

PAYMENT SYSTEMS REPORT

2002





PAYMENT SYSTEMS REPORT 2002*

**Bank of Thailand
June 2003**

*Please refer to the Thai language report for the official version.

Payment Systems Committee



M.R. Pridiyathorn Devakula
Governor
Chairman



Members

1. **Mrs. Nopamart Manoleehakul**
Assistant Governor, Operations
2. **Mrs. Saowanee Suwannacheep**
Assistant Governor, Information Systems
3. **Ms. Swangchit Chaiyawat**
Assistant Governor, Financial
Institutions Policy Group
4. **Mrs. Tasna Rajatabhothi**
Assistant Governor, Financial
Markets Operations Group
5. **Ms. Udomsup Techakampuch**
Assistant Governor, Supervision Group



6. Mr. Tanin Mukdaprakorn

Senior Director, Deposits and Debt Instruments Group

7. Dr. Chim Tantiyaswadikul

Senior Director, Information Technology Group

8. Mr. Sermsingh Sinhaseni

Senior Director, Legal Group

9. Dr. Thaweesak Koanantakool

Director, National Electronics and Computer Technology Center

10. Mr. Manoo Ordeedolchest

Honorary President and Former President,

Association of Thai Computer Industry

11. Dr. Somchai Richupan

President, Siam Development Institution

Member & Secretary

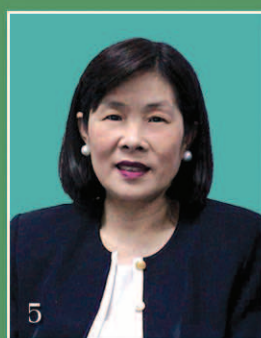
12. Mr. Sayan Pariwat

Senior Director, Payment Systems Group

Subcommittee on National Payments Co-operation



Mr. Teera Aphaiwongse
Senior Executive Vice President
Bangkok Bank



Members

- 1. Mr. Sayan Pariwat**
Senior Director, Payment Systems Group
Bank of Thailand
- 2. Mr. Charnporn Jotikasthira**
Executive Vice President
Siam Commercial Bank
- 3. Ms. Supattra Hiranras**
Senior Vice President
Support Functions Department
Krung Thai Bank
- 4. Mr. Chet Raktakanishta**
First Executive Vice President
Bank of Ayudhya
- 5. Ms. Vilawan Vanadurongvan**
Executive Vice President
Bank of Asia
- 6. Mr. Asadaporn Vanabriksha**
Senior Vice President
Head of Transaction Banking
Hong Kong and Shanghai Banking Corp.
- 7. Mr. Suwan Rattakul**
Executive Vice President (Postal Management)
Communications Authority of Thailand
- 8. Mr. Pramoth Chaiamphorn**
First Senior Vice President
Kasikornbank

Member and Secretary

Message from the Chairman

The Bank of Thailand has seen the importance of conducting payment systems policy that has no less significance to the national economy than its duties in monetary policy and financial institution policy. This can be seen from the value of payments in 2002, which totaled 95 trillion Baht and equaled 17 times the country's GDP. A convenient, efficient and safe payments system facilitates the smooth functioning of the economic and financial sectors. Moreover, it serves as a mechanism that supports international trade and investment linkages, contributing towards stability in the whole financial system, cost reductions in the economic system, and the smooth operation of monetary policy.

The Bank of Thailand has conducted work in three major areas between 2001-2002 to ensure the efficient operations of the payments system. This includes work on policy, organizational structure, and systems development.

Policy

The Bank of Thailand carried out a project on payment strategic directions in 2001 to study and analyze the country's payment systems infrastructure, and to formulate a vision and strategy. This project led to a payment systems development plan for 2002–2004 called "Payment 2004 : A Road Map for Thai Payment Systems" that serves as a development framework for the key payment infrastructures by the concerned parties.

Organizational Structure

- The Payment Systems Committee was restructured in August 2001 to enable the Bank of Thailand to formulate payments policy in response to business and technological changes. Three external and qualified experts in the economic, technological and legal areas relating to payment systems were invited as members of the committee.

- The Payment Systems Group was restructured in October 2002 to reorganize the working system and processes to increase efficiency, and to ensure that the roles, duties, and responsibilities of the department are in conjunction with the payment system policy of the central bank and increasingly meet international standards. The role in payment systems oversight was added.
- The Subcommittee on National Payments Cooperation, comprising of financial institutions and non-financial institutions, and the Bank of Thailand, was established in December 2002 to create cooperation among payment service providers. In the long-term, the subcommittee should become an independent organization with duties in developing new payment systems, and formulating payment guidelines and standards that are coordinated with the wider public policy.

Systems Development

- The re-launch of BAHTNET services in December 2001 to support real time gross settlement and delivery versus payment for securities to serve as an infrastructure to support the development of financial and capital markets in the country.
- The review of efficiency improvements in cheque clearing through cheque truncation, and the development of three-day clearing for the bill for collection system in order to shorten the collection time from six to three working days. The latter system was launched in February 2003.
- The improvement of the retail payments system (SMART: System for Managing Automated Retail Funds Transfer) to promote efficiency and convenience, along with encouraging public sector agencies to move funds transfer transactions into the electronic payments system.
- Studies on the necessity for cross-border payment systems to reduce risks and increase efficiency, including HK-PVP, CLS and ASEANPay.

Due to rapid changes in technology and payment systems on the world economic stage, the Bank of Thailand will emphasize its role in promoting the development of the national payments system. Four major policy areas will be implemented during 2003-2005 and are as follows:

- Oversee the widespread use of electronic payment systems by 2003
- Ensure payment systems are in compliance with the BIS Core Principles by 2004
- Promote the creation of payment systems supporting electronic commerce by 2005
- Ensure complete payment data by 2005

The above policies will increase the potential in developing the country into a regional payment systems center that can respond to global competition, financial changes, and foreign investment.



M. R. Pridiyathorn Devakula
Chairman, Payment Systems Committee

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1. Introduction

1.1 The Payment Systems Committee

1.1.1 Objectives

The Bank of Thailand established the Payment Systems Committee on August 27, 2001. The committee, chaired by the Governor of the Bank of Thailand and including qualified experts on economic, technology and legal matters, aims to formulate central bank payments policy that meets global payment technology and commercial developments.

1.1.2 Committee Members

| | |
|--|-----------------------|
| (1) Governor | Chairman |
| (2) Assistant Governor, Operations | Member |
| (3) Assistant Governor, Information Systems | Member |
| (4) Assistant Governor, Financial Institutions Policy Group | Member |
| (5) Assistant Governor, Financial Markets Operations Group | Member |
| (6) Assistant Governor, Supervision Group | Member |
| (7) Senior Director, Deposits and Debt Instruments Group | Member |
| (8) Senior Director, Information Technology Group | Member |
| (9) Senior Director, Legal Group | Member |
| (10) Director, National Electronics and Computer Technology Center | Member |
| (11) Honorary President and Former President, Association of Thai Computer Industry | Member |
| (12) President, Siam Development Institution | Member |
| (13) Senior Director, Payment Systems Group | Member & Secretary |

1. Introduction

1.1.3 Roles and Duties

(1) To formulate national payment policy directions and establish suitable and transparent technological standards

(2) To promote efficient payment systems, and support the use of new payment methods or services in the country, and cross-border linkages

(3) To oversee and determine risk reduction measures in the payment system, and consider the appropriateness of adopting standards set by international organizations

(4) To coordinate private sector developments in a consistent manner to reduce basic infrastructure costs, and to regulate payment services they provide

(5) To publish an annual report to summarize the work of the Committee that is transparent and of good standard

1.1.4 Major Achievements

The Committee held eight meetings during 2001–2002 and endorsed the following key policies:

1.1.4.1 Approved Payment 2004. Payment 2004 serves as a road map for developing the national payments system to support the business, banking and related sectors, and comprises of the following agendas.

