidelines are two separate sets of guidelines for banks and non-bank service providers.

(i) Mobile Payments Guidelines No.1 of 2011 for the banks lead model

(ii) Mobile Payment Guidelines No. 2 of 2011 for custodian account based mobile payment services

4.1.4 Licensing, Registration, Appointment and Authorization Procedures

Requirements and procedures to be followed by a person to establish a local bank, foreign bank branch, a finance company, a finance leasing company, a primary dealership, a dealership in foreign currency and as a money changer have been issued by the Central Bank from time to time.

4.2 Payment Instruments

Payment Instrument is a tool or a set of procedures enabling the transfer of funds from the payer to the payee. Payment instruments in Sri Lanka can be broadly classified into cash, non-cash and electronic money (e-money). Non-cash payments can be further categorized in to paper-based instruments and electronic instruments. Further, based on the party submitting the payment instrument for processing can be further categorized into Credit based instruments (Credit Push) and Debit based instruments (Debit Pull).

4.2.1 Cash

Cash is the common mode of payment, because it has finality in settlement of a transaction and is readily and legally acceptable as a medium of exchange. The Central Bank of Sri Lanka has the sole right and authority to issue currency in Sri Lanka which includes both currency notes and coins as stipulated in the Monetary Law Act No. 58 of 1949. In fulfilling this task, the Bank is entrusted with designing, printing and distributing of Sri Lanka's bank notes and minting of coins. The purpose of currency management is to build and maintain public confidence in the currency by preserving its value and integrity and by making available adequate stocks to meet the demand for currency, which is essential for the proper functioning of the economy. The Central Bank of Sri Lanka issued

a new series of currency notes on the theme "Development, Prosperity and Sri Lanka Dancers" on 4th February 2011. This is the 11th series of currency notes of the Central Bank to be issued since its establishment in 1950. The new series consists of six denominations i.e. Rs. 5,000, Rs. 1,000, Rs. 500, Rs. 100, Rs. 50 and Rs. 20. The high value Rs. 5000 note is being introduced to facilitate expansion in transactions that has taken place with the growth of the economy. However, the inconvenience of carrying cash and increased security threats has encouraged the use of other payment instruments.

4.2.2 Non-cash Payments

The use of non-cash payment instruments is increasing gradually reflecting the change of payment habits of the general public. Major non-cash payment instruments in use include:

- Paper based instruments: cheques, drafts, bills of exchange, promissory notes, money orders and postal orders; and
- Electronic payments: credit transfers, direct debits, debit cards, credit cards, and prepaid cards.

4.2.2.1 Cheques

Cheque is a retail payment instrument widely used by business entities and individuals. It is also the most extensively used non-cash paper based retail payment instrument and is widely accepted by the business sector. However, the use of cheques for large value payments between banks, and in capital and securities market transactions has dropped significantly with the introduction of the RTGS system in September 2003.Since September 2003, LCBs and PDs have not been allowed to use cheques drawn on the CBSL to settle their large value and time critical payments under normal circumstances. However, they would be able to use cheques drawn on the CBSL only as a backup measure, if and when the CBSL declares a contingency situation in the RTGS system. The Government and some government agencies, which maintain current accounts with the CBSL, can use cheques drawn on the CBSL. The LCPL clears such cheques.

4.2.2.2 Credit Transfers

Customers of LCBs submit credit transfer orders to their banks by written instructions or by electronic means such as ATMs, telephone or Internet. For

the interbank settlement of such credit transfers, LCBs send the payment order to the SLIPS operated by LCPL. The SLIPS clears the credit transfer between banks with a value date of T+0 to T+14. Corporate customers use direct credit transfers mainly to pay salaries, dividends and pensions. They submit details of such bulk payments to their banks using diskettes, magnetic tapes and electronic file transfers.

4.2.2.3 Direct Debit

Direct debit transfer is an instrument used by customers for their regular payments such as paying for utility services (i.e. electricity, telephones and water etc.), loan repayments, and dues on credit cards. Bank customers give direct debit authorization in advance to their banks for debiting the amounts claimed by the billing utility/financial organizations from their specific accounts. The billing organization sends details of such preauthorized direct debit transfers in a magnetic tape or diskette to the bank and also informs details of the bill to each customer well in advance the payment date. Such direct debit transactions are sent to the SLIPS by LCBs for clearing. The use of direct debit transfers is very limited and has shown a very slow growth in recent years.

4.2.2.4 Payment Cards

i) Credit Cards

Credit cards were first introduced to Sri Lanka in 1989. It represents a "pay later type" payment instrument, which permits cardholders to purchase goods/services up to a revolving credit limit approved by the issuing bank. Cardholders are also permitted to withdraw cash up to an approved limit from their credit card accounts using ATMs or over the counter at any bank, which accepts the respective card for cash withdrawals.

Customers are permitted to make the minimum sum/part/full payment by the due date. An interest is charged on the amounts unsettled by the due date. An additional fee is charged on transactions, which are considered as cash withdrawals. The use of credit cards to purchase petrol, diesel, traveller's cheques, drafts and telegraphic transfers are generally considered as cash withdrawals.

The majority of the credit cards issued by LCBs are affiliated with Visa, MasterCard, or AMEX. Almost 78%of these cards are globally accepted. The non-bank company issues domestic credit cards only.

ii) Debit Cards

Debit cards are mainly used by cardholders to effect payments and withdraw cash from their accounts through an ATM or at an EFTPOS terminal which has direct access to a Sri Lanka rupee or foreign currency account (current, savings, non-resident foreign currency account, etc.) of the cardholder. Debit cards are not permitted to be used for purchasing/importing goods in commercial quantities and for capital transfers.

iii) Prepaid Cards

Prepaid cards, which allow "pay before" type transactions, are largely in use for obtaining small value services such as public telephones, Internet services and overseas telephone calls. The use of these prepaid cards have increased significantly with the introduction of card-based public telephones by a number of telephone companies.

4.2.3 E-money

Customers are permitted to have a cash account in their mobile phones in to which they can top-up money and then carry out a range of cash transactions including cash withdrawals direct from the mobile phone without having an actual bank account. Currently 'eZ cash' from Dialog Axiata PLC operates these services for both its prepaid and post-paid customers. This is scheme is approved by the Central Bank of Sri Lanka.

4.2.4 Other Access Channels for Banking and Payments

(i) Telephone Banking

Under telephone banking facilities, bank customers are given an access to their bank accounts and to send messages to banks using a telephone/mobile phone at any time of the day to obtain the following services:

a) Checking the balance of his/her account;

b) Credit card services including checking of credit card balance, applying for a new credit card and checking of the status of a credit card application;

c) Reporting of a lost or stolen cash/credit card; and

d) Information on banking services and products.

The privacy and security of telephone banking are secured with phone banking number/credit card number and personal identification number (PIN).As of June 2004, nine LCBs had been providing telephone banking facilities to individual and corporate customers. The quality of services and level of these services vary from bank to bank depending on their business strategies. The total number of bank customers registered for telephone banking services was 438,515 at the end of 2003, which showed a year-on-year increase of 75%.

(ii) Internet Banking

Internet banking was started in Sri Lanka in 1999 in order to allow bank customers to access the banking services in a convenient and efficient manner. Banks have developed Internet services to provide better customer services particularly to their corporate customers to perform large value payment and import/export related transactions. The level of usage of Internet banking varies from bank to bank depending on the level of technology, customer base and business strategies. The total number of bank customers enjoying this facility showed an increase during last two years and reached 24,650 at the end of 2003. The total volume and value of Internet banking transactions during 2003 amounted to 188,057 and LKR 81 billion (USD 0.8 billion) respectively.

(iii) Postal Instruments

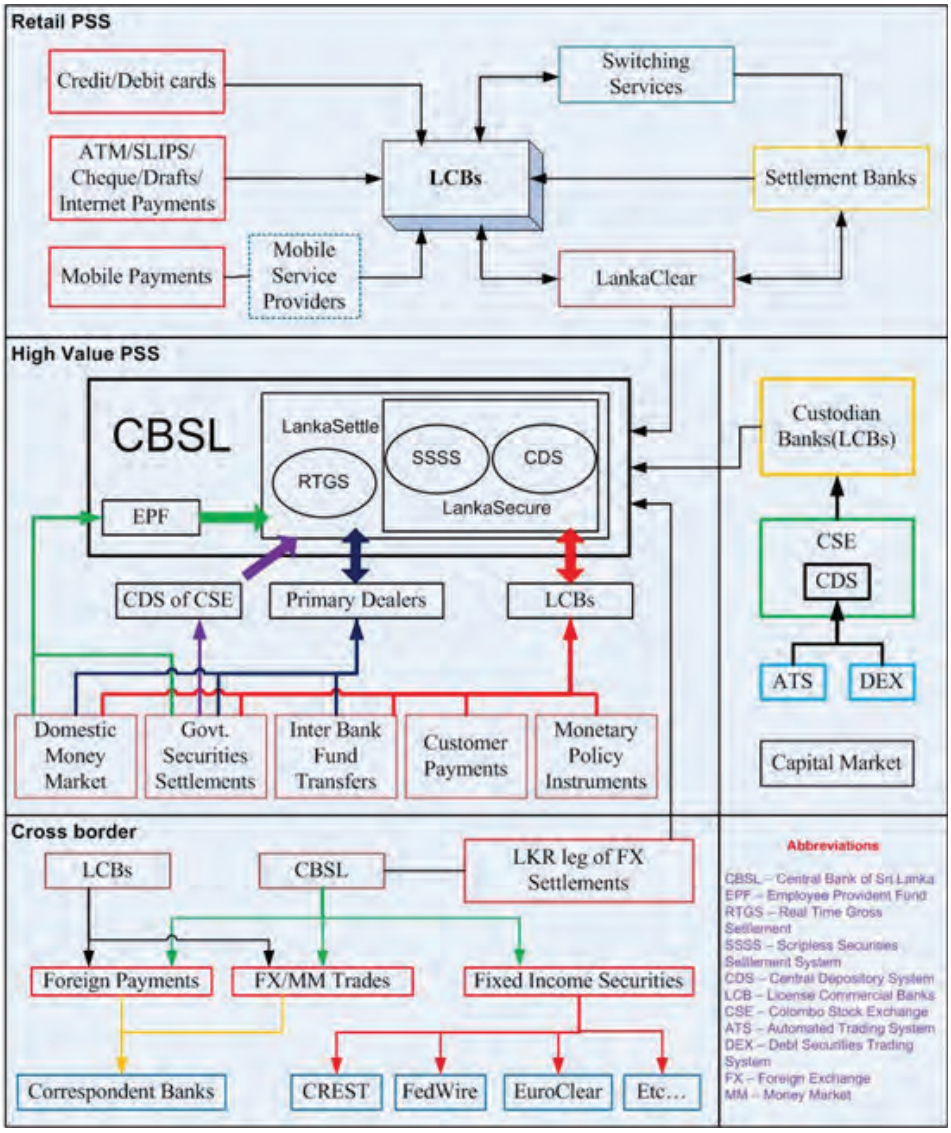
Post offices, which are scattered nationwide, issue money orders and postal orders to transfer funds from person to person. The postal network is the largest branch network in terms of customers and regions in Sri Lanka. At the end of 2003, there were 4,680 post offices, including sub-post offices and agency post offices. Postal and money orders are mainly used to make small value payments to individuals and to pay pension and social security payments by government. The total value of payments made through postal instruments was LKR 11 billion (USD 118.6 million)during 2003.

4.3 Payment and Settlement Infrastructure

Financial infrastructure refers to the different systems that provide for the execution of both large-value and small-value payments. PSS enable the transfer of money in the accounts of financial institutions to settle financial obligations between individuals and institutions.

The main payment, clearing and settlement systems in Sri Lanka are Lanka Settle, comprising the Real Time Gross Settlement System (RTGS) and the Scripless Securities Settlement Systems (LankaSecure) operated by the Central Bank of Sri Lanka, Cheque Imaging and Truncation System (CITS), the inter-bank cheque clearing system operated by Lanka Clear Ltd. and Sri Lanka Inter-Bank Payment System (SLIPS) operated by Lanka Clear Ltd.

Figure 2
Financial Infrastructure Network in Sri Lanka



The Central Bank operates LankaSettle, the systemically important high value payment and securities settlement system. The LankaSettle system has two components i.e. the RTGS system (which processes large value and time critical payments) and the LankaSecure system (Scripless Securities Settlement System). The integration of the RTGS System and LankaSecure System provides the most secured securities settlement mechanism based on Delivery versus Payment for scripless securities transactions. Participants of the LankaSettle System, as at end Dec 2011, are the Central Bank, 24 Licensed Commercial Banks, 7 Non-Bank Primary Dealers, the Employees' Provident Fund and the Central Depository System of the Colombo Stock Exchange. The RTGS System is operated by the Payments and Settlements Department of the Central Bank.

4.3.1 LankaSettle - Real Time Gross Settlement(RTGS) System

The RTGS System is a computer based fund settlement system which processes and settles each payment instruction individually and irrevocably on real time basis using funds in the participants' RTGS Settlement Accounts in the RTGS System. The value of transactions settled in the RTGS System accounts for about 89 per cent of the non-cash payments in Sri Lanka. The RTGS System settles large value and time critical rupee payments. The majority of RTGS transactions are relating to: transactions in the inter-bank call money market, Government securities markets, Open Market Operations, the rupee leg of transactions in the foreign exchange market, urgent payments of customers and net obligations under the systems operated by LankaClear (Pvt) Ltd. The Central Bank provides an Intra-day Liquidity Facility (ILF) to participating Commercial Banks and Primary Dealers, free of charge against collateral of scripless securities in the LankaSecure System. The average value of ILF granted by the Central Bank per day during 2011 was Rs.11.6 billion.

The RTGS System settled an average of 1,114 transactions a day in 2011, with a daily average turnover value of Rs.241 billion.