(1) Establishment of the Thailand Payments Association (TPA). This agenda aims to create a channel for payment service providers to coalesce and to co-operate in promoting payment systems and related developments that are safe and efficient, along with focusing on their compatibility and inter-linkages.

(2) Collection of National Payment Data. This agenda aims to raise the importance of data to public and

1. Introduction

private sector organizations, particularly financial institutions that are involved with payment systems. This involves the efficient compilation of national payment systems data and their publication as a statistical report that meets international standards, so as to support decision-making and planning purposes.

(3) Drafting of the Payment Systems Act.

This agenda aims to push forward the enactment of a legislation with powers to control risks and to promote efficiency in the payments system that will contribute towards stability in the whole financial system.

(4) Establishment of Payment Infrastructure and Standards.

This agenda aims to develop payment systems infrastructure for payments across financial institutions that is straight through processing (STP), reduces duplicate investments, and supports the future growth of electronic commerce.

(5) Study on Cross-Border Payment Systems.

This agenda aims to assess the feasibility of connecting cross-border payment systems for both wholesale and retail funds transfers in order to promote efficiency and reduce risks in the payments system.

1.1.4.2 Reviewed improvements in BAHTNET regulations and pricing that are appropriate and equitable for members.

1.1.4.3 Reviewed changing guidelines for the use of bonds as collateral for inter-bank net credit clearing balance usage in Bangkok. This enables member banks to use bonds with, or without, ILF obligations to help member banks manage their funds and credit clearing balances more efficiently.

1.1.4.4 Reviewed improvements in increasing efficiency in the cheque clearing system. The Committee agreed in principle on the project to develop the three-day cheque collection system (B/C-3D) across clearing houses, and the cheque truncation project.

1. Introduction

1.1.4.5 Approved project on improving efficiency of the SMART system. This includes moving payment transactions from the Bank of Thailand and civil servant salaries into the SMART system along with encouraging the Customs Department to replace the use of cheques with the SMART system for tax refunds. The project also examines development directions to support market demands.

1.1.4.6 Established the Subcommittee on National Payments Co-operation. The subcommittee comprises of senior-level executives from various commercial banking groups, major organizations providing payment services, and the Bank of Thailand, totaling nine members. The subcommittee initially serves as the predecessor of the Thailand Payments Association , and will examine the appropriate organization structure in the future.

1.1.4.7 Approved in principle that the Bank of Thailand promote the establishment of the “ITMX” (Interbank Transaction Management and Exchange). The ITMX will serve as the key infrastructure and central computer system that exchanges transaction management and processing data across banks in order to support electronic commerce transactions, using data structure and inter-connection standards, which can be linked to other systems.

2. The Changing Role of the Bank of Thailand in the Payments System

2.1 Increasing Importance of Payment Systems Towards the Economy

Today, payment systems have become increasingly important for economic growth in Thailand, stemming from two factors namely, **expansion in the size of the economic system and increased foreign trade and investment that have been driven by globalization.** This has resulted in the dramatic growth of domestic and international payment flows, whether in terms of transaction volumes, average transaction values, or total transaction values. A good payments system that is efficient and safe, therefore, is significantly important for national economic development, and helps to lower the payment costs of the private sector and increases national competitiveness. Alternatively, the absence of an efficient and safe payments system may have negative consequences to the extent of disrupting or damaging the economic system.

2.2 The Role of the Bank of Thailand in the Past

The Bank of Thailand has continually given importance to payment systems in the past, serving as a crucial mechanism that supports **monetary policy and financial institutions policy.** Recent rapid technological development and changes that have altered business methods have reinforced the importance of payment systems. This can be seen from the increase in payment service providers from non-financial institutions, for example, card issuing companies that issue credit cards, debit cards, prepaid cards, along with state enterprises such as the Communications Authority of Thailand. Many new payment instruments have also been introduced in the market. As the Bank of Thailand serves as the state body overseeing payment systems, it has seen the need to increase importance in this area.

2. The Changing Role of the Bank of Thailand in the Payments System

The Bank of Thailand has a major role in providing payment services in three areas as follows: BAHTNET, SMART, and ECS. As the private sector was unready for making investments, the Bank of Thailand initially developed the three systems as the country's key financial infrastructure serving the wider public.

2.3 The Changing Role of the Bank of Thailand

As mentioned, the Bank of Thailand has seen the need to adjust its role due to the changing business environment and introduction of new payment systems and instruments, coupled with the entry of payment service providers that are non-financial institutions.

2.3.1 Role in Formulating Payment Systems Policy Directions

Due to changes in the present business climate from the past, the Bank of Thailand's role as the country's central bank raises its need to formulate payment systems policy at the macro-level. This addresses changes in the business environment in order to serve as a mechanism to support economic development and increase national competitiveness. Such policies has led to the reform of the payments system to serve electronic commerce, which includes two urgent key issues as follows:

2.3.1.1 Setting of Payment Rules and Standards

Payment rules and standards are of key importance in creating uniformity and connectivity for payments. Technological advancements have gradually dismantled national borders, and have also raised a country's capability to connect with cross-border payment systems, both regionally and internationally.

2. The Changing Role of the Bank of Thailand in the Payments System

2.3.1.2 Promotion of payment systems, instruments and technologies to serve the possible changes in business environment

As discussed, payment systems have evolved from being a basic infrastructure for the economic system into a core strategy in pushing the country towards economic success in the future.

To achieve such an objective would require the Bank of Thailand to involve stakeholders in the payments system, both from the public and private sectors, in formulating appropriate payment policies and directions.

In 2002 the Bank of Thailand has push forward the coalescing of payment service providers in the form of a Subcommittee on National Payments Co-operation that is under the Payment Systems Committee. The subcommittee's chairman and members represent commercial banks, the Communications Authority of Thailand, and the Bank of Thailand. The first group of subcommittee members who were appointed by the Payment Systems Committee on December 25, 2002 are as follows:

The Subcommittee on National Payments Co-operation

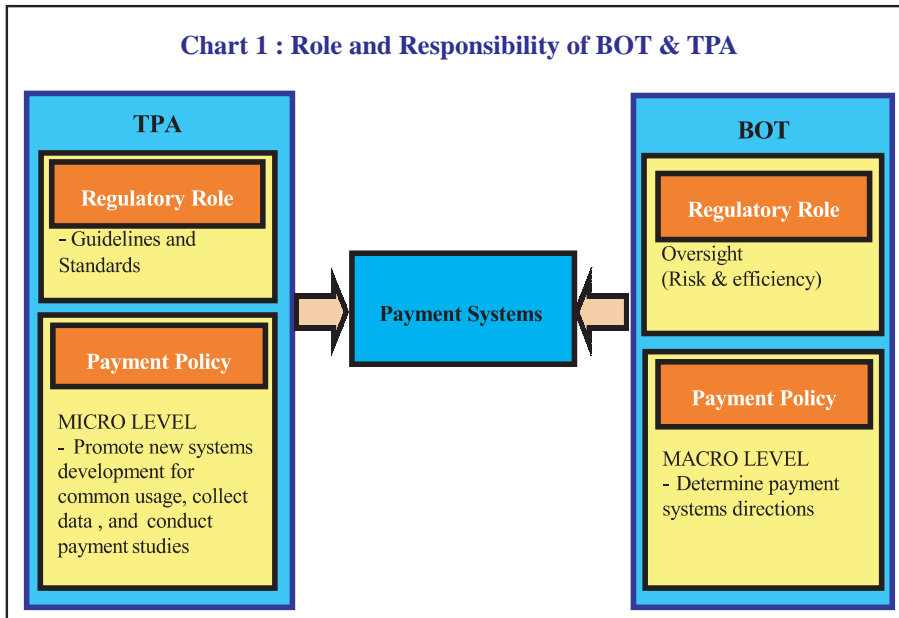
- | | |
|--|----------|
| (1) Mr. Teera Aphaiwongse | Chairman |
| Senior Executive Vice President, Bangkok Bank | |
| (2) Mr. Charnporn Jotikasthira | Member |
| Executive Vice President, Siam Commercial Bank | |
| (3) Ms. Supattra Hiranras | Member |
| Senior Vice President & Management Branch Krung Thai Bank | |
| (4) Mr. Chet Raktakanishta | Member |
| First Executive Vice President Bank of Ayudhya | |
| (5) Ms. Vilawan Vanadurongvan | Member |
| Executive Vice President Bank of Asia | |

2. The Changing Role of the Bank of Thailand in the Payments System

- | | | |
|-----|--|-------------------------|
| (6) | Mr. Asadaporn Vanabriksha Senior Vice President HongKong and Shanghai Banking Corp. | Member |
| (7) | Mr. Suwan Rattakul Executive Vice President (Postal Management) Communications Authority of Thailand | Member |
| (8) | Mr. Sayan Pariwat Senior Director, Payment Systems Group Bank of Thailand | Member |
| (9) | Mr. Pramoth Chaiamphorn First Senior Vice President Kasikornbank | Member and Secretary |

In the successive phase, the subcommittee would be upgraded into the **Thailand Payments Association (TPA)**. The Bank of Thailand would maintain two main duties, namely its **regulatory role** in the oversight of payment systems to ensure safety and efficiency, and **payments policy** formulation at the macro-level. The TPA would have powers in setting guidelines for payment services, technical standards, along with increased involvement in formulating payments development policy at the micro-level to push forward the common use of new payment systems. Co-operation and coordination between the Bank of Thailand and the TPA in their respective roles, coupled with planned legislation for payment systems oversight and for the establishment of the TPA, would help payment system development directions respond towards actual market needs (see Chart 1).

2. The Changing Role of the Bank of Thailand in the Payments System



2.3.2 Role in Oversight

Recent payment transaction volumes and values per payment have been relatively high. Increased convenience and efficiency in payments processing have also been evident. However, systemic risk, where a payer is unable to fulfill financial obligations, causing an impact to the wider system, has also been of concern. Thus, it has been the duty of the Bank of Thailand to regulate and supervise payment systems in order to create confidence for both the domestic and international financial systems that the country has a good, safe, and efficient payments system that meets international standards.

2.4 Restructuring of the Payment Systems Group

In 1991 the Bank of Thailand established the **Payment Systems Development Committee** to formulate plans and guidelines in developing the payments system, focusing on the need to develop it into a financial infrastructure that will pave the way towards the country being a regional financial center

2. The Changing Role of the Bank of Thailand in the Payments System

in Southeast Asia. The committee appointed many working groups in 1992–1993 to oversee the study and presentation of recommendations related to payment system developments to the committee. This involved co-ordination with consulting companies and the relevant internal departments in the Bank of Thailand. Among these working groups was **the Working Group on Payment Systems Development**, which coordinated work with related parties inside and outside the central bank.

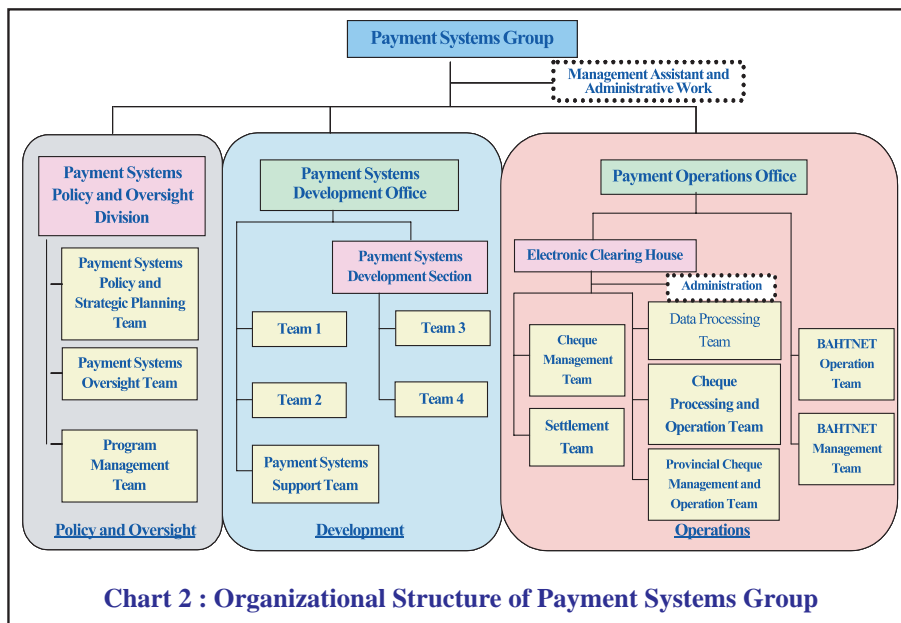
In August 1993 the Bank of Thailand realised the need to set-up an organizational unit to support the required work to meet its objectives. This led to the establishment of the **Office of Payment Systems Development**, which was responsible for the scope of work of the earlier working group. **Dr. Tarisa Watanagase** was the first director of this office, which had a staff body of 34. After the launch of BAHTNET and the partial introduction of the Electronic Cheque Clearing System (ECS), together with the movement of staff from the former clearing house to the new electronic clearing house, the office was upgraded to the Payment Systems Department in February 1996. **Saowanee Suwannacheep** succeeded as the senior director of the Payment Systems Department and saw the need to improve its working process and organizational structure in order to respond to the on-going environmental, customer needs, and technological changes. The request for restructuring the Payment Systems Department was made to the governor, and was later implemented under the modernization office project until the appointment of **Sayan Pariwat** as the succeeding senior director.