4.3.2 LankaSecure - Scripless Securities Settlement System (SSSS) and Scripless Securities Depository System (SSDS)

The LankaSecure System comprises of the Scripless Securities Settlement System (SSSS) and Scripless Securities Depository System (SSDS). LankaSecure facilitates the issue of Government securities and Central Bank securities in electronic or scripless form and settlement of trades of such scripless securities on a Delivery versus Payment (DvP) basis. Accordingly, transactions are settled in the system if the participant who sells securities has sufficient eligible securities

in his Securities Account in LankaSecure and the buying participant has sufficient funds in his Settlement Account in the RTGS System to pay for the transaction. All securities transactions settled in the system are irrevocable. The SSDS is the title registry as well as the custodian for Government securities. The ownership of securities is recorded to the beneficiary level in the SSDS. The holders of scripless securities in the SSDS can obtain up to date details of their investments at any point of time through LankaSecureNet, an internet based facility. During the first half of 2009, LankaSecure settled about 57 DvP transactions per day. The average number of Delivery Free transactions settled in the system amounted to 48 a day, while transactions relating to repositioning of securities accounted for about 1969 transactions per day.

4.3.3 Cheque Imaging and Truncation (CIT) System - LankaClear Interbank Cheque Clearing

The Central Bank is responsible for providing facilities for the clearance of retail payments, such as cheques, bank drafts and off-line fund transfers. In 2002, the Central Bank authorized LankaClear (Pvt) Ltd (LCPL), a company jointly owned by the Central Bank and Licensed Commercial Banks to provide cheque clearing facilities. The average number of cheques cleared by LCPL in 2011 was 191, 718 per day, while the average value of cheques cleared amounted to Rs. 26 billion per day. The total value of cheques cleared through the CIT system represented 12 per cent of the total value of non-cash payments. In May 2006, LCPL introduced the CIT system, which facilitates the electronic presentment of cheque images and clearance of cheques. The CIT system introduced a uniform cheque clearing time schedule of T+1(where T is the day on which LCPL receives the cheque for clearing and 1 is the following business day) throughout the country, enabling Commercial Banks to credit proceeds of cheques to their customers' accounts on the following business day. Under this system, dishonoured / returned cheques have been replaced with a Cheque Return Notification (CRN). The net clearing balances under the CIT system are settled in the RTGS system at 8.30 a.m., while net balances of the Settlement Clearing System of the CIT system (which handles CRNs) are settled in the RTGS system at 2.45 p.m. on each business day. In March 2011, Lanka clear migrated to the direct connectivity mode of settlement clearing enabling the advancement of window cut-off time to 7.30 p.m. the next day. This enables commercial banks to release cheque proceeds to customers' accounts before 3.00 p.m. the next day.

4.3.4 Sri Lanka Interbank Payment System (SLIPS)

Sri Lanka Interbank Payment System (SLIPS) was introduced in 1993 by the Central Bank, as an off-line retail fund transfer system. With the establishment of LCPL, operations of SLIPS were handed over to LCPL in 2002. SLIPS handle pre-authorized small value bulk payments (direct credit and debit transfers). In 2010, SLIPS was upgraded to an on-line interbank payment system to facilitate settlement of transactions on T+0 basis. Transactions are cleared electronically on a multilateral net settlement basis and interbank net balances arising from SLIPS transactions are settled in the RTGS at 8.30 a.m. and 3.00 p.m. on each business day. During the year 2011, the daily average value of transactions cleared through SLIPS was 1.8 billion. CBSL issued the General direction, Sri Lanka Interbank Payment System No.01 of 2011 to the participants of the system and LankaClear, with the objective of facilitating the smooth operation of SLIPS.

4.3.5 Rupee Draft Clearing System

LCPL also operates a Rupee Draft Clearing System and US Dollar Cheque Clearing System. In the Rupee Draft Clearing System, cheques and drafts of foreign banks drawn on their 'nostro' accounts with Commercial Banks in Sri Lanka and in favour of customers of Commercial Banks in Sri Lanka are cleared manually by LCPL. The net clearing balances of this system are settled at the RTGS at 2.15 p.m. on each business day. The daily average value of cheques cleared by this system was Rs. 2.3 million in 2011.

4.3.6 US Dollar Cheque Clearing System

The US Dollar Cheque Clearing System was launched in 2002 and is a semi-computerized clearing system for cheques and drafts in US Dollars issued by Commercial Banks in Sri Lanka and payable to Sri Lankan individuals and institutions, and issued by banks and exchange houses abroad and drawn on Commercial Banks in Sri Lanka. This system reduced the time lag for clearing and settlement of US Dollar cheques and drafts from 3 weeks to about 4 days. The system also reduced the clearing charges by banks significantly, as previously cheques and drafts had to be dispatched to correspondent banks abroad for realization, whereas now they are exchanged over the counter locally. The settlement of interbank clearing balances of the US Dollar Cheque Clearing System takes place through the accounts of participants maintained in a private Commercial Bank. A daily average of 231 cheques worth of US $ 953,246 was cleared in the system during 2011.

*4.3.7 Equities Trading System and Debt Securities Trading Syste*m

The Colombo Stock Exchange (CSE) operates two on-line systems: i.e. the Automated Trading System (ATS) for real time trading of equity (shares) and the Debt Securities Trading System (DEX) for trading of beneficial interest of Government securities and corporate debt securities. Stockbrokers licensed by the Securities and Exchange Commission of Sri Lanka (SEC) perform as direct participants in the ATS and DEX. At the end of Dec 2011 there were 28 direct participants, 15 member firms and 13 trading members permitted to trade in the DEX System.

Table 6
Transactions Through Payment System

Payment systems	2010		2011(a)	
	Volume ('000)	Value (Rs. bn)	Volume ('000)	Value (Rs. bn)
Large Value Payment Systems	**247**	**47,806**	**267**	**57,790**
RTGS System	247	47,806	267	57,790
Retail Value Payment Systems	**81,664**	**6,054**	**91,069**	**7,079**
Main Cheque Clearing System	42,795	5,346	46,012	6,202
Rupee Draft Clearing System	n.a	0.7	n.a	0.5
Sri Lank Interbank Payment System (SLIPS)	12,530	332	12,443	422
Credit Cards	16,451	75	18,609	93
Debit Cards	5,340	16	8,346	24
Internet Banking	4,319	269	5,461	321
Phone Banking	229	5	198	5
Postal Instruments	n.a	10	n.1	11
Total	**81,911**	**53,860**	**91,336**	**64,869**
US Dollar Cheque Clearing System	**57**	**24**	**55**	**25**

Source: Central Bank of Sri Lanka Annual Report 2011.
(a) Provisional

5. Assessment of the Current PSS Framework

5.1 Compliance with the CPSS-BIS Ten (10) Core Principles for Systemically Important Payment Systems (CPSIPS)

Safe and efficient payment systems are critical to the effective functioning of the financial system. Payment systems are the means by which funds are transferred between Banks, and the most significant payment systems, which this report refers to as systemically important payment systems, are a major channel by which shocks can be transmitted across domestic and international financial systems and markets. Robust payment systems are, therefore, a key

requirement in maintaining and promoting financial stability. Over the past few years, a broad international consensus has developed on the need to strengthen payment systems by promoting internationally accepted standards and practices for their design and operation.[12]

In ensuring a safe and efficient payments system, Both, LankaSettle and CITS in Sri Lanka adheres to the Core Principles for Systematically Important Payment System (SIPS) developed by the Committee on Payment and Settlement System (CPSS) of the CBs of the group of 10 countries.

5.1.1 LankaSettle - Real Time Gross Settlement (RTGS) System

5.1.1.1 Core Principle I

"The system should have a well-founded legal basis under all relevant jurisdictions"

CBSL owns and operated the LankaSettle System. The Payment and Settlement Systems Act. No. 28 of 2005 (PSSA) is a dedicated piece of legislation applicable to the payment system in Sri Lanka. It provide for the regulation of payments, clearing and settlement system, for the deposition of securities on the books of CBSL. The Act provides the CBSL a set of clearly defined legal powers to regulate and oversee the domestic PSS.

The legal basis for the CBSL's operation involvement in the payment system is the Monetary Law Act (MLA). In 2002, amendments were made to the MLA to make the CBSL responsible for administration, supervision and regulation of monetary financial and payments systems of Sri Lanka. Further, it provides wider powers for the CBSL to establish systems for transfer of funds and transfer and settlement of scripless securities. Accordingly, this amendment to MLA empowered the CBSL to:

- Establish finality and irrevocability of transactions;
- grant validity and enforceability to electronic records and transactions; and
- provide for the outsourcing of transactions related to payment and settlements.

12. Report of the BIS Task Force on Payment System Principles and Practices on Core Principles for Systemically Important Payment Systems.

Regulations and system rules have improved over the years with periodical reforms. the system rules are issued to participants from time to time with a new set of complete and updated versions. The regulations are publicly available on the CBSL website.

Other legislations of relevance are:

- The local treasury bills ordinance (LTBO) No. 98 of 1923. The ordinance provides for the issue of treasury bills either in scrip or scripless form.
- the registered stock and securities ordinance (RSSO) No. 07 of 1937 which provides for the issue of registered stock, government promissory notes, bearer bonds, the treasury bonds in scrip or scripless form. The CBSL is empowered to appoint primary dealers as the participants, to regulate & supervise them and to issue direction to participants.
- Payment Devices Fraud Act No. 30 of 2006
- The Bills of Exchange Ordinance, No. 25 of 1927
- The Banking Act No. 30 of 1988
- The Securities and Exchange Commission of Sri Lanka Act. No. 36 of 1987
- The Prevention of Money Laundering Act No. 6 of 2006
- The Exchange Control Act, No 24 of 1953

The regulations do not ensure that conflict of law problems can be avoided in the event of bankruptcy of foreign participants. There are no policies and mechanisms to deal with insolvency process and procedure with respect to their country laws. Assessment is broadly observed.

5.1.1.2 Core Principle II

"The system's rules and procedures should enable participant to have a clear understanding of the systems' impact on each of the financial risk they incur through participating in it"

LankaSettle has comprehensively updated system rules. It describes the duties, obligations and rights of CBSL and participants and how CBSL and participants interact at bossiness level in the system. The system rules broadly cover:

- Access criteria for participation;
- Payment messaging in RTGS
- Queue management
- Intraday liquidity facility (ILF)
- Net settlement batches
- Operating calendar and schedule
- Security of LankaSettle operations
- Technical security and backup standards
- Contingency planning
- System administration and user assistance
- System changes and change control
- Settlement of disputes between participants
- Fees and charges

There are four related agreements namely:

- Mandate Agreement
- Accession Agreement
- Master Repo Agreement
- Agreement on Intra-day Liquidity facility

The work schedules, the procedures of technical and operational risk management are set forth in the system rules and the above mentioned agreements. The system rules are amended from time to time whereby all participants are informed by circulars well in advance. The system rules itself clearly describes the handling of abnormal situation. System rules and related agreements will be publicly available as soon as legal clearance for the amendment is received. Assessment is observed.

5.1.1.3 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"

All payment in the RTGS system is settled in Central Bank money (the commercial banks have to maintain statutory reserve requirement (SRR) of 7% of total deposits with the CBSL). Therefore, the instant finality does not lead to any credit risk among participants in the system. But CBSL is subject to credit risk to the extent it provides credit to participant during the day. However, this risk is mitigated by CBSL requiring collateral, i.e. government securities, for any credit provided. therefore, the system as a whole is not exposed to any credit risk. The main sources of liquidity are reserve balances (only for the commercial banks) and the intraday liquidity facility (ILF). Participants, except, CDS of the Colombo Stock Exchange and Employee Provident Fund have to identify their requirements of the ILF and submit collateral to a special ILF account held in LankaSecure in order to obtain necessary funds to participant's accounts. The system's queue management facility helps the participants to manage their liquidity needs. It is possible to assign different priorities to payments in the queue by overruling the order in which payments were sent. The gridlock resolution mechanism in built into the system allows simultaneous settlement of two or more transactions, while keeping the defined priority and first in first out (FIFO) order. Assessment is observed

5.1.1.4 Core Principle 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"

LankaSettle payments are final and irrevocable according to the real-time gross settlement principle on the value date of the payment if the participant has sufficient funds. Participants have the ability to cancel their payment instructions from the system as long as it has been settled or could change the priority. Payments that are unable to be settled due to lack of liquidity are cancelled by the end of the day. Assessment is observed.

5.1.1.5 Core Principle V

"A system in which multilateral settlement takes place should, at a minimum, be capable of ensuring in time completion of daily settlement in the event of an inability to settle by the participant with the largest single settlement obligation"

In the LankaSettle system, individual transactions are processed one by one in real time. Assessment is not applicable.

5.1.1.6 Core Principle VI

"Assets used for the settlement should preferably be a claim on the Central Bank; where other assets are used, they should carry little or no credit risks and little or no liquidity risk"

Central Bank money acts as settlement asset in LankaSettle which is provided in the form of intraday liquidity facility against collateral issued by CBSL (government bonds and bills) which has no formal risk on the nominal value of the collateral. Assessment is observed.

5.1.1.7 Core Principle VII

"The system should ensure a high degree of security and operational reliability and should have contingency arrangement for timely completion for daily processing"

Within the CBSL, the Security Serviced Department (SSD) is responsible for the physical security, the IT Department if responsible for the IT security, the Payment ad Settlements Department (PSD) is responsible for operations and oversight and the Management Audit Department is responsible for audit at the LankaSettle system. The LankaSettle security policies and procedures are set out in the system rules and these apply to both the system operators and participants. CBSL as the regulator is entitled to make on-site inspection of participants and the system has facilities to monitor user activities on real time basis. The system also creates logs that show events, actions, errors, warning, and identification of the users who initiated the trisections and are checked each day by the PSD. On-line backup is available with the secondary site and at the end of the day two backup tapes are stored at a trusted third place. The LankaSettle has well equipped disaster recovery site (DRS), 10 km away from the primary site, located in less risky area. The CBSL has persuaded all participants to have fully equipped DRS available for use during a contingency event.

In March 2006, CBSL issued Business Continuity Guidelines which inter alia requires all participants to submit to the CBSL annually a risk assessment statement and quarterly reports, which consist of contingency events that occurred during that period. A SWIFT Service bureau was established to implement a more economical and safe SWIFT connectivity for all participants enabling them to have backup SWIFT connection for their DR sites. Assessment is observed.