The objective in restructuring the Payment Systems Department was to adjust the working system and to improve the working process for greater efficiency. It also responds to the wider policy guidelines on the role of the Bank of Thailand in the payments system. Apart from developing payment systems that operates continuously and efficiently, an increased role in payment

2. The Changing Role of the Bank of Thailand in the Payments System

systems oversight was also introduced, covering both financial and non-financial institutions. Concurrently, improvements in operational efficiency were also made to match technologies and transaction volumes in the payments system. The key points from restructuring included the following :

- Setting roles, duties, and responsibilities to serve the policy guidelines of the Bank of Thailand
- Improving the working process in the policy and strategy areas, including tasks related to project management
- Changing the working process to one-stop service at the ECS
- Pooling staff ranked between levels four to six into a common systems development group in order to increase the flexibility in utilizing human resources and delegating tasks, which is suitable for project-styled work
- Reviewing the structure and the number of departmental staff once again in May 2003



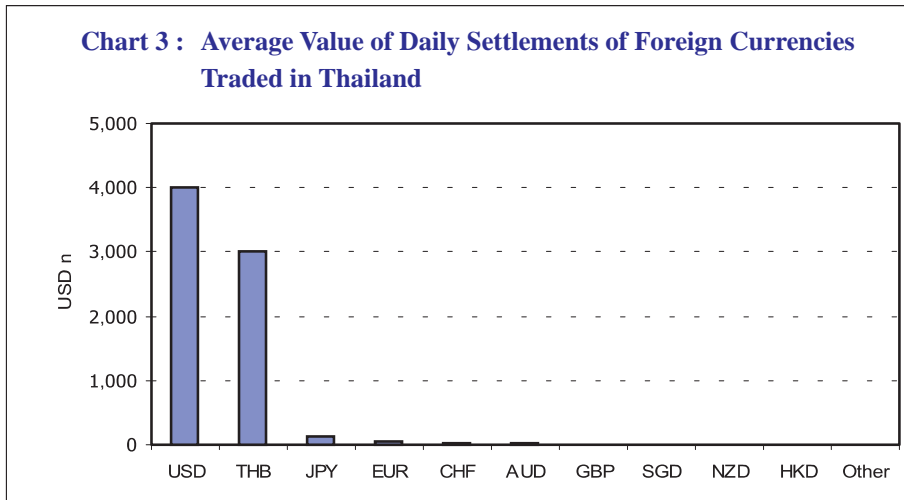
3. Risks in the Payments System

The Bank of Thailand has given interest in reducing risks in the payment systems during the past three years, which includes the following:

- Development of the Thai real time gross settlement system (RTGS) – BAHTNET – which facilitates large-value funds transfer
- Provision of intraday liquidity facility (ILF) to members in the payments system
- Survey of foreign exchange settlement risk—which started in August 2000 with research findings concluded for financial institutions in October 2001, raising their awareness and concern for risk controls
- Study on payment system risks originating from government securities and B2B transactions, which recommended measures in responding to the related risks and concluded research findings to related organizations in January 2002
- Implementation of operational risk mitigation project in 2002 to assess the payment services provided by the Bank of Thailand and to prepare contingency plans and their implementation in practice at back-up sites in order to cope with such risks and to provide for service continuity.

3. Risks in the Payments System

3.1 Foreign Exchange Settlement Risk



Due to the common concern shared by central banks around the world on foreign exchange settlement risks, the Bank of Thailand participated with ten other central banks that are members of the EMEAP Working Group on Payment and Settlement Systems to conduct a survey on foreign exchange settlement risks.¹ *Foreign Exchange Settlement Risks in the East Asia-Pacific Region* was published to report the overall status of risks in the region to create awareness and understanding for financial institutions on the related risk control measures between 2000-2001, with technical assistance provided by the Reserve Bank of Australia.

Foreign exchange transactions traded in Thailand during the survey period included 14 foreign currencies. The USD and THB were the highest traded value, with the ratio of 55 percent and 40 percent, respectively. The ratio of traded values for other currencies was between zero to two percent.

¹ Australia, People's Republic of China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore

3. Risks in the Payments System

The survey of risks makes two considerations as follows : **the size of risks that equals to the value of the currency bought, and the duration of exposures, which falls between the unilateral cancellation deadline and the reconciliation time.** The survey results can be summarized as follows :

- **Methods in foreign currency trading.** Some financial institutions need improvement changes to conduct trading in some foreign currencies in order to reduce the duration of risks before the value date, where risks also remained at three working days.
- **Size of risks.** This compares the value of risks originating from foreign currency trading to tier-one capital of financial institutions that is required by law. Survey results suggested that the size of industry risks was relatively small, being 0.5 times the capital, and can be explained by the 1997 economic crisis that required financial institutions to increase their capital under the financial institutions rehabilitation plan in order to cushion the risk of bad loans. Other reasons include regulations limiting foreign currency trading from non-residents, control of financial institutions foreign currency holdings, and control of trading and funds transfer of foreign exchange transactions from individuals. In addition, the survey found that financial institutions that are foreign commercial bank branches were the major players in effecting transactions, while Thai commercial banks were comparatively lower, resulting in a lower ratio of value of risk to capital for the latter group. Alternatively, the ratio for foreign commercial bank branches was comparatively higher, resulting from the trading of transaction of high value with relatively lower capital.

3. Risks in the Payments System

- **Risk management by financial institutions.** Survey results suggest awareness among financial institutions on the risks arising from foreign currency trading and practices that adhere to market standards. Some financial institutions have plans to improve the methods in extending longer periods for the cancellation of transactions with correspondent banks in order to reduce risk exposures, while bilateral netting arrangements seek to reduce the value of payments exchanged and the value at risk. Participation in the Continuous Linked Settlement System (CLS) has also been considered.

3.2 Risk Management in Government Securities and B2B E-Commerce

The Bank of Thailand's Payment Systems Group conducted a project on risk management in the payments system in 2001 in response to security concerns in payment systems that are related to government securities and B2B e-commerce, which are expected to grow in importance in the near future. The objectives are as follows :

- Investigate and identify risks located in electronic payment systems in Thailand
- Determine the characteristics and estimate the size of such risks
- Recommend measures to support risk management and suggest guidelines in developing electronic payment systems in the future to reduce the existing risks

Settlement risk is given particular emphasis as it leads to systemic risk. The report is divided into two parts. Part one is the study on the settlement of government securities. Part two focuses on the study of payments arising from B2B e-commerce.

3. Risks in the Payments System

3.2.1 Government Securities Settlement

Government securities have an important role, making up 83.4 percent of the total securities outstanding. In mid-2001 the outstanding market value was approximately 1.8 trillion Baht or 35 percent of GDP.

The Bank of Thailand, acting as the registrar for government securities, introduced delivery versus payment (DVP) through BAHTNET since December 11, 2001, which helped remove settlement risk. However, this has been limited to government securities that are in scripless form in the book entry system, which make up about half of the total securities market. Research findings also suggest that cheques remain a popular payment method in nearly half of the ownership transfers.

In order to support the procedural development for delivery versus payment for government securities in an efficient, safe and risk-reducing manner, international research findings in reducing risks were reviewed. This included, for example, the World Bank, the Bank for International Settlement (BIS), the Committee on Payment and Settlement Systems (CPSS), the International Organization of Securities Commissions (IOSCO), and recommendations from the consulting company CAPCO, along with the advice from Peter Allsopp and Paul Whitmore. Domestic factors were also considered. Measures to respond to risks originating from government securities include the following :

- The need to promote and push forward the delivery versus payment period for government securities from the original T+2 or longer to T+1, along with the development of infrastructure to facilitate STP
- The need to promote and push forward more government securities in scripless form, along with encouraging membership of direct participants in

3. Risks in the Payments System

BAHTNET to increase DVP usage and promoting clear legislation to support such transactions. As for government securities whose payments remain cheque-based, loss sharing agreement measures should be imposed, for example.

The report also recommends the consideration of cross-border transactions in the future, and the importance that should be given towards regular testing contingency plans and back-up systems.

3.2.2 B2B Payments

Although business to business (B2B) electronic commerce in Thailand is not currently widespread, the public and private sectors realize its benefits, providing convenience, speed, and cost reductions in the long term. B2B e-commerce also results in important changes in the payments system, including the increased role of non-financial institutions in the payments system, and the operation of businesses that largely rely on technology, networks and security systems. New financial instruments such as e-money and electronic funds transfer are also included. However, such a trading system poses the risk of physical authentication of trading partners as transactions are effected through electronic means and there is faceless interaction.

The report recommends four measures in response to B2B payment systems as follows:

- Regulation of relevant parties in the payments system, including financial institutions and non-financial institutions.
- Legislation creating confidence in carrying out transactions in the payments system. This focuses

3. Risks in the Payments System

on the need for a rule book for each payments system that determines the rights and obligations of every payment participant, together with clear settlement finality.

- Risk management systems, including the setting of appropriate membership requirements in the payments system and the use of real-time monitoring facilities as an advanced warning mechanism when any member encounters problems.
- Creating a payment systems environment that supports and encourages the development of reliable and safe payment systems for B2B e-commerce. This includes, for example, authenticity, confidentiality, integrity, non-repudiation, payment-related damage insurance services, and escrow services serving as a temporary central payments collector that pays a seller upon the receipt of a good or service by the buyer. Also included is the promotion of alternative dispute resolution by a central party to resolve disputes between trading partners efficiently and economically as compared to the use of the legal procedure.

3.3 Operational Risk Mitigation

The Bank of Thailand's role as the country's major payment service provider, including BAHTNET (large-value electronic funds transfer), SMART (retail funds transfer), Electronic Cheque Clearing System, and provincial cheque clearing and

3. Risks in the Payments System

collection, is aware of the need to control operational risk to avoid the discontinuity of systems and the damaging effects to the whole economic system. The operational risk mitigation project was initiated as a result and include the following objectives:

- Assess the scope of risks in payment systems provided by the Bank of Thailand
- Analyze, assess the potential, and strengthen preparedness to address operational risk in payment systems
- Prepare handbooks or reports publicizing guidelines in managing operational risk in payment systems for various relevant agencies and organizations locally and internationally
- Prepare follow-up procedures and reporting of operational risk in the Bank of Thailand payment systems in compliance with its bank-wide risk management

The following was implemented during 2002 :

- Key risk indicators (KRI) and key control measurement
- Preparation of back-up plans
 - (1) Contingency plans responding to disaster events at the Electronic Clearing House and the operational office for BAHTNET
 - (2) Key manpower replacement plan
 - (3) Operational replacement plan
 - (4) Electrical system back-up plan
 - (5) Back-up computer plan in case of disruptions with host computer
 - (6) Back-up computer and back-up site plans

3. Risks in the Payments System

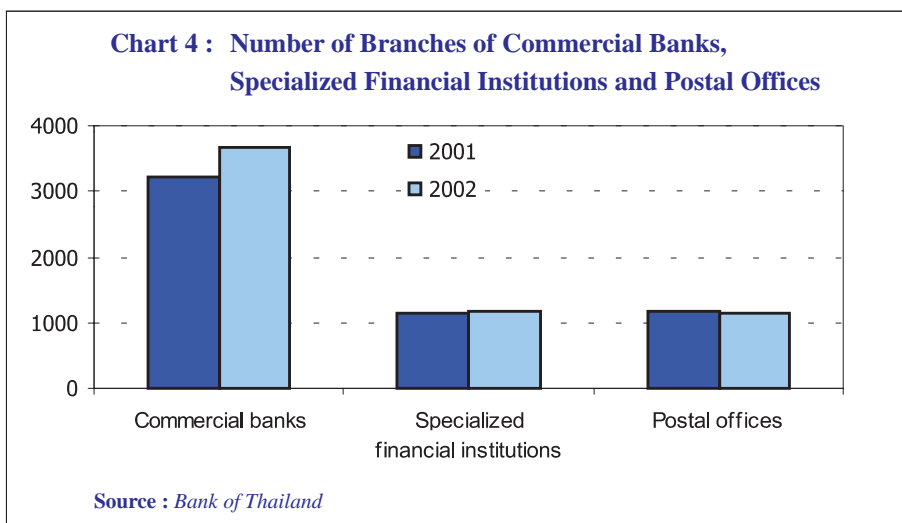
The project has led to the preparation of a contingency plan for every payments system to better respond to disruptions brought by current technologies. Efficiency improvements have been made to the back-up site of the electronic clearing house in 2002, together with annual testing plans in the event of disasters and the use of the back-up site. This also enables the joint testing of systems by members, strengthening their confidence in the systems.

4. Payment System Statistics

4.1 Infrastructure Developments

4.1.1 Branches of Commercial Banks, Specialized Financial Institutions and Postal Offices

Commercial bank branches continue to be a major channel for making payments throughout the country, although their role has increasingly changed towards servicing specific customer groups and in providing diverse electronic payment service channels with the use of new communications technology. Commercial bank counter services remain a popular way to make transactions such as deposits, withdrawals, funds transfer, along with the payment for utilities, goods and services. Funds transfer through postal money orders also remains popular and important due to the wide geographical coverage of postal offices, and particularly for customer groups in the provincial areas where there is a lack of modern communication systems and unfamiliarity with new and changing technologies.