5.1.1.8 Core Principle VIII

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

RTGS system is large value and time critical payments and settlement occurs in real time in Central Bank money. The RTGS system provides a number of operational and technical features, such as queuing, payment priorities and intraday information, facilitating smooth processing of payments. Payments in LankaSettle are subject to a flat free around USD 3 (Rs. 400) per transaction as present and there is no entry fee or a license fee for the participants' instructions.

At present the LankaSettle system does not serve its full potential to the financial markets and the economy at large. Due to lower than expected transaction volumes cost recovery is lower than originally expected. However, with the increase in transaction fee it is anticipated to break-even in future. Assessment is broadly observed.

5.1.1.9 Core Principle IX

"The system should have objective and publicly disclosed criteria for participation, which permits fair and open access"

LankaSettle system rules are available to all participants. The rules will be published as soon as legal clearances are obtained for the latest amendment. Assessment is observed.

5.1.1.10 Core Principle X

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

RTGS and LankaSecure are operating as two independent system. RTGS is operated by Payments and Settlement Department (PSD) and LankaSecure is operated by Public Debt Department (PDD). The different Assistant Governors and Deputy Governors supervise each department work. Therefore, governance arrangements are clearly defined.

The highest decision making body on LankaSettle matters is the CBSL Monetary Board. The Governor of the CBSL regularly meets with chief executive officers of banks and other participants. The National Payment Council (NPC), involving a large stakeholder representation, meets at least six time per year and has received a broad mandate from the CBSL Monetary Board to provide advice and guidance on broad range of payments and securities clearing and settlement matters. Payments System Reform Steering Committee which has representatives from all LankaSettle participants and from CBSL, meets often to discuss the operational and procedural issues concerning the two settlement systems. Assessment is observed.

5.1.2 Cheque Imaging and Truncation (CIT) System

5.1.2.1 Core Principle I

"The system should have a well-founded legal basis under all relevant jurisdictions"

Legal basis for electronic cheque presentment is provided by the Payments and Settlements Act (PSSA) No.28 of 2005. The Act replaced the previous requirement to deliver cheques physically to the paying bank and opened the way for cheque imaging the truncation system. In a situation where presenting banks have to return cheques, cheque Return Notifications (CRN) are issued to the customers, instead of physical cheques. Legal validity for CRN is provided by the PSSA and it states that the CRN shall be deemed as the related cheque. Under the PSSA, the CBSL has power to issue Directions to LCPL and the participants of the CIT System. The CBSL issued a direction in respect of the CIT system, enabling the LCPL to legally operate the system. Under the powers vested on the LCPL by the above General Direction, the LCPL has issued CIT System rules and an Operations Manual to the participants.

Bills of Exchange Ordinance No. 25 of 1927, deals with negotiable instruments. It codifies aspects related to the cheque payments instruments, the procedures for endorsement, presentment and payment of cheques.

The regulations do not ensure that conflict of law problems can be avoided in the event of bankruptcy of foreign participants. There are no policies and mechanisms to deal with insolvency process/procedures with respect to their country laws. Assessment is broadly observed.

5.1.2.2 Core Principle II

"The systems" rules and procedures should enable participants to have a clear understanding of the systems' impact on each of the financial risks they incur through participating in it"

The LCPL operates the CIT system with a set of System Rules and operations manual. It describes all the necessary details for the participants i.e. the duties/role of the participants, right of the LCPL etc. The System Rules cover the following areas:

- Access criteria for the participation in the CIT system;
- Suspension of participants;
- Termination of participants;
- Routing policy;
- Cheque return notification;
- Settlement of overall net balances; and
- Contingency and business continuity plans.

The Operations Manual covers the following areas:

- Types of services;
- Modes of participation;
- Responsibilities of participants;
- Responsibilities of the LCPL;
- Operating timetable;
- Clearing reports;
- Cheque Return Notification;
- Archiving of cheque images; and
- Contingency arrangements.

If the System Rules in the operations manual need to be amended, the updated version would be informed well in advance to all participants. Assessment is observed.

5.1.2.3 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 CIT system has reduced risks significantly by reducing the cheque realization time which spanned from 1 to 10 days to one day (T+1, where T is

the day receiving the cheque for clearing at the LCPL and 1 is the following business day). Credit and liquidity risk is mitigated by the facility provided by the CBSL for LCBs to use the reserves maintained under the Statutory Reserve Requirement (SRR) and Intra-day Liquidity Facility (ILF) for the settlement of net clearing obligations, arising from the cheque clearing, in the RTGS System. However, the inherent risks in cheques as a debit instrument still exists. Therefore, recent oversight efforts of the CBSL have centred on ensuring T+1 settlement, reducing cheque returns and increasing the efficiency of the CIT System by moving from CD submission mode to direct connectivity mode to submit on line the cheque images to reduce transmission times.

A circular has been issued to all participants to migrate to direct connectivity mode through which the cheque images are submitted for clearing from the collecting bank itself by end 2009. This will facilitate the full adherence of T+1 cheque clearing by all bank branches island wide. Assessment is observed.

5.1.2.4 Core Principle 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"

The LCPL provide clearing of cheques and drafts in Sri Lanka rupees to Licensed Commercial banks (LCBs) in Sri Lanka subject to guidelines and directions issued by the CBSL. Its cheque system includes three types of clearing.

- Main cheque clearing : automated processing and clearing of cheques
- Cheque settlement clearing: manual processing of returned cheques and
- Rupee draft clearing and, manual processing of cheques and drafts of foreign banks drawn on their "nostro" accounts with LCBs in Sri Lanka.

Multilateral net settlement (MLNS) positions of the participants under the main cheque clearing are settled in a batch in the RTGS system at 8.30 a.m. on the following business day of the cheque clearing. Rupee draft clearing is settled at 2.15 p.m. on the same day. The net positions arising from the settlement clearing and the net clearing obligations of the adjustment clearing (correcting of technical mistakes) are settled in the RTGS system at 2.45 p.m. on the same day. It enables the participants to credit their individual customers' account on the same day approximately before 3.30 p.m. Assessment is observed.

5.1.2.5 Core Principle V

"A system in which multilateral settlement takes place should, at a minimum, be capable of ensuring in time completion of daily settlement in the event of an inability to settle by the participant with the largest single settlement obligation"

Settlement of net amounts in batches that are derived from LCPL are made through the RTGS and CBSL does not take any liability on behalf of a third party. The settlement of multilateral net batch is executed if all participants have enough fund to debit their part of the batch. If not, the batch will be suspended for later re-trial and participants must make immediate arrangements to fund their settlement account in RTGS enabling the settlement to complete. If a participant fails to maintain adequate funds in its RTGS settlement account at the specified time of submitting MLNS clearing batch files to the RTGS system, such participant will have to pay a default charge based on the time the participant spent to provide fund to his account. Assessment is observed.

5.1.2.6 Core Principle 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 risks and little or no liquidity risk"

Central Bank money acts as the settlement asset for the MLNS batches, derived from LCPL, in the RTGS system. The system provides ILF against collateral for smooth operations of the system without any liquidity risk during the day. Assessment is observed.

5.1.2.7 Core Principle VII

"The system should ensure a high degree of security and operational reliability and should have contingency arrangement for timely completion for daily processing"

Physical security for the main processing centre (MPC) at LCPL is provided by the security department of Bank of Ceylon i.e. the LCPL is established at the Bank of Ceylon (BOC) Head Office premises which is a state owned commercial bank and LCPL and BOC have an internal arrangement for physical security. IT department of LCPL is responsible for IT security and all operations relating to cheque clearing process. Payments and Settlements Department (PSD)

of CBSL is responsible for oversight of the system and ensuring that proper Business Continuity arrangements are in place. Assessment is observed.

5.1.2.8 Core Principle VIII

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

The main objective introducing the CIT system is to establish a uniform clearing system which provides optimum efficiency in cheque clearing i.e. crediting the proceeds of a cheque to the relevant customers account on the next business day (T+1) across the entire country eliminating the regional disparities in the process of cheque clearing.

Participants pay a cheque processing fee of LKR 1.60 per cheque (for over 100,000 cheques) and this cost is not passed down to the customers. The participants submitting cheques to the regional centres have to pay Rs: 13.50 per cheque for scanning and submission. If the participant requests for a additional report there will be a separate charge for that. In addition, LCPL undertakes archival of cheques at a nominal payment. Assessment is observed.

5.1.2.9 Core Principle IX

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

CITS system rules are available to all participants of the system and if there is any amendment to the system rules, all participants are informed regarding the amendment to the rule well in advanced. The system rules will be publicly available on the LCPL website soon. Assessment is observed.

5.1.2.10 Core Principle X

"The systems governance arrangement should be effective, accountable and transparent"

Operation of the CIT system is governed by the CIT operations manual in terms of the general direction No.01/2008 issued by the CBSL. The LCPL and each CIT participant are bound by the system rules and the conditions. The Board of Directors of the LCPL is the decision making authority who handles all policy issues of the system. The LCPL will take decisions on systemic issues

in consultation with the CBSL and Sri Lanka Bank's Association, which is the representative body to all licensed commercial banks. CITS system is supervised by the PSD of CBSL. Assessment is observed.

6. Policy Implications

The payments and settlements landscape in Sri Lanka is continuously growing and changing significantly. This is mainly due to the rapid increase in financial transactions with expansion of the economy and integration of financial markets at home and abroad. The rapid advancement of information and communication technology has contributed to this result as well. With the wider use of electronic payment and settlement systems, and the increasing payment and settlement system interconnectivity, systemic risk is growing.

Likewise, payment systems play a fundamental role in the economy by providing a range of mechanisms through which transactions can be easily settled. Bank notes are the part of this broad notion of payment systems. In spite of the expanding role of its various substitutes the banknote is still a fundamental payment instrument in the economic life. Therefore the Monetary Policy has been focusing mainly on gradual modernization of the payment system.

The robust payment system is a key requirement in maintaining and promoting economic and financial stability. They contribute towards promoting economic activity and improving macroeconomic management as well as the micro objective, particularly in the core area of payment systems. But payment systems can also involve significant exposures and risks for participants and users when payment systems failures occur. In addition, this can be a channel for transmission of disturbances from one part of the economy or financial system to another, disrupting the smooth function of the payment system and stability of the financial system and thereby disordering of the entire economy. This systemic risk is an important reason for the close interest and observation that central banks have always taken in the oversight of payment systems.

Due to the rapid development in financial sector in Sri Lanka, the risk and efficiency related concentration might arise; it would be beneficiary to take advance policy measures regarding the payment and settlement system oversight.

Policy therefore should take into consideration the market development and needs to balance between moving toward regional integration and readiness of the authorities in term of capacity.

When payment systems become more developed in the future with better technology, faster settlement arrangement, and higher settlement volume and value, there will be stronger needs in policy design to take into account its interconnection with monetary policy and financial stability of the country.

7. Conclusion

Payment system in Sri Lanka is at an early stage of development, staying behind other developed countries in the world. Cash remains widely used in the economy. There are increasing uses of other payments tools such as credit cards, debit cards and electronic transfer from a very low base. The central bank plays an important role as operator, facilitator and overseer of the clearing house. The PSS in Sri Lanka is important in building blocks in the establishment of a solid legal framework designed to underpin commercial activities and financial transactions. They thus underlie the development and enhancement of a market economy based on the rule of law.

Payment system has interconnection with monetary policy and financial stability. This interconnection has gained more interests among policy makers. On top of the above mentioned importance of PSS, it is evident that payment system is well underway to be further developed to meet the future demand arising from new market development of the financial markets such as money or interbank markets, stock markets, insurance markets, and pensions. When these markets are developed, there will be significant demand for a rapid and more efficient payment and settlement arrangement. This is necessary for the central bank to enhance its capacity in controlling, forecasting, and arranging liquidity provision to or absorption from the banking system although it is very difficult at this stage to identify any direct linkage between payment system and monetary policy in the country.

The emergence of innovative payment and settlement mechanisms and the improvements made to the existing systems to cater to the increasing payment needs have led to broaden of the role of the Central Bank as the regulator and facilitator of the national payment system. The introduction of the mobile based e-money system in June 2012 was one of the latest developments to facilitate fund transfers, payments for goods and services and variety of other services through electronic cash.

A stable demand for money is the prerequisite for conducting monetary policy, especially for the monetary targeting regime. The payment system is

supposed to act a transmission channel through which the Central Bank conducts its monetary policies. In practice, the linkage between payment systems and monetary policy depends on the design and management of intraday liquidity facilities/markets; while the linkage between payment systems and financial stability depends on the settlement arrangements – DNS, RTGS or hybrid. Both settlement arrangements and intraday liquidity facilities aim at addressing the payment float problem, which may produce potential settlement risk and financial instability.

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Appendix

Comparative Tables

1. Basic Statistical Data

	2007	2008	2009	2010	2011
Mid year population ('000 persons)	20,039	20,217	20,450	20,653	20,869
GDP (Rs. billions)	3,579	4,411	4,835	5,604	6,543
GDP per capita (Rs.)	178,845	218,167	236,445	271,346	313,511
Exchange Rate (Annual average) Rs/USD	110.62	108.33	114.94	113.06	110.57
GDP per capita (USD)	1,616.75	2,013.91	2,057.12	2,400.02	2,835.41

Source: Central Bank of Sri Lanka

2. Banknotes and Coins in Circulation (End of Year)

	2007	2008	2009	2010	2011
Total Value (Rs millions)	173,364	186,099	217,430	255,652	293,233
Total Value (USD millions) (a)	1,594.59	1,644.86	1,900.94	2,304.21	2,652.01
Value per inhabitant (USD) (a)	79.57	81.36	92.96	111.57	127.08
Value as a percentage of GDP	4.84	4.22	4.50	4.56	4.48
Value as a percentage of Narrow Money (b)	65.03	67.11	64.57	62.78	66.84

Source: Central Bank of Sri Lanka

(a)Year-end figures converted at end-of-year exchange rates, unless otherwise noted.
(b)Narrow money: M1

3. Transferable Deposits Held by Non-banks

	2007	2008	2009	2010	2011
Total Value (Rs millions) (a)	119,409	122,300	154,870	190,643	195,836
Total Value (USD millions) (b)	1,098.32	1,080.96	1,354.00	1,718.28	1,719.37
Value per inhabitant (USD) (b)	54.81	53.47	66.21	83.20	82.39
Value as a percentage of GDP	3.34	2.77	3.20	3.40	2.99
Value as a percentage of Narrow Money (c)	44.79	44.10	46.00	46.82	44.64

Source: Central Bank of Sri Lanka

(a)Demand deposits held by the public
(b)Year-end figures converted at end-of-year exchange rates, unless otherwise noted.
(c)Narrow money: M1

4. Settlement Media Used by Banks

(end of 2011)

	Banks' reserves at central bank (USD millions)	Banks' reserves at central bank as a percentage of narrow money	Transferable deposits at other banks (USD millions)	Transferable deposits at other banks as a percentage of narrow money (USD billions)
Sri Lanka	1487.33	0.3748	-	-

Source: Central Bank of Sri Lanka

5. Institutional Framework

(end of 2011)

	Number of institutions offering payment services (a)	Number of institutions offering payment service (per million habitat)	Number of central bank branches (per million habitat) (b)	Number of bank branches (per million habitat) (c)	Number of post office branches (per million habitat)	Others (per million habitat)	Total number of branches offering payments services (per million habitat)
Sri Lanka	24	1.14	0.05	75.65	226.9	nap	302.6

Source: Central Bank of Sri Lanka

(a) "Number of Institutions" includes both domestic and foreign licensed commercial banks, excludes licensed specialized banks.
(b) "Number of central bank branches" includes only the head office which provides cashless payment services.
(c) "Number of bank branches" includes both domestic and foreign licensed commercial banks branches, excludes the branches of central bank and the licensed specialized banks.