4. Payment System Statistics

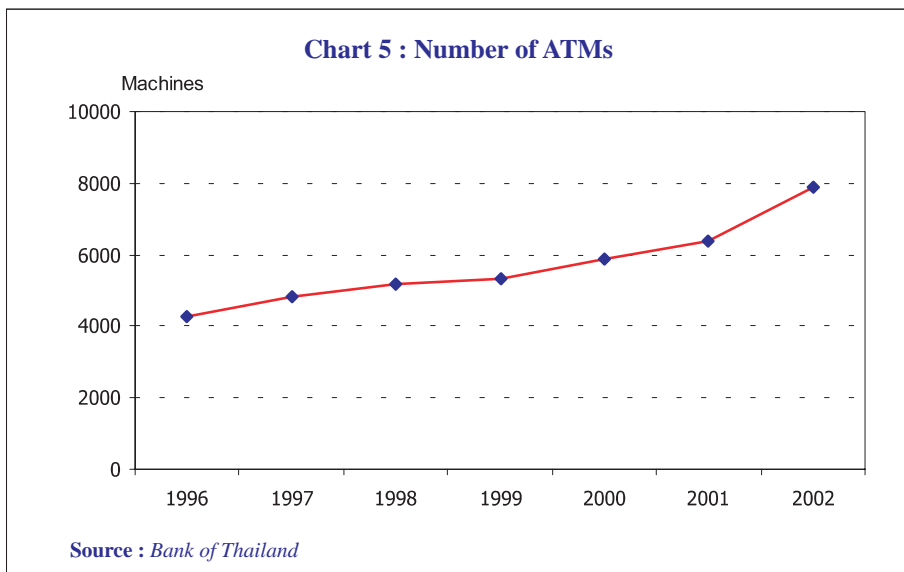
Chart 4 shows the changes in branches of commercial banks, specialized financial institutions and postal offices between 2001–2002. In 2002 Thai commercial bank branches continued to grow despite the consolidation of Bangkok Metropolitan Bank and Siam City Bank on April 1, 2002. Bank Thai started operations on April 22, 2002, bringing the total number of Thai commercial banks to 13 as of end-2002. Alternatively, foreign commercial bank branches closed operations due to the merging of their head offices overseas in 2001, resulting in the reduction of foreign commercial bank branches in Thailand, which numbered 18 in end-2002. Branch expansion by all commercial banks was at 13.69 percent, as compared to specialized financial institutions, including the Government Savings Bank, the Government Housing Bank, and the Bank for Agriculture and Agricultural Co-operatives, which was 1.83 percent. Branch expansion for the postal office was reduced by 1.88 percent to comply with branch improvement plans and the automated counter system plan in late 2001. This replaces branch expansion, which already has nationwide coverage, along with the need to improve the Pay at Post service, which serves as a payment channel for utility services and for goods from the public sector, state enterprises and private sector. This has been a popular channel and is increasingly convenient and fast.

4.1.2 ATM

Since 1983 ATMs have started to play a role in cash withdrawal and deposits, and have been widely popular for the general public, along with reducing the work of bank branches. Chart 5 shows the continued growth rates for ATMs since 1996. In 2002 ATM installation grew as high as 24 percent from 2001, making the total number of ATMs nationwide 7,885 machines.

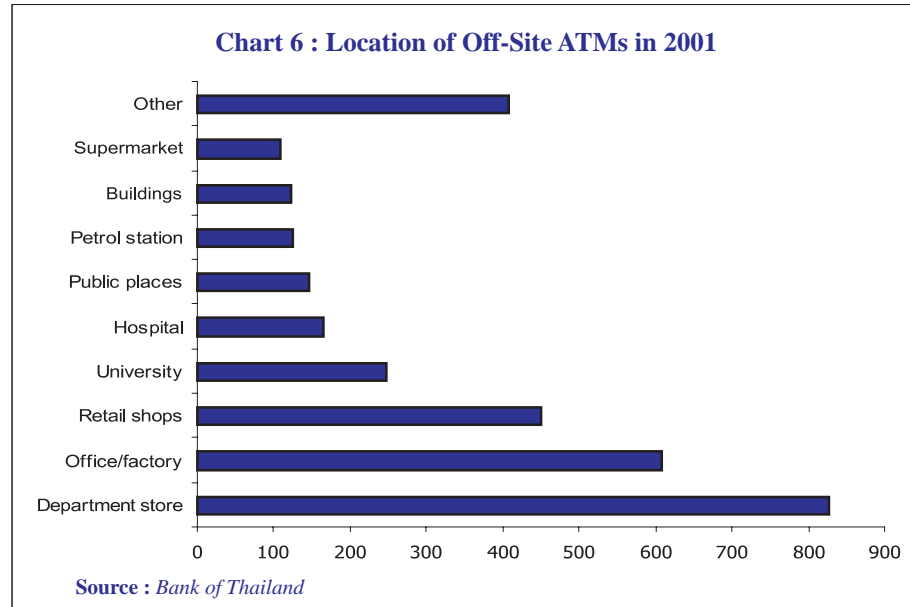
4. Payment System Statistics

This growth originated from local commercial banks, the Government Savings Bank and the Government Housing Bank, while there was no installations from foreign commercial banks, which have four of 18 membership seats in the ATM Pool, between 2001–2002.



Since 1993 commercial banks have been encouraged to join their ATM networks into a nationwide network (ATM Pool) in order to provide the public with the convenience in using ATM cards to withdraw or deposit cash, without any charges, with any machine regardless of the bank. But since the ATM card-issuing bank still has to pay charges for the bank owning the ATM machine for the customer, this has resulted in greater demand for ATMs in order to service a commercial bank's own customers.

4. Payment System Statistics



Research results on the location of ATM installations in 2001 suggest that a majority is branch-based, including both inside and outside the branch office. Chart 6 shows the installation of off-site ATMs to provide customer convenience in daily 24-hour services. A majority of the off-site locations include department stores, business offices or industrial factories, retail and convenient stores, and universities, respectively.

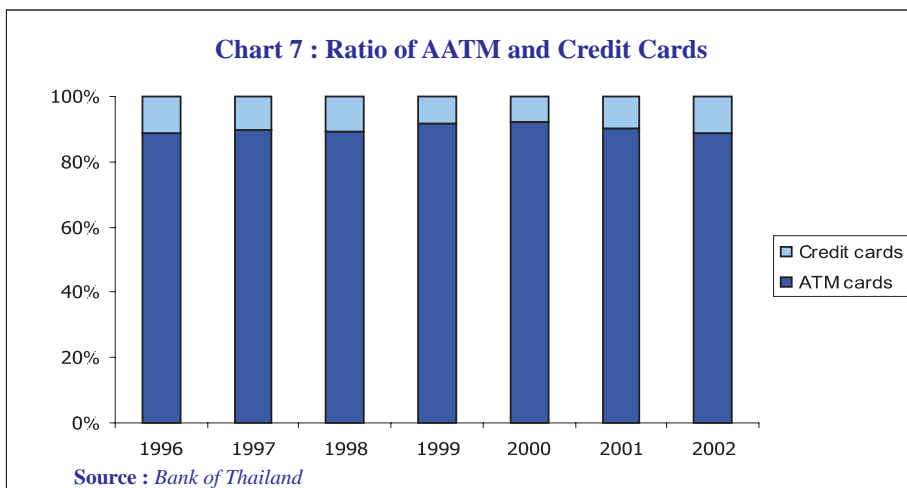
4.1.3 ATM and Credit Cards

Plastic cards such as ATM cards, debit cards, credit cards, and pre-paid cards, have become increasingly popular payment means as a cash substitute. Chart 7 shows the proportion of ATM and credit cards between 1996-2002, where the ratio of ATM cards is 90 percent of the total number of cards. This is mainly due to the ease in ATM subscriptions where a deposit account with a bank is only required.

Nevertheless, there is an interesting observation in the growth of credit cards between 2001-2002. While the growth rate

4. Payment System Statistics

in 2000 was approximately eight percent, the rate for 2001 jumped to as high as 45 percent. A main reason stems from the market competition in credit card fees from Thai commercial banks, foreign commercial bank branches and non-financial firms, that seek to increase their customer base. However, credit card growth rates slowed down in 2002 as a result of the Bank of Thailand's notification on the official control of **credit card business** on December 12, 2002. This stipulated a minimum monthly salary of cardholders at 15,000 Baht, after previously notifying the relaxation of minimum salary requirements to 7,500 Baht in April 2002.

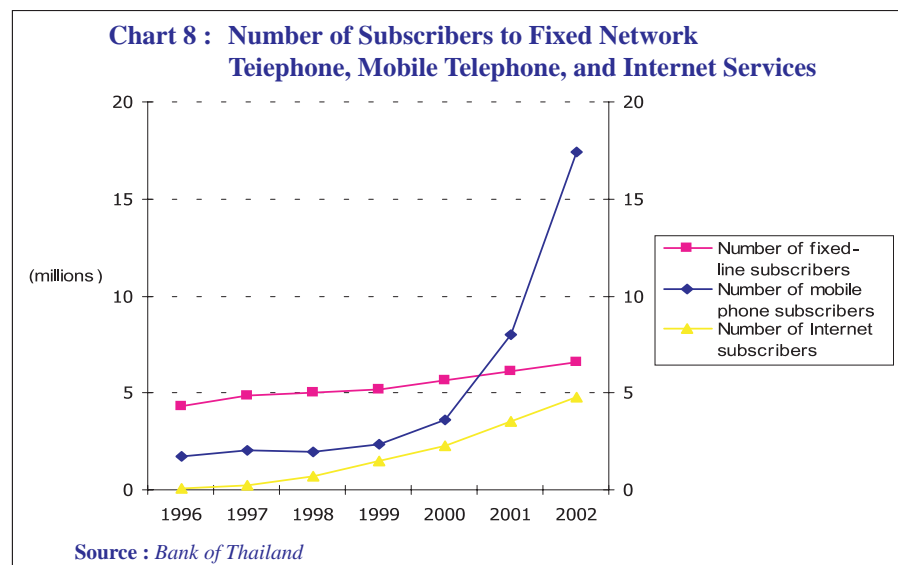


4.1.4 Fixed Network Telephone, Mobile Telephone, and Internet Subscribers

Chart 8 shows the number of fixed network telephone, mobile telephone and Internet service subscribers between 2001–2002. Fixed network telephone subscribers continued to grow at an average rate of approximately seven percent, which was not relatively high. Mobile telephone and Internet subscribers

4. Payment System Statistics

increased at higher rates, particularly for mobile telephone subscribers between 2001–2002, where growth was doubled for each year, from 3.64 to eight million subscribers from 2000-2001, and later to 17.41 million subscribers in 2002. Growth rates for 2001 and 2002 were 120 percent and 118 percent, respectively.



In addition, the penetration rates of fixed network telephone, mobile telephone and Internet service subscribers, indicate the opportunity and trend in using mobile telephones as a payment channel, where many commercial banks and companies have started to provide mobile banking services for the payment of goods and services in 2002.²

² See Table 2 on Technological Infrastructure (end of report)

4. Payment System Statistics

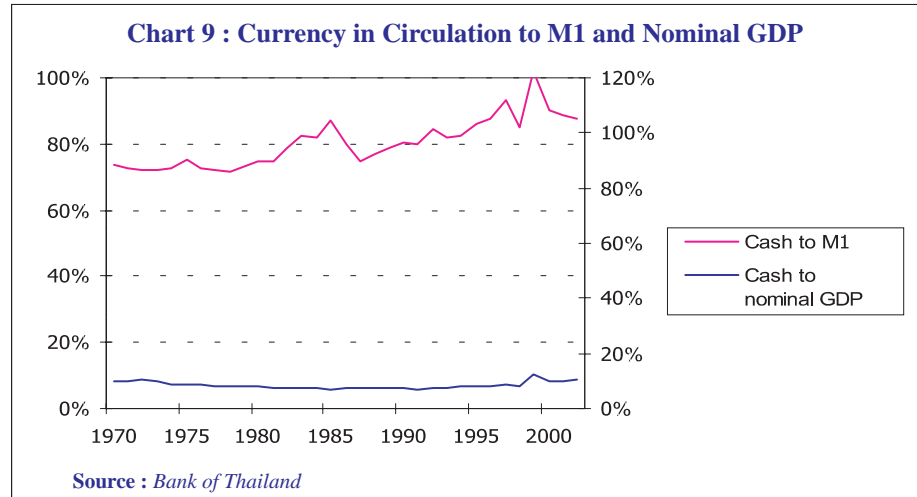
4.2 Cash Usage

The *Bank of Thailand Act* of 1942 gives the Bank of Thailand the sole power in printing and issuing bank notes in the country. The supply of bank notes issued each year depends on the economic conditions and the demand for different denomination of bank notes by the public. Issuance of new bank notes requires currency reserves to back the full value of the bank notes.

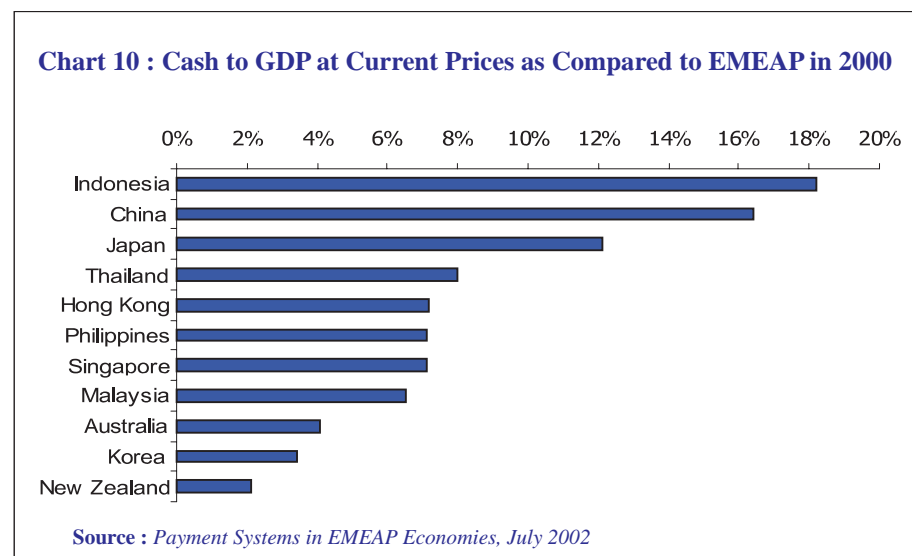
Cash is a basic and widely accepted means of payment. Cash is a component of M1, which is currency held by the public, and comprises of bank notes and coins, transferable deposits of businesses and households held in commercial banks, and the narrow money supply. The main purpose is the payment for goods and services by businesses and the general public.