6. Use of Cashless Payment Instruments

(total number of transactions in millions)

Cheques											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	35.49	36.48	37.69	40.07	44.34	46.15	44.55	40.64	42.79	46.01

Payment by credit/debit cards (a)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	6.26	7.68	9.76	12.35	16.39	18.87	21.04	19.94	21.79	26.96

Credit transfers (b)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	1.61	2.02	2.41	3.07	4.13	5.91	7.82	9.02	12.52	12.43

Direct debit (c)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	0.00	0.00	0.00	0.03	0.04	0.03	0.03	0.01	0.01	0.01

Source: Central Bank of Sri Lanka

(a)2007 only credit card transactions are included since reliable debit card transaction data are not available
(b)Credit transfers related to SLIPS
(c)Direct debit transactions related to SLIPS

7. Use of Cashless Payment Instruments

(total number of transactions per inhabitant)

Cheques											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	1.867	1.895	1.919	2.037	2.23	2.303	2.204	1.987	2.072	2.205

Payment by credit/debit cards (a)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	0.329	0.497	0.628	0.824	0.824	0.941	1.041	0.975	1.055	1.292

Credit transfers (b)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	0.085	0.105	0.123	0.156	0.208	0.295	0.387	0.441	0.606	0.596

Direct debit (c)											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sri Lanka	nav	0.000	0.000	0.000	0.001	0.002	0.002	0.001	0.001	0.001	0.001

Source: Central Bank of Sri Lanka

(a)2007 only credit card transactions are included since reliable debit card transaction data are not available
(b)Credit transfers related to SLIPS
(c)Direct debit transactions related to SLIPS

8. Features of Selected Interbank Funds Transfer Systems

(end of 2011)

	Type (LV or R)	Owner	No. Of participants	Processing	Settlement	Membership
Sri Lanka						
RTGS	LV	CB	34	RTT	RTGS	O(c)
CITS	R	PA(b)	25	ACH	RTGS	O(c)
SLIPS	R	PA(b)	27(d)	ACH	RTGS	O(c)

	Degree of Centralization	Pricing(a)	Closing time for same day transaction	Number of transactions (thousands)	Transaction Value (billions USD)	Ratio of transactions value to GDP
Sri Lanka						
RTGS	C	F	16:30	267	523	8.8
CITS	C	S	nav	46012	56	0.9
SLIPS	C	V	14:30	12443	4	0.1

Source: Central Bank of Sri Lanka

(a) F=Full costs (including investments), V=Variable costs, S=Symbolic costs
(b) LCPL (Payment Association) owned by Central Bank of Sri Lanka and all Licensed Commercial Banks operating in Sri Lanka
(c) O=Any bank can apply.
(d) 24 Direct participants and 3 Indirect participants

9. Operating Hours of Selected Large-Value Interbank Funds Transfer Systems

(end of 2011)

	Gross (G) or net (N)	Opening/closing time for same-day value in local time	Settlement finality in local time	Cut-off for all third-party payment orders	Cut-off for international correspondents' payment orders in local time	Memo item: Standard money market hours in local time
Sri Lanka						
RTGS	G	08:00 - 16:30	Real Time	15:00	nav	08:00 - 16:30

Source: Central Bank of Sri Lanka

10. Features of Selected Securities Settlement Systems

(end of 2011)

	Owner	No. Of participants	Settlement of cash	Securities settlement	Delivery lag	DVP mechanism *
Sri Lanka						
SSSS	CB	32	RTGS	N	T+0	DVP2

	Intraday finality	Central Securities	Cash settlement Agent	Number of transactions (thousands)	Value of transactions (USD billions)	Ratio of transactions value to GDP
Sri Lanka						
SSSS	Yes	SSSS	CB	624	485	8.196

Source: Central Bank of Sri Lanka

11. Direct Participants in Central Bank Funds Transfer Systems

(end of 2011)

	Total direct participants	Deposit-taking institutions	Non-deposit taking institutions, of which:				
			Central bank	*Public authorities*	*Postal institution*	*Securities companies*	*Others*
Sri Lanka							
RTGS	34	24	1	1(a)	0	7	1(b)

Source: Central Bank of Sri Lanka

(a)Employee Providence Fund
(b)Central Depository Systems

12. Participants in Selected Securities Settlements Systems

(end of 2011)

	Total	Of which:		
		banks	*securities companies*	*others*
Sri Lanka				
SSSS	32	23	6	3(a)(b)(c)

Source: Central Bank of Sri Lanka

(a)Employee Providence Fund
(b)Central Depository Systems
(c)Central Bank of Sri Lanka

13. Banknotes and Coin Issued

End of year, in billions of rupees

	2005	2006	2007	2008	2009	2010	2011
Total banknotes issued	**128492**	**152919**	**168,782**	**181,307**	**212,173**	**249,977**	**287,080**
of which							
LKR 5,000	-	-	-	-	-	-	31,536
LKR 2,000	-	15,054	40,162	54,189	72,652	99,271	105,717
LKR 1,000	98,583	104,599	95,291	93,189	101,922	109,382	105,363
LKR 500	14,551	16,531	14,988	15,693	18,171	19,683	21,391
LKR 200	517	280	221	175	176	210	166
LKR 100	9,370	10,370	11,269	11,416	12,255	13,333	14,317
LKR 50	2,457	2,654	3,015	2,773	3,052	3,568	3,688
LKR 20	1,486	1,713	1,892	1,899	2,068	2,603	3,013
LKR 10	1,460	1,648	1,875	1,904	1,807	1,857	1,821
Total coin issued	**3,944**	**4,320**	**4,582**	**4,792**	**5,257**	**5,675**	**6,153**
Of which							
LKR 10	476	448	424	405	447	646	849
LKR 5	1,817	2,040	2,225	2,372	2,501	2,625	2,776
LKR 2	537	635	703	762	811	863	920
LKR 1	424	493	522	540	574	614	661
cts 50	173	181	182	183	184	186	186
cts 25	118	119	120	120	121	121	121
cts 10	39	39	39	39	39	39	39
cts 05	23	23	23	23	23	23	23
cts 02	6	6	6	6	6	6	6
cts 01	4	4	4	4	4	4	4
Total currency issued	**132,436**	**157,240**	**173,364**	**186,099**	**217,430**	**255,652**	**293,233**

Chapter 10

ROLE OF PAYMENT AND SETTLEMENT SYSTEMS IN MONETARY POLICY AND FINANCIAL STABILITY IN CHINESE TAIPEI

By
Kuo-Hsing Chang[1]

1. Introduction

1.1 Purpose and Scope of Study

The purpose of this study is to offer insight into the state of Chinese Taipei's payment and settlement systems (PSSs) and their practical role in favour of Monetary Policy (MP) and Financial Stability (FS). This report will also identify the potential vulnerabilities and risks in the domestic systemically important PSSs. However, this does not mean that the risks mentioned in this report are certain to occur. It is hoped that the research findings will enhance the awareness of risk among the market participants and system operators and spur them to take appropriate action in a timely manner, in addition to serving as a reference for financial authorities.

This study is divided into five sections. Section 1 is a brief description of the current development of Chinese Taipei's economy, finance and payment infrastructure. Section 2 reviews the literature on the inter-connectedness of PSSs with respect to MP and FS. Section 3 focuses on the assessment of Chinese Taipei's CBC's Interbank Fund Transfer System (CIFS) in accordance with the "Core Principles" issued by Committee on Payment and Settlement Systems (CPSS), Bank for International Settlements (BIS). Section 4 abstracts the policy implication from the issues and assessment mentioned above. Finally, in Section 5, we draw the conclusion from this study.

1.2 Overview of Economy and Finance in Chinese Taipei

Export-led policy has successfully contributed to Chinese Taipei's vigorous economic growth and robust financial development, just like most other Asian

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countries. Although this growth model has been widely duplicated by the emerging market economies, especially the "Brick Four" - China, India, Brazil and Russia, Chinese Taipei is still well-known for its strong high-technology products, such as notebook computers, cell phones and wafer fabrication.

Both the Lehman Brothers events and the GIPS sovereign debt crises affected Chinese Taipei's economy during 2008-09. Soon after, the growth rate sprang back to 10.72% in 2010, the highest rate over the last decade, partly due to a lower base in the previous year. During 2001-2011, the average GDP growth rate was 4.1%; during the same period, the CPI inflation rate has maintained at a stable level with average inflation at 0.99%, compared to WPI average inflation 2.24% (see Figure 1).

Since Chinese Taipei has a small open economy, its growth and price level are deeply and widely influenced by the global economy and business cycle, even in such a case, the Central Bank, Chinese Taipei (henceforth, the CBC) has made every effort to conduct its interest rates and exchange rates policies in order to promote financial stability, guide sound banking operations, maintain the stability of the internal and external value of the currency, and foster economic development within the scope of the above objectives.

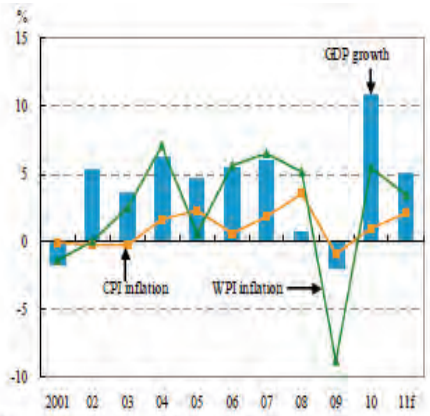
Chinese Taipei's weighted average interest rates of deposits and loans declined sharply to the historic lows. Deposits fell below 1% and loans came to around 2%, and their interest rates spreads shrank to 1.11% at Q2:2009, and subsequently expanded gradually to 1.4% at Q4:2011, but they are still less than the average before the crisis. That indicates sustained global economic recovery was underway, but fragilities remained in the financial system (see Figure 2).

In general, the New Chinese Taipei dollar (NT$) is flexibly floated against the US dollar. The exchange rates of NT$/US$ had gradually appreciated from 34.999 in 2001 to 29.418 in 2011. During the same period, Chinese Taipei's current account balances kept positive surplus and increased yearly. The ratios of the current account surplus to GDP are as high as between 5% and 11.5%. As a result, Chinese Taipei's foreign exchange reserves accumulated from US$122 billion in 2001 to US$386 billion in 2011, however, some belong to short-term capital inflows (some sort of hot money in nature).

Much of the hot money are usually channeled into the local capital markets and raises concerns about asset price bubbles. Moreover, the potential vulnerabilities to sudden reversals of capital inflows will pose policy challenges for the central bank to address the volatility of the exchange rates (see Figures

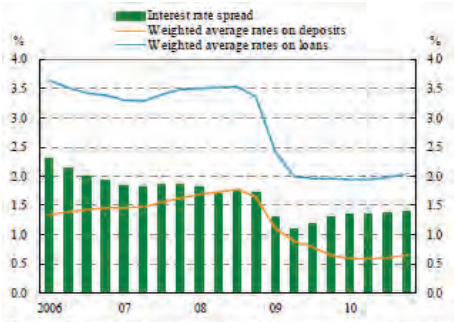
3 and 4). As we learned from the 1997 Asian financial crisis, heavy capital inflows have enabled the weaker enterprises to easily access funds by issuing bonds, resulting in a further deterioration in the credit quality of assets held by investors. Should interest rates unexpectedly rise in the advanced economies, economic prospects worsen in the emerging markets, or investor appetites change, it can lead to sudden reversals of capital inflows and compromise the soundness of the financial system.

Figure 1
Growth and Inflation in Chinese Taipei



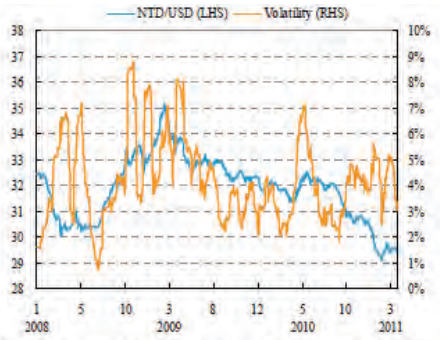
Note: Figure for 2011 is DGBAS forecast.
Source: DGBAS.

Figure 2
Interest Rates in Chinese Taipei



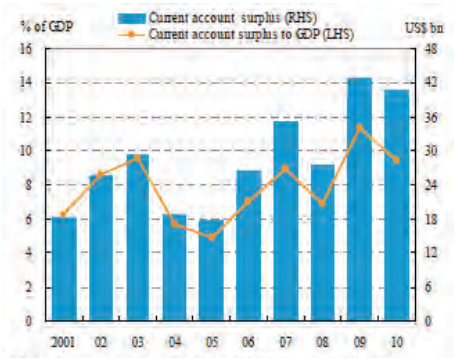
Notes: 1. Interest rate spread = weighted average interest rates on loans - weighted average interest rates on deposits.
2. The weighted average interest rates on deposits and loans exclude preferred deposits of retired government employees and central government loans.
3. Excludes the data of medium business banks.
Source: CBC.

Figure 3
Exchange Rates in Chinese Taipei



Note: Volatility refers to the annualized standard deviation of 20-day daily returns.
Source: CBC.

Figure 4
Current Account Balances in Chinese Taipei



Note: Current account surplus and GDP are annual figures.
Sources: CBC and DGBAS.

1.3 Framework and Performance of PSSs in Chinese Taipei

1.3.1 Framework of PSSs in Chinese Taipei

Since the early 1980s, the CBC has actively participated in the design and management of systemically important payment and settlement systems (SIPSSs) in Chinese Taipei:

- Taiwan Cheque-clearing Houses (TCH) first time adopted Magnetic Ink Character Recognition (MICR) to speed the processing of the bill of exchange in 1985;

- The Financial Information Service Co., (FISC) launched the Shared CD/ ATM system and the Nationwide Interbank Remittance System (NIRS) in 1987;

- The CBC owns and operates CBC-Wire, which consists of the CBC's CIFS in 1995 and the Central Government Security Settlement (CGSS) system in 1997;

- The CBC restructured its CIFS into an all-the-line Real Time Gross Settlement System (RTGS) in 2002;

- The Debt Instruments Depository and Clearing Co. (DIDC) once launched the Short-term Bills Central Depository and Clearing System in 2004; in 2006, the DIDC and the Chinese Taipei Securities Central Depository Co., Ltd. (TSCD) merged and the new entity was renamed as the Chinese Taipei Depository & Clearing Corporation (TDCC) in order to provide book-entry and custody services for the Chinese Taipei Stock Exchange Corporation (TSEC), the centralised listed stock exchange; and the Gre Tai Securities Market (GTSM), the over- the-counter (OTC) quasi-listed stock exchange

- The Mega Bank brought the US$ Bills Clearing and Settlement (UBCS) system into operation in December 2010.

The above PSSs can be classified into three categories: (1) SIPSSs[2] ; (2) retail payment and settlement systems (RPSSs); (3) systemically important securities settlement systems (SISSSs) (see Table 1). They together constitute the framework of payment and settlement systems in Chinese Taipei. All the system construction and configuration are proceeding in proper sequence, matching with the need for economic and financial development.

Among others, the CBC-CIFS acts as a settlement hub of Chinese Taipei's payment systems by linking up the systemically important financial market infrastructures such as: CBC-CGSS; FISC-NIRS; Taiwan Cheque Clearing House - Cheque Clearing System (TCH-CCS); Taiwan Depository and Clearing Corporation – Bills Clearing System (TDCC-BCS); Taiwan Stock Exchange Corporation - Stock Book-Entry Clearing System (TSEC-SBECS); and Gre Tai Securities Market – Electronic Bond Trading System (GTSM-EBTS) (see Appendix 1). Above all, the CBC provides the settlement accounts and final settlement services for the clearing institutions such as TCH, FISC, TDCC, TSEC and GTSM. These arrangements not only favour banks to centralise their liquidity management, but also reinforce safety with non-risk central bank money as their settlement assets.

Initially, the CIFS is an on-line electronic-based fund transfer system operated by the CBC. Through the CIFS, interbank funds transfer can be executed in RTGS mode or in Deferred Net Settlement (DNS) mode across the current accounts that participating banks held at the CBC. Since September 2002, the CBC has reshaped the CIFS into an all-the-line RTGS only system, with a view to improving the payment float problem arising from the DNS. Indeed, the existence of the payment float may expose one party's position to its counterparty so that it also results in potential settlement risks and systemic risk.

Under the RTGS mode, payment orders are processed in a manner of real time and on the basis of transaction-by-transaction. The payment float improves to a certain extent, which implies better efficiency and less risk. However, banks may encounter serious liquidity pressures with the RTGS mode. To streamline the system operation, the CBC introduced some standing facilities into its CIFS system by providing intraday overdrafts, incorporating queue mechanism and executing throughput management.

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2. Following the CPSS Core Principles Report, it is likely that a system is of systemic importance if at least one of the following is true: i) it is the only payment system in a country, or the principal system in terms of the aggregate value of payments; ii) it handles mainly payments of high individual value; iii) it is used for the settlement of financial market transactions or for the settlement of other relevant payment systems.

In centralising large value fund transfers to the CIFS for final settlement, the CBC at first linked the CIFS with the CGSS so that government bond issuances and transactions, principal redemptions and interest payments in the CGSS are now dealt by the CIFS with Delivery versus Payment (DvP) mode. After that, the CBC, in turn, ratified the TDCC, TSEC and GTSM to hold settlement accounts at the CBC and to connect their clearing systems with the CIFS, with a view to realising DvP for those large value transactions in domestic financial markets, such as short-term bills, centralised listed stocks, OTC quasi-listed stocks and fix income securities. These arrangements not only favour banks to centralise their liquidity management, but also increase the settlement security with non-risk central bank money as settlement assets in replacement of the previous commercial bank money. Both the RTGS and DvP mechanisms are designed to address the systemic risk in the large-value securities settlement systems.

Table 1
Configuration of Payment and Settlement Systems in Chinese Taipei

Payment and Settlement Systems		**System Operators**
e-Government	Treasury Proprietary Disbursement Network	MOF
Systemically Important PSSs	CBC-Wire: ♦ CBC's Interbank Fund -transfer System (CIFS) ♦ Central Government Securities Settlement (CGSS)	CBC
	Nationwide Inter-bank Remittance System (NIRS)	FISC
	Cheque Clearing System (CCS)	TCH
Retail PSSs	Interbank Shared Network: ♦ CD/ATM System ♦ EFT/POS System ♦ ATM/Credit/Debit/Pre-paid Cards System ♦ FEDI System	FISC

Payment and Settlement Systems		System Operators
	♦ FXML System ♦ Internet Banking System ♦ Mobile Banking System ♦ Bulk Payment System	
	Automated Clearing House	TCH
	Banks/Post Giro System	Banks; Post
	Regional Shared Exchange Centers for Credit Unions	Credit Unions
	Union Credit Card Processing Center	UCCC
Systemically Important Securities Settlement Systems	Bills Clearing System (TDCC-BCS)	TDCC
	Stock Book-Entry Clearing System (TSEC-SBECS)	TSEC; TDCC
	Electronic Bond Trading System (GTSM-EBTS)	GTSM; TDCC
	Local USD Bills Clearing and Settlement System (UBCSS)	Mega Bank
	Futures and Derivatives Market Settlement System	TAIFEX; GTSM

1.3.2 Performance of Systemically Important Payment Systems in Chinese Taipei

Table 2 shows the transaction statistics about the systemically important financial market infrastructures in Chinese Taipei, including the capital markets such as call loans, short-term bills, bonds, stocks and foreign currencies. As to the transactions of non-cash instruments in Chinese Taipei, their penetration ratios both by value and volume are also given in Appendix 2.

Acting as a large-value interbank fund transferring system, the growth of the CBC-CIFS is very significant both in terms of its annual turnover with respect to real GDP and its average daily transaction value and volume, comparing with the other two systemically important payment systems (SIPSs), a moderate growing FISC-NIRS and a steady declining TCH-CCS. With the centralising of large-value fund transfers to the CBC-CIFS for final settlement in past few years, the daily transaction value of the CIFS is increasingly close to the total value of those financial markets, which registered NT$ 1,434 billion and NT$

1,589 billion in 2011, compared with 568.9 and 999 in 2001 as well as 974.8 and 1992.1 in 2006. Besides, the total settlement of SIPSs (CIFS, NIRS, CCS) grew from NT$250 trillion in 2001 or twenty-six times RGDP to NT$485 trillion, or thirty-three times RGDP.

Table 2
Annual Money Turnover and Average Daily Transaction in Chinese Taipei's SIPSs and Financial Markets

	SIPSSs	CBC-CIFS	FISC-NIRS	TCH-CCS	Call loans	ST-Bills	Bonds	Stock	FX	Total
2001	26.2	568.9	288.8	153.1	46.3	234.1	479.8	74.0	4.7	999.0
2002	26.1	611.4	309.7	127.4	38.6	201.6	535.5	87.1	5.6	1,057.7
2003	26.1	640.4	333.4	112.5	35.0	190.8	811.3	81.0	7.3	1,365.9
2004	28.6	762.4	382.0	104.7	40.2	192.2	811.5	94.0	10.2	1,464.9
2005	31.8	989.1	397.5	96.2	79.4	211.2	1,284.1	75.6	12.1	2,046.9
2006	30.4	974.8	414.3	95.1	95.0	193.4	1,098.9	95.2	15.6	1,992.1
2007	29.6	1,012.0	441.2	90.5	81.3	173.5	779.1	132.7	18.6	1,770.8
2008	31.3	1,120.6	428.8	82.0	66.2	184.1	539.9	104.0	19.4	1,530.6
2009	33.1	1,234.9	375.9	69.9	101.6	166.4	385.6	117.3	16.2	1,290.5
2010	34.0	1,416.7	420.1	75.1	140.2	231.5	420.2	111.5	20.2	1,517.9
2011	32.8	1,434.4	436.0	77.1	131.3	227.8	392.8	105.2	24.2	1,589.2

Note: The numbers in parentheses indicate the volume of transaction.
Source: CBC.

Today's payment systems are growing more interdependent due to common infrastructure and procedure, and thus results in increasing single-point failure. The resilience of a payment system is determined by the weakest part of its components. Business Continuity Planning (BCP) has been aware of an effective vehicle to contain the possibility of single-point failure.

Acting as a competent authority of interbank payment systems, the CBC has urged all the relevant service providers to apply BCP to their daily operation risk management, especially converting delay-control into system performance. For example, the FISC-NIRS shall complete all its daily payment transactions before 16:50; otherwise, it shall apply to the CBC for deferring cut-off time and explain the reason for approval.

Table 3 summarises the delay statistics on the system operation between the CBC-CIFS and FISC-NIRS during 2000-2011. The delay ratio steadily declined from 40.01% in 2000 to 5.62% in 2011. That implies that the system performance has chalked significant improvement over the past few years. Table 3 also identifies some factors that cause the the CIFS system to defer its close-off time. During 2005-2011, most delays are ascribed to out-of-order in software application programmes (95 times); the second one is hardware network/ telecommunication (21 times); the third one is others (16 times) and includes abnormal bank deposit withdrawal, marine cable break due to earthquake, or errors in shifting programmes, etc.; the fourth one is holiday peak effect (9 times)…and so forth. Indeed, the daily operation risk management has made the inter-connection between the CIFS and NIRS system increasingly more efficient.

Table 3
Delay Statistics on Performance of CBC-CIFS/FISC-NIRS

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Business days	275	248	251	251	254	249	251	249	251	253	253	249
Delay days	109	117	70	58	57	39	34	36	27	16	8	14
Delay ratio (%)	40.01	47.33	27.89	23.11	22.72	15.66	13.55	14.46	10.76	6.32	3.16	5.62
Number of Banks that Apply for Deferring Close-off Time (16:50)												
Defer to 17:00	9	12	2	1	0	0	0	0	0	0	0	0
Defer to 17:10	6	7	3	0	1	1	1	2	20	7	8	8
Defer to 17:30	102	136	86	58	51	35	30	22	3	9	0	3
Defer to 18:00	7	12	0	1	2	0	1	2	7	1	0	2
Overdue 18:00	3	8	0	5	9	4	4	12	1	0	0	1
Total	127	175	91	65	64	40	36	38	31	17	8	14

Source: CBC.

Factor Analysis for Deferring close-off time (2005-2011)

Hardware Failure		**Software Failure**	
Abnormal Events	**Times**	**Abnormal Events**	**Times**
Mainframe system	4	Application programs	95
Network & Telecom.	21	Error in shifting program	5
Power apparatus (including UPS)	3	CPU/Database insufficient capacity	5
Hard disk	4	Bill Clearing System	7
Hardware Security Module (HSM)	6	Holiday peak effect	9
Branch-end terminal	7	Others	16

1.3.3 Collaborative Oversight, Risk Management and Standing Facilities

1.3.3.1 Collaborative Oversight Framework

The CBC is entrusted to maintain the sound operation of the PSSs in accordance with the Central Bank, Chinese Taipei Act (CBC Act) as well as the Banking Act.

According to Article 32 of the CBC Act, the regulations governing cheque clearance and settlement of accounts among banks shall be stipulated by the CBC. For that entitlement, the CBC enacts the "Regulations Governing the Administration of Negotiable Instrument Clearing Business by the CBC."

In addition, according to Article 47-3 of the Banking Act, a financial information service business which intends to engage in an interbank fund transfer clearing service shall obtain the competent authority's approval. If such a business also involves large-value fund transfer clearing, the approval of the CBC is also required.

With the legislation of the "Organic Act to Establish Financial Supervisory Commission (FSC) Under Executive Yuan" (The FSC Act), issued by Executive Yuan on 23 July 2003, the FSC acts as an additional competent authority for the payment systems in Chinese Taipei. According to that legislation, the payment system oversight in Chinese Taipei is entrusted to both the FSC and the CBC, with the purpose of forging Chinese Taipei ahead on a two-peak mode with collaboration and specialisation.

The CBC has the rights to revise the relevant rules and regulations, such as "Directions for the Central Bank of ROC to Govern Electronic Interbank Fund Transfers and Settlements" (The EFT Directions), with an additional chapter on the management of clearing institutions.

Under the collaborative framework, the CBC and the FSC are respectively charged with the enforcement of the following rules and regulations:

- Rule of CBC Governing Bills and Exchanges;
- Rule Regulating the CBC Interbank Fund Transfer Operation;
- Rule Regulating Credit Card Services (FSC);

- The Master Agreement of PC and Network Banking Activities (FSC);
- The Security and Management of the Criteria for E-Banking of Financial Institutions (FSC)
- Guideline Governing the Establishment and Management of Interbank Payment Service Providers (FSC)

1.3.3.2 Risk Management

The CBC-Wire is owned and operated by the CBC. With the CBC-Wire, the CBC carries out its reserve requirement adjustments, discount window, and open market operation, Besides, it offers final settlement for those portfolio transactions arising from the money markets, securities and equity markets, and foreign exchange markets.

The CBC-Wire is composed of the CIFS and CGSS, of which the CIFS is a RTGS, functioning as a large-value fund transfer system across participating banks; while the CGSS is a book-entry system with DvP settlement for government bond transactions. Both the RTGS and DvP mechanism are designed to address the systemic risk in the large-value payment systems.

To assist the FISC-NIRS in smooth operation, the CBC permits banks to open a pool account in name of the "Guarantee Account for Interbank Clearing Services" so as to warrant every interbank net clearing payment dealt by the FISC-NIRS. In addition, the Bank ratifies the TSEC and GTSM to open settlement accounts and to connect their clearing systems with the CIFS in order to deal with the final settlement of net clearing balances resulting from financial market transactions with respect to the TSEC-listed stocks, GTSM-quasi-listed stocks and bonds. These arrangements not only favour banks to centralise their liquidity management, but also increase the settlement security with non-risk central bank money as settlement assets in replacment of commercial bank money.

In July 2000, the GTSM introduced the Electronic Bond Trading System (EBTS), providing bond dealers an online trading platform, different from the price negotiations conducted via phone. The EBTS significantly improved trading efficiency and thus substantially increased the volume of outright transactions. It was an important progress in Chinese Taipei's bond market. Moreover, the Ministry of Finance, the CBC and bond market supervisors have continued to introduce measures regarding the improvement of bond issuance, trading and settlement. These included the introduction of a regular and moderate issuance

system, reopening system, when-issued trading system, primary dealer system and lending facility for government bonds, the establishment of a corporate bond and financial debenture trading platform, as well as the opening of new bond-related financial products. They also introduced a DvP mechanism for book-entry security transactions in order to reduce the settlement risk in the bond markets.

1.3.3.3 Standing Facilities

In response to the increased demand for liquidity on account of implementing the RTGS and in order to streamline the system operation, the CBC took the following supplementary actions:

(1) Provide Intraday Overdrafts: Employing pledges backed with eligible collaterals, such as central government bonds, treasury bills and CBC Certificates of Deposits (CDs) financial institutions may apply to the CBC for liquidity accommodation with a view to settlement. To avoid potential abuse, an intraday overdraft is calculated by multiplying the amount of the overdraft with the time span of the credit extension (measured by minutes), and the CBC may charge this liquidity accommodation according to its Accommodation Rate with Collateral. Once a certain intraday overdraft is not refunded by a participating financial institution by the deadline, such that it must be carried over to the next business day, the CBC may begin to charge this financial institution a penalty interest rate, which is calculated by multiplying the amount of the un-refunded overdraft with the time span of the credit extension in terms of 1.2 times the CBC's Accommodation Rate without Collateral. If the un-refunded overdraft is carried over to the next business day, the penalty interest rate shall be doubled, and the CBC, starting from the third business day, may suspend this default financial institution's access to an intraday overdraft temporarily. If a financial institution has its intraday access suspended by the CBC twice within a year, this bank will have its qualification to apply for the intraday overdraft function called to a halt for a certain period.

(2) Incorporate Queuing Mechanism: Once a payment order is initiated by a participating institution with insufficient account balances to cover it, the payment order will temporarily be held by the queue system according to its priority, which may fall into four categories of interbank transactions: (1) financial institutions' accrued funds payable to the CBC; (2) financial institutions' accrued bills of exchange payable, accrued net bills of exchange payable, and funds transfers to the CBC's Guarantee Account, or for

securities settlements to the CBC's Guarantee Account for Interbank Clearing Businesses; (3) financial institutions' forward payments to refund call loans at maturity; and (4) interbank funds transfers or other payments. The system mechanism is designed to keep payment orders in the queue line until the deficiency of current accounts is made up in order to avoid inputting payment orders repeatedly. The queue system adopts the principle of By-pass FIFO (first in, first out) to handle payment orders according to their priority ranks, i.e., for the same category, payment orders are executed in the manner of first-in-first-out and by-pass. If the available balance is not sufficient to settle the next payment order, the latter ones will simply be moved forward to be executed. Only when all payment orders of the same category are settled will the execution be moved to the next category. When the system runs to close off, all payment orders with insufficient available balances that are still held in the queue line will be revoked by the system directly.

(3) Execute Throughput Management: To control the daily flow of payment orders on the CIFS, the CBC has stipulated throughput ratio requirements so as to avoid deferring payments and thereby affecting participants' funding schedules. According to the required throughput ratio, all banks shall finish their daily transaction value by at least 50% (30% for bills finance companies) no later than 14:30, and at least 80% (for both banks and bills finance companies) no later than 16:30.

2. Literature Review

2.1 Framework of PSS, MP and FS Inter-position

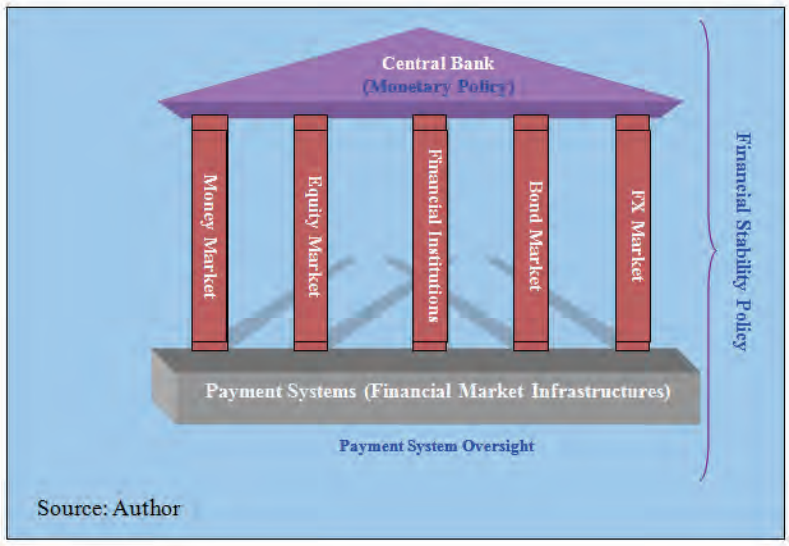
The modern monetary economy can be presumed as an physical organ[3], which is composed of the PSSs, the financial intermediation, and the fractional reserve banking system (include central banking) with each function contributing to discharge payment duties between creditor's rights and debtor's obligations, bridge the saving and the investment, and maintain price and financial stability accordingly.

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3. Kiyohiko G Nishimura, Deputy Governor of the Bank of Japan, once gave a speech to compare the payment system to the blood circulatory system at the Bank of Korea International Conference, Seoul, on May 26, 2011. His figure of speech says: While the infrastructure making financial contracts is straightforward and smooth could be compared to arteries pumping out blood into the body of the economy, the payment and settlement system would then be the veins carrying the blood back to the heart.

The recent financial crises remind many economists and central bankers to re-think central banking when confronting increasingly future uncertainty (Eichengreen, 2011), then did they focus on the relationship among the payment system, the financial stability and the monetary policy. Such an interactive position can be described as Figure 5, which looks like a bourse constituted by the roof (central bank), the pillars (financial institutions) and the floor (financial market infrastructures) together. The bourse may not work smoothly if each component is out of order or experience disruption, because they are closely interdependent to one another. On the other hand, both banks (include central banks) and financial markets cannot function well without a sound financial market infrastructure.

Figure 5
Interposition among PSS, MP and FS



By transferring money between payers and payees, the payment system builds a bridge between money and real economic activities. Acting as a transmitting channel for day-to-day monetary policy implementation, the payment system is also associated with the financial stability because financial instability can be transmitted through the payment system at a speed limited only by the speed of the payment system itself. Both monetary and financial stabilities provide further grounds for central banks to exercise oversight of payment systems, even if not active involvement.

(1) Payment systems and monetary policy are closely intertwined. A speedy and well-functioning payment system is a prerequisite for the smooth transmission of monetary policy. The central bank is dependent on safe and efficient large-value payment systems of the banking industry and financial markets, which are able to execute its open market operation, say, a securities repurchase agreement on a same-day basis, in order to implement its interest rate and/or liquidity policies. Disruptions in payment systems can quickly have a negative impact on the national financial markets, and can be an impediment to the development of the real economy. Based on this reason, many central banks in the advanced countries are empowered with oversight of payment system, supervision of banks, and/or surveillance of financial market (Deutsche Bundesbank, 1997).

(2) Payment systems build the cornerstone for financial stability. A safe and efficient payment system contributes to the maintenance and promotion of financial stability and economic growth. However, it concentrates risks if it is not properly managed. As a consequence, it can be a source of financial shocks, such as liquidity dislocations and credit losses. Particularly in the large-value payment system, the settlement failure of one participant may cause other participants to be unable to meet their obligations when due. Such a systemic risk may have a domino effect, and can quickly spread throughout the financial system as a whole. The central bank's RTGS arrangement and the intraday liquidity facility are developed to address the systemic risk; it turns out to be an effective tool for the smooth functioning of monetary transmission, and in turn, contributing to the financial stability (Fry et al., 1999).

(3) Financial stability per se is broader concept of monetary policy. Price stability to some extent is in favour of financial stability. For all that, there is as yet no universally accepted definition of financial stability. Defined positively, "financial stability" can be thought of in terms of the financial system's ability to: (i) facilitate an efficient allocation of economic resources both spatially and inter-temporally; (ii) assess and manage financial risks; and (iii) withstand adverse shocks. From a negative view, "financial instability" refers to the occurrence of currency, banking, or foreign debt crises, or inability of the financial system to absorb adverse shocks (endogenous or exogenous), and allocate resources efficiently, with the result that it cannot facilitate real economic performance in a sustained manner (CBC, 2008).

The key to ensure that the linkages among the payment system, monetary policy and financial stability are not disruptive lies in regular contact and information-sharing among those responsible for the payment system, monetary policy, banking supervision, and financial markets surveillance. This is particularly important when major operational changes are contemplated and when markets and systems are under strain. With close cooperation and coordination, policies consistency and transparency together form and result in reliable payment systems, in which risks/obligations are managed prudently. At least, there should be opportunities to prevent settlement risks developing into financial crises.

2.2 Theory of PSS, MP and FS

2.2.1 Pre-crisis Intraday Liquidity Policy

The monetary policy theoretically is based on the quantity theory of money, which assumes that the payment behaviour is fixed or determined by market convention, so the relation between the demand for money balances and its determinants is a fundamental building block in most theories of macroeconomic behaviour and is a critical component in the formulation of monetary policy. The central bank has the obligation of controlling money supply to meet the demand for money. Under this policy framework, a monetary target approach mainly focuses on the control of base money first, then monetary aggregates, finally the output and inflation. Another inflation target approach focuses on the determination of short-term interest rates and directly targets inflation stabilisation only.

The shift in monetary policy emphasis from direct controls on interest rates and credit to indirect management of commercial banks' reserves and liquidity through open market operations once served to emphasise the critical importance of reliable and efficient same-day payment and settlement arrangements. Such arrangements mainly aim at managing the payment float arising when the accounting entries for the two sides of a payment order are not posted simultaneously. Where there is a large and variable payment float, there exists uncertainty in the final settlement process. The intraday liquidity policy is then developed to contain such a settlement uncertainty, involving intraday credit/ overdraft/repo facilities to speed the payment flow throughout the payment systems.

Among others, an interbank fund transfer system used for the settlement of financial market and other large-value transactions, will offer substantial benefits for monetary policy implementation. It can also contribute to the

maintenance of the stability of the financial systems (IMF, 1994; Johnson et al., 1998). These benefits include:

- The elimination of float arising from these transactions, thus reducing erratic fluctuations in bankers' balances with the central bank, and making it easier to forecast their levels accurately;

- The effective operation, at a low cost, of an interbank money market, in which banks and other financial institutions can efficiently manage their daily liquidity requirements, and in which the central bank can conduct precisely targeted open market operations;

- The elimination of credit exposures between banks and the reduction of their liquidity exposures, arising in the settlement of their transactions and those of their customers;

- The opportunity for banks to maintain a lower stock of overnight balances with the central bank; and

- The ability to reduce or eliminate settlement risk arising from transactions in other financial markets, such as for securities or for foreign exchanges.

With this in mind, the payment system not only serves as financial market infrastructure (FMI), but it also enters into the very heart of decision making in monetary policy (Crockett, 1998)[4].

Even when the payment float is not a problem because it is either stable or minimal, no discussion of payment system/monetary policy linkages is complete without some mention of the possibility of a spillover of intraday credit into overnight credit, and the potential effect of such an event on the overall monetary conditions. For all that, central banks can introduce safeguards such that the spillover effect is negligible. In other words, intraday/interday (overnight) markets can be effectively segmented by imposing collateral arrangements and a penal regime for any "spillover" lending. Hence, monetary policy can still operate effectively in the context of end-of-day balances and overnight (or longer) interest rates (Fry et al., 1999).

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4. Andrew Crockett (1998) once pointed out that the BIS Committee on Payment and Settlement Systems was transformed into a senior-level body in 1990 after a growing realisation that "payment systems were not only a technical matter but also went to the very heart of the central bank policy concerns."

In practice, among many central banks, it is general accepted that: (i) Part of the reserves account balances are allowed for settlement use; (ii) Many central banks provide intraday credits/repo on the ground of RTGS system efficiency; (iii) Relevant support facility: collateral arrangements, interest charges, penal regime; (iv) Accommodation through intra/inter call loan markets (see Table 4), where we find intraday liquidity accommodation is mainly provided by the central bank, instead of by the market, either against collaterals or for a penalty charges. Except Switzerland and Japan, most countries listed in Table 4 are lacking in intraday money market. In addition, most central banks do not charge interest on intraday credit except USA and Chinese Taipei. People may ask why distribution of intraday liquidity through a market was seldom adopted as a common practice. This issue then concerns the role of the intraday market.

Table 4
Comparative Analysis of Intraday Credit Policies for Selective Economies' RTGS Systems

	Be	Fr	Ge	It	Ne	Swd	Sws	UK	USA	Ca	Ja	Tw	HK	Si
Access to required reserves for payment purpose	**Y**	**Y**	**Y**	**Y[1]**	**Y**	**nap**	**Y**	**nap**	**Y**	**nap**	**Y**	**Y**	**nap**	**Y[1]**
Access to liquidity reserves for payment purpose	**nap**	**nap**	**nap**	**nap**	**Y**	**nap**	**Y**	**Y**	**nap**	**nap**	**nap**		**nap**	
Intraday credit provided by central bank	**Y**		**Y**	**Y**	**Y**	**Y**			**Y[3]**	**Y**	**Y**	**Y**		**Y[2]**
Quota Limited				y		y			y	y				
Collateral Pledged	y		y	y	y	y			y	Y	y	y		y
Interest charge									y			y		
Intraday repo operated by central bank	**Y**	**Y**				**Y[4]**	**Y**	**Y**		**Y**			**Y**	
Interest charge														
Overnight liquidity accommodated by central bank	**Y**	**Y**	**Y**	**Y**	**N[5]**	**Y**	**Y**	**Y[6]**	**Y**	**Y**	**Y[6]**	**Y**	**N[5]**	**Y**

Charge overnight interest rate/Lombard rate	y	y	y	y		y	y	y	y	y	y	y		y
Penalty charge	y	y	y	y		y	y	y	y	y	y	y		y
Lag surcharge								y		y	y	y		
Accommodation through money market			**Y**			**Y**	**Y**[7]			**Y**	**Y**[7]			**Y**
Intraday call loan market							y				y			
Interday call loan market			y			y				y				y

Source: Compiled by Author According to CPSS LVPS Report (Appendix 1) May, 2005.

Notes:

1 Italy allows no more than 12.5% balances in reserves accounts to afford payments; Singapore 3%.
2 Whether or not Singapore provides intraday credit and requires collateral pledge depends on cases.
3 FedWire carries out credit rating and divides participants into six classes on which intraday credit quota depends, interest charges at discriminated cost in accordance with/without collaterals.
4 Not standing facility.
5 At the end of business day, central bank will automatically transfer fund in order to square the net debit positions in all RTGS accounts.
6 BOE charges intraday credits that are not able to refund after business hours by penalty fee 2.5~5 percentage points, depending on first or repeated offender; BOJ has similar regulation.
7 In Japan, intraday call loan market developed to support BOJ's DNS settlement. In Switzerland, it is used to accommodate specific securities transactions.

Typically, intraday liquidity can be obtained directly from the central bank. In contrast, overnight liquidity is usually made available to banks through a market. Martin & McAndrews (2007) discuss the separate roles of intraday and overnight markets and argue that an intraday market can be organised in the same way as the overnight market, if banks' deposit reserves are paid interest by the central bank or the marginal cost of overnight liquidity is zero, in another word, the opportunity cost of money is close to zero. Even so, this kind of intraday market may be feasible, but does not necessarily mean it is desirable. In all, the ***Economist*** [5](2001) once indicated, "[Banks] like to hang on to their cash and deliver it as late as possible at the end of the working day". To deal with this problem, intraday liquidity accommodation is the key, whatever it may come from central banks or markets; and it would be better to distinguish intra/inter liquidity markets

5. See "The Long Shadow of Herstatt," The Economist, April 14, 2001.

so that intraday market is mainly used for settlement purpose, while overnight market is used for monetary policy implementation.

2.2.2 Post-crisis Thinking on Monetary Policy Strategy

During the past few years, the world economy underwent from "Great Moderation" to "Once-in-a-century Credit Tsunami", this makes many economists and central bankers bug-eyed. Spaventa (2009) first casted doubt on economists and economics: Does economic theory suffer from essential deficiencies? Or, economists cannot see around corners, neither are they perspicacious but helpless.

In the pre-crisis period, there was a general consensus among academic economists and central bankers about the science of monetary policy strategy, whereby monetary policies were formed in an economic environment full of market uncertainty and imperfect information. In general, the strategic thinking involves a set of target objectives, policy instruments, particular procedures and general rules, so as to ensure policy effectiveness, consistency and sustainability (Mishkin, 2010).

The global financial crisis has taught us to question our beliefs about the way we conduct monetary policy, and broader financial stability strategy. Blanchard et al. (2010) once reviewed the main elements of the pre-crisis consensus on macroeconomic theory, and identified what we learned from the 2007-2009 financial crises and what tenets of the pre-crisis framework may still hold. In Table 5, Blanchard summarises the comparison of macroeconomic stability policies in pre- and post-crisis. Among others, one important implication from this comparison indicates the following: monetary policy, especially the inflation target approach, dominated fiscal policy and financial regulation in the "Great Moderation"; however, coping with economic downturn, monetary policy becomes fatigue, instead fiscal and financial stabilisers become more powerful, and three policy tools shall be considered together during the whole boom-bust cycle.

Table 5
Comparison of Macroeconomic Stability Policies

Pre-crisis Consensus	Lessons from Crisis	Implication for Policy Design
The Great Moderation	Reinterpreting the Great Moderation	Designing Better Automatic Fiscal Stabilisers
Set Inflation at 2% around	Low Inflation Limits the Scope of MP in Deflationary Recessions	Combining Monetary and Regulatory Policy
One Target: Stable Inflation	Stable Inflation May be Necessary: But it is Not Sufficient	Should the Inflation Target be Raised?
One Instrument: Policy Rate	Financial Intermediation Matters	Inflation Targeting and Foreign Exchange Intervention
A Limited Role of Fiscal Policy	Countercyclical Fiscal Policy is an Important Tool	Creating More Fiscal Space in Good Times
Financial Regulation: Not a Macroeconomic Policy Tool	Regulation is not Macro-economically Neutral	Providing Liquidity More Broadly

Source: IMF Staff Position Note, Feb. 12, 2010.

Before the global financial tsunami, most economists and policymakers thought of monetary policy as having one target, inflation, and one instrument, the policy rate and the Tinbergen Rule holds[6]. So long as inflation was stable, the output gap was likely to be small and stable, and monetary policy did its job. But the crisis has made it clear that the policymakers have to watch many

6. The Tinbergen rule states that if the number of policy targets surpasses the number of instruments, then some targets may not be met. See Jan Tinbergen (1952), ***On the Theory of Economic Policy*** (Amsterdam: North-Holland).

targets, including the composition of output, the behaviour of asset prices, and the leverage of different agents. It has also made clear that they have potentially many more instruments at their disposal than they used before the crisis. The challenge is to learn how to use these instruments in the best way, because the Tinbergen Rule may not still hold if there exist objective frictions among multiple targets at the same time.

The most important lesson of the global crises is that: price stability is no longer separable from financial stability, and it is systemic risk that the central bank and the regulatory authority should pay much closer attention to than before. Systemic risk is a complex function of all sorts of linkages, arising from cross-correlated and pro-cyclical asset prices, market frictions, and interconnectedness, and such like. This is what makes the role of the central bank in managing systemic risk essential.

At the most basic level, of course, control of systemic risk will require strong prudential oversight of individual financial institutions and markets. But that is not enough. A shock in an isolated financial market or in the real sector can quickly spill over into another, and in the process be dramatically amplified. For this reason, systemic risk control should be approached from a macro-prudential perspective in which the real and financial sector linkages take center stage (Bank of Korea, 2012).

2.2.3 Intraday Liquidity Management

RTGS systems eliminate the settlement risk from unwinding because payments are settled irrevocably, and with finality, on an individual gross basis and in real time. However, the elimination of settlement risk comes at the cost of an increased need for liquidity to smooth non-synchronised payment flows. Since 2008, the Basel Committee on Banking Supervision (BCBS) has issued a series of reports on intraday liquidity management. Some of the key points of which are summarised below:

(1) The BCBS (2008) published the "Sound Principle Report" of which Principle 8 identifies six operational elements that should be included in a bank's strategy for managing intraday liquidity risk, and indicates that a bank should:

- Have the capacity to measure the expected daily gross liquidity inflows and outflows, anticipate the intraday timing of these flows where possible, and forecast the range of potential net funding shortfalls that may arise at different points during the day;

- Have the capacity to monitor intraday liquidity positions against the expected activities and available resources (balances, remaining intraday credit capacity, available collaterals);

- Arrange to acquire sufficient intraday funding to meet its intraday objectives;

- Have the ability to manage and mobilise collaterals as necessary to obtain intraday funds;

- Have a robust capability to manage the timing of its liquidity outflows in line with its intraday objectives; and

- Be prepared to deal with unexpected disruptions to its intraday liquidity flows.

(2) The BCBS (2010) published the "***Basel III Liquidity Rules Report***", which sets out two new minimum liquidity standards: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). Although the LCR is designed to promote the short term resilience of a bank's liquidity risk profile, currently, it does not include intraday liquidity within its calibration[7].

(3) The BCBS (2012) published the "***Monitoring Indicators Report***", which proposed a set of indicators and four scenario stress tests aiming to provide supervisors with sufficient information on intraday liquidity risks or on how well the risks are managed.

Indicators

The indicators are:

- Daily Maximum Liquidity Requirement
- Available Intraday Liquidity
- Total Payments
- Time-specific and Other Critical Obligations
- Value of Customer Payments Made on Behalf of Financial Institution Customers

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7. The Basel III liquidity rules states: Banks and regulators should be aware that the LCR stress does not cover expected or unexpected intraday liquidity needs that occur during the day and disappear by the end of the day. The Committee is currently reviewing if and how intraday liquidity risk should be addressed.

- Intraday Credit Lines Extended to Financial Institution Customers
- Timing of Intraday Payments
- Intraday Throughput

Scenario Stress Tests

- Own financial stress: A bank suffers, or is perceived to be suffering from, a stress event.
- Counterparty stress: A major financial institution counterparty suffers an intraday stress event which prevents it from making payments.
- Customer stress: The customer bank of a correspondent bank suffers a stress event.
- Market-wide credit or liquidity stress.

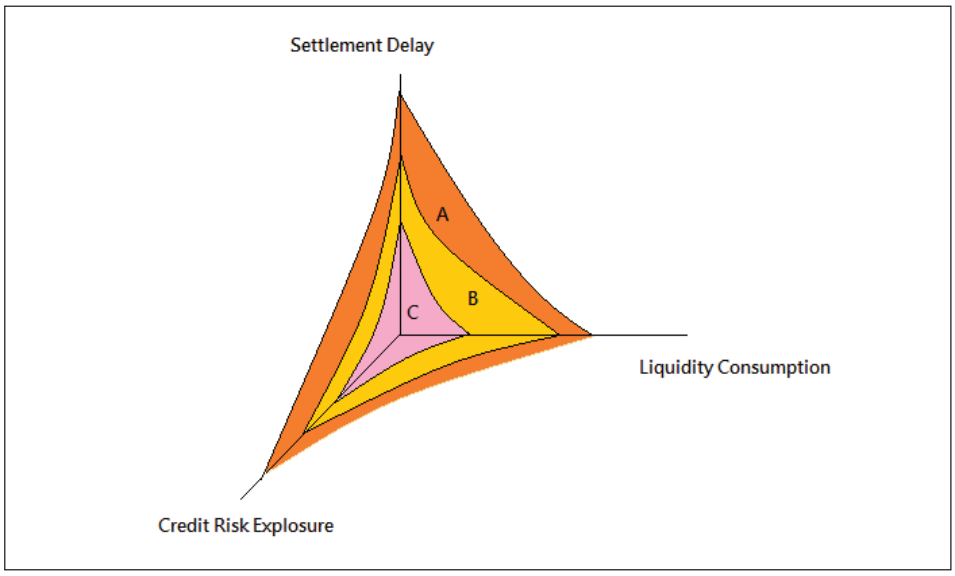
2.3 Implication of Safe and Efficient SIPS to MP and FS

A safe and efficient large-value interbank fund transfer system may contribute to ensure the quality of currency in circulation, and support financial institutions and markets to reduce transaction cost, speed up the payment cycle and control their liquidity positions. Progressing with the electronic fund transfer penetration and the standardisation of the transaction platform, such a development largely raises inter-operability and functional complementarities across payment systems, and creates significant economies of scale, besides the network externality effects. Based on the consideration of public interests (safety and efficiency), most governments vest such a payment system with natural monopoly power (Bergman, 2003). In general, a single financial market infrastructure for large-value interbank payment system has advantage of technical efficiency due to unified system specification and operating standard, including common message format and inter-operative application programmes. Open competition in this field of market may instead result in operational complexity among multi-systems and inefficiency. The characteristic of such a SIPS is of special implication to MP and FS, because it is not only too big to fail, but also too connected to fail.

The Bank of Finland (2005) once applied indicators - settlement delay, credit risk exposure and liquidity consumption - to measure system efficiency (see Figure 6). The system structure will be more efficient when it is closer to the origin. Since individual agent's behaviour is often subject to resource constraint and risk preference, there usually exists trade-off relationship among the target variables. In general, increasing liquidity consumption, settlement risk exposure, or both, can increase settlement speed (or improve settlement delay). On the

other hand, given fixed throughput capacity, intending to reduce settlement failure risk, the only method need consume more liquidity but at the cost of increasing interest payment. Similarly, given fixed liquidity resources, the only way to improve settlement speed must allow more settlement risk taking. However, technological advance and payment innovation may raise overall system efficiency, such as A moves to B and B moves to C.

Figure 6
Efficiency of Payment and Settlement Systems



Source : Bank of Finland (re-edited by author).

3. Assessment of Payment Systems Based on the CPSIPS

3.1 The CPSS-IOSCO PFMI Assessment Methodology

The Committee on Payment and Settlement Systems – International Organisation of Securities Commissions (CPSS-IOSCO) (2012) jointly issued the ***"Principles for Financial Market Infrastructures"*** (PFMIs) to replace their previous reports:

(1) CPSS's "***Core Principles for Systemically Important Payment Systems"*** (CPSIPS), issued in January, 2001;

(2) CPSS-IOSCOs' "***Recommendations for Securities Settlement Systems"*** (RSSS), issued in November, 2001; and

(3) CPSS-IOSCOs' "***Recommendations for Central Counterparties"*** (RCCP), issued in November, 2004.

The principles in the PFMI report harmonise and strengthen the existing international standards for payment systems (PSs), central securities depositories (CSDs), securities settlement systems (SSSs), and central counterparties (CCPs). The revised standards also incorporate additional guidance for OTC derivatives, CCPs and trade repositories (TRs). In addition to the standards for FMIs, the report outlines the general responsibilities of central banks, market regulators, and other relevant authorities for FMIs in implementing these standards.

The main public policy objectives of the CPSS and the IOSCO in setting forth these principles for FMIs are to enhance safety and efficiency in payment, clearing, settlement, and recording arrangements, and more broadly, to limit systemic risk and foster transparency and financial stability.

At the same time as publishing the final version of the PFMI, the CPSS and IOSCO have issued two related documents for public consultation, namely an "***assessment methodology***" and a "***disclosure framework***" for these new principles. After the consultation period, the CPSS and IOSCO will review the comments received and publish the final versions of the two documents later in 2012. In light of this, the CBC has formed a Task Force to study the aforesaid three documents in detail, and embark on drawing an "action plan" to assess our SIPSs according to PFMI in the forthcoming year, but not now.

3.2 World Bank-IMF IOSCO-ROSC Assessment Methodology

Not until today, almost all countries followed the World Bank-IMF's Financial Sector Assessment Programme (FSAP) to assess the vulnerabilities and development needs in their financial sectors, including payment systems. The FSAP is designed to help countries enhance their resilience to crises and to foster growth by promoting financial stability and financial sector diversity. This programme basically looks to:

- Identify strengths, vulnerabilities and risks of the financial system;
- Ascertain the sector's development and technical assistance needs;
- Assess the observance and implementation of relevant international standards, codes and good practices;
- Determine how key sources of risk and vulnerabilities are being managed; and
- Help prioritise policy responses.

Through the FSAP, country authorities can be involved in stress-test modeling, comparing their risk management systems with those in other countries, and benchmarking their regulatory and supervisory structures against other countries. The assessment process, therefore, increases the country authorities' capacities to oversee and strengthen their financial sectors.

The assessment of observance of the CPSS's CPSIPS has been listed as part of the World Bank-IMF's FSAP. Two main documents are prepared as part of the CPSIPS assessment: (i) ***Report on the Observance of Standards and Codes*** (ROSC); and (ii) ***Detailed Assessment***. The objective and the scope of the assessment mainly focus on the SIPSs. The factors used to identify the SIPSs should be clearly indicated.

Using a descriptive style, the assessor should state the main findings of the assessment of observance of the Core Principles under the following main groupings: Legal Framework (CP I); Understand and Management of Risks (CP II–III); Settlement (CP IV–VI); Operational Reliability and Efficiency (CP VII–VIII); Access and Governance (CP IX–X); and Central Bank Responsibilities (Resp. A–D). The summarised assessment must bring out the main aspects of the strengths and weakness.

The CBC had assessed its CIFS system in applying the CPSS's Core Principles during 2007-2008. At the same time, it also pushed the TCH and FISC to self-assess their Cheque Clearing System (CCS) and NIRS, respectively,

according to the CPSS's Core Principles and submit their self-assessment reports to the CBC for screening during 2008-2009.

However, from today's view, the assessment results seem out of date, because each system has since made extensive improvements under the CBC's oversight. The CBC authorities think it would be better to submit new assessment results that follow CPSS-IOSCO's PFMI methodology in the future, so the new assessment results are not available for the moment.

4. Policy Implication

Once upon a time, the PSS was deemed as no more than an accounting process and a downstream back-office subordinate to the banking business units that took responsibility for monetary policy or financial stability. Over the past two decades, the PSS has evolved into an independent business function, along with monetary policy and financial stability, and together they form the core mandates of the central bank.

Likewise, in the past two decades, financial and fiscal stability once took a backseat to monetary policy until the outbreak of the global financial crisis, which has taught us to question our beliefs about the science of monetary policy strategy. In general, the strategic thinking involves a set of target objectives, policy instruments, particular procedures and general rules, so as to ensure policy effectiveness, consistency and sustainability. Conventional monetary policy has one target - inflation, and one instrument - the policy rate; and assumes that the Tinbergen rule holds. However, a new consensus emerges from the recent financial crisis, that is, price stability is no longer separable from financial stability, and the Tinbergen rule may not hold if there exists target friction between monetary and financial stabilities. With this lesson in mind, central bankers shall find an effective solution to harmonise their objectives in monetary policy, financial stability and/or payment systems, and together the three are of equal importance.

Theoretically, the linkage between payment systems and monetary policy depends on the design and management of the intraday liquidity facilities/markets; while the linkage between payment systems and financial stability depends on the settlement arrangements – DNS, RTGS or both. Both settlement arrangements and intraday liquidity facilities aim at solving the payment float uncertainty from which hides potential settlement risk and financial instability.

For example, an accidental default payment in the DNS system may unwind other successful payments and result in settlement risk and system gridlock, or more serious, even cause systemic contagion and amplification effect through the inter-connected payment systems. The RTGS systems eliminate the settlement risk from unwinding; however, the elimination of settlement risk comes at the cost of an increased need for intraday liquidity to smooth non-synchronised payment flows. So, intraday liquidity management and risk control play a critical role in smoothing the RTGS system operation.

In practice, the major part of intraday liquidity is provided by central banks by means of collateral pledge or repos open market operation, accompanying with incentive mechanism, such as interest charges or penalty. The rest are accommodated from intra/inter call loan markets. To avoid a spillover effect into the overnight market, the intraday credit shall be totally refunded before the end of business day, otherwise, penalty fees will be charged. The fact is clear that intraday liquidity is only used for settlement purpose, and it is better to segregate intraday market from interday market, which is used for policy transmission. That implies that a policy mix is required if central bankers try to link payment systems with monetary policy.

Last but not least, most SIPSSs are characterised by natural monopoly power; they are of special significance to monetary policy and financial stability, because they are not only too big to fail, but also too connected to fail.

5. Conclusion

5.1 Need an Advanced Study on the Inter-linkage among PSS, MP and FS

In the past, payment services are subordinated to banking services and are charged therein. In Chinese Taipei, payment services and relevant revenues for some banks accounted for 10% ~ 13% of total revenues. This fact indicates payment services are not subordinated to banking services any more.

In payment systems, one bank's payment is another bank's liquidity. A failure to transfer funds for whatever reason can lead to similar failure by other system participants who are relying on these payments. Even those not directly involved with the bank experiencing the original failure may be affected. Failure to meet payment obligations will lead quickly to loss of confidence and reappraisals of credit-worthiness, both among the community of payment system banks and, more widely, among the financial market participants.

Payment systems not only represent a potential source of systemic disturbance in them but also have the potential of transmitting financial shocks and problems from their initial source to other parts of the financial system – and even to magnify them. So market rumours about one bank's credit-worthiness can encourage other banks to delay sending payments to it until they received the expected payments in advance.

Conventional monetary policy targeted a single objective of price stability, which is assumed to encompass financial stability. The global financial crisis proved that price stability may not warrant financial stability, because the two objectives occurred in dilemmatic friction. Central bankers shall find an effective solution dealing with the problem of target friction if payment systems, monetary policy and financial stability are together considered in their policy making.

5.2 Close Watch on New Development in Liquidity Risk Management

In light of the liquidity dry-up during the financial crisis of 2007–2009, the BCBS (2008) suggested that "A bank should actively manage its intraday liquidity positions and risks to meet payment and settlement obligations on a timely basis under both normal and stressed conditions and thus contribute to the smooth functioning of payment and settlement systems."

To complement these principles, the BCBS has further strengthened its liquidity framework by developing two minimum standards for funding liquidity since 2010. One is the LCR, aiming to promote the short-term resilience of a bank's liquidity risk profile by ensuring that it has sufficient high-quality liquid assets to survive a significant stress scenario lasting for one month. Another one is the NSFR, aiming to promote resilience over a longer time horizon by creating additional incentives for banks to fund their activities with more stable sources of funding on an ongoing basis. The NSFR has a time horizon of one year and has been developed to provide a sustainable maturity structure of assets and liabilities.

According to the BCBS (2012), banks shall be required to report the amount of intraday liquidity available to them at the start of each business day and the lowest amount of available intraday liquidity by value on a daily basis throughout the reporting period.

A secure, efficient and reliable payment system shall warrant currency value as of high quality and strengthen market trade confidence in favour of consumption and investment. With this in mind, the CBC shall closely watch the new development of monitoring indicators and stress tests on the intraday liquidity risk management, in addition to the Basel III liquidity rules.

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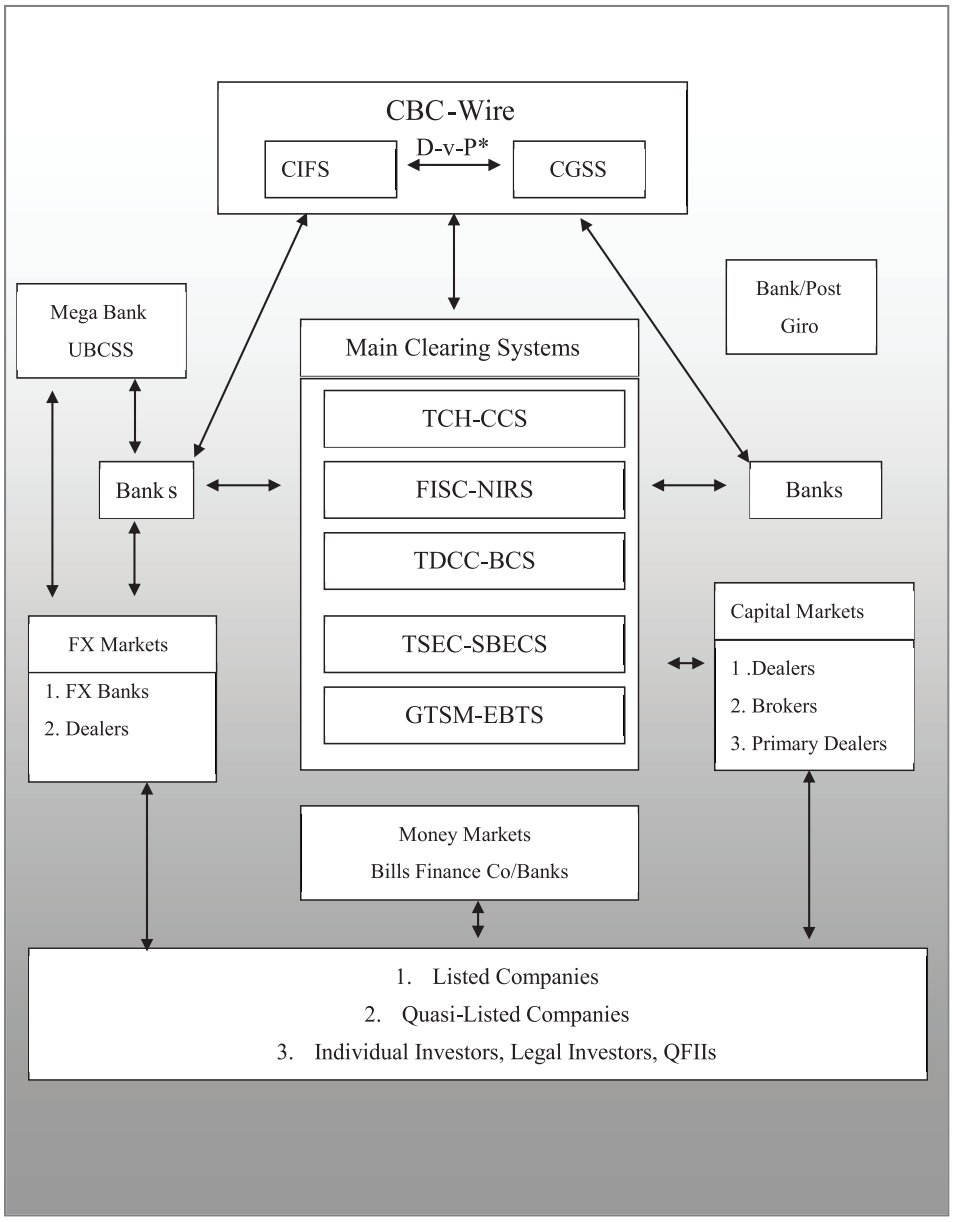
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Appendix 1

Chart of Payment and Settlement Systems in Chinese Taipei



Appendix 2

Penetration Ratio of Non-Cash Instruments in Chinese Taipei

By Value (%)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Paper-based										
Cheques	11.762	9.992	8.065	6.257	6.181	5.635	4.817	4.032	3.806	3.822
Card-based	2.863	2.896	2.950	2.742	2.624	2.718	2.924	2.074	1.985	2.010
1. ATM cards	2.541	2.542	2.568	2.370	2.265	2.361	2.595	1.760	1.673	1.671
2. Credit cards	0.321	0.354	0.380	0.371	0.357	0.353	0.326	0.311	0.308	0.332
3. Debit Cards	0.001	0.001	0.001	0.001	0.002	0.003	0.003	0.003	0.004	0.006
Electronic-based	0.356	0.593	0.836	0.836	0.938	1.136	1.244	0.993	1.156	1.420
1. FEDI	0.293	0.482	0.671	0.643	0.630	0.684	0.698	0.582	0.553	0.537
2. FXML	0.000	0.000	0.000	0.004	0.005	0.009	0.016	0.035	0.164	0.357
3. Internet Banking	0.002	0.003	0.003	0.004	0.003	0.109	0.094	0.084	0.094	0.106
4. Mobile banking	0.001	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
5. Bill Payment	0.000	0.000	0.001	0.003	0.007	0.008	0.006	0.009	0.012	0.022
6. On-Batch Media	0.059	0.079	0.094	0.076	0.134	0.001	0.001	0.001	0.015	0.032
7. ACH	0.001	0.027	0.064	0.105	0.157	0.325	0.427	0.282	0.317	0.365
Large-value EFT	85.020	86.519	88.149	90.165	90.256	90.511	91.015	92.901	93.052	92.748
1. CIFS	56.434	56.894	58.726	64.314	63.340	63.032	65.828	71.223	71.768	71.129
2. NIRS	28.586	29.625	29.423	25.850	26.916	27.480	25.188	21.678	21.284	21.619
Total	100	100	100	100	100	100	100	100	100	100