Chart 9 shows the ratio of cash usage by businesses and the general public in Thailand between 1970-2002. Cash usage to M1 is relatively high, at approximately 80 percent, and indicates an upward trend with relatively minor changes. An exception is during periods of major crises, such as between 1983-1985, where finance companies faced problems and authorities withdrew the licenses from 15 firms leading to a financial crisis outside the economic system. The 1997 economic crises also caused a lack of confidence in financial institutions. The proportion of cash during these periods therefore experienced irregular increases, such as in the fear of the Y2K problem in 1999 that led to higher cash withdrawals for holding and using.

4. Payment System Statistics



Similarly, the ratio of cash to GDP at current prices was relatively stable at eight percent. This suggests relatively minor changes in the use of cash as a major payment means, except for cases where important incidents like the fear of the Y2K problem in 1999

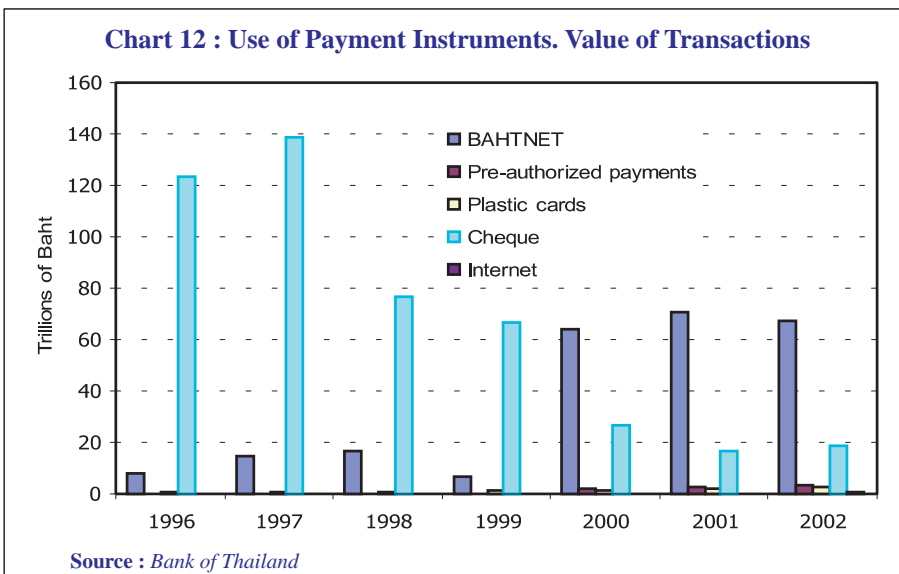
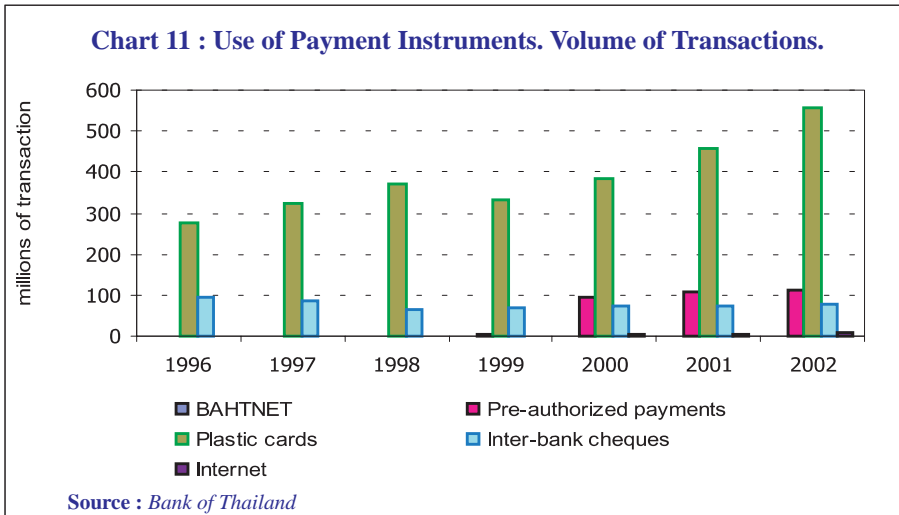


4. Payment System Statistics

Chart 10 shows the ratio of cash to GDP at current prices for 11 member countries of EMEAP (the Executives' Meeting of East Asia-Pacific Central Banks and Monetary Authorities). The ratio for Thailand was eight percent, being the fourth highest following Indonesia, the People's Republic of China, and Japan, where the ratio was 18 percent, 16 percent, and 12 percent, respectively.

4.3 Electronic Payments

Charts 11–12 show the volume and value of various payment instruments between 1996–2002.



4. Payment System Statistics

4.3.1 BAHTNET

BAHTNET is an electronic funds and securities transfer system that links the Bank of Thailand with members using the service, including local commercial banks, foreign commercial banks, finance companies, finance and securities companies, specialized financial institutions, the public sector, and other institutions. BAHTNET started operations in 1995 with relatively low transaction volume and value during the early phase, until on March 10, 2000, when major cheque-based inter-bank transactions were directed to BAHTNET. This included inter-bank lending, foreign exchange transactions, funds transfer of non-resident Baht accounts, and bonds and securities trading. This resulted in a sharp increase in BAHTNET transaction volume since 2000, and in 2002, transaction volumes grew to 803,000. BAHTNET transaction values adjusted slightly downwards to 67,095 billion Baht due to the large decrease in inter-bank transaction values. Third party funds transfer by the business sector grew, resulting in a slight change downward for total transaction values in 2002.

4.3.2 Pre-authorized Funds Transfers

Data on pre-authorized funds transfer comprises of data on funds transfers across the accounts of the same bank³ and data on retail inter-bank funds transfer services provided by the Bank of Thailand under the SMART system. In 2002 funds transfer transaction volumes totaled 113 million valued at 3,109 billion Baht. The total growth rate was approximately 6.5 percent, resulting from the increase of Thai commercial bank's direct credit transactions that originate from their own customers and from inter-bank services offered through the SMART system.

³ Data collection started in 2000.

4. Payment System Statistics

4.3.3 Plastic Cards

Plastic cards (ATM and credit cards) have become payment means whose popularity have increased rapidly. This includes credit cards issued by both financial institutions and non-financial institutions where there has been increased competition in expanding the customer base between 2001–2002. Commercial banks have also increased the provision of payment services through ATMs such as in inter-bank funds transfers, utilities payment, and goods and services payment, increasing the number of ATM transactions. In 2002 ATM card usage numbered 558 million transactions valued at 2,210 billion Baht with a growth rate for transactions of 22 percent as compared to 19 percent in 2001. The growth rate of ATM transaction values decreased by half since 2001, which stood at 31.5 percent, while there was a sharp increase of 79 percent in 2002 in the growth rate for credit cards transaction values. This resulted from the Bank of Thailand's relaxation of minimum salary requirements by cardholders in early-2002 that decreased to 7,500 Baht, leading to the expansion of customer base by financial institutions and the promotion of credit card usage through increased public relations. This growth continued to late-2002, although the Bank of Thailand returned to the minimum monthly salary requirement of cardholders set at 15,000 Baht in order to control the growth of personal credit extended through credit cards, which could have risk implications for the whole financial system.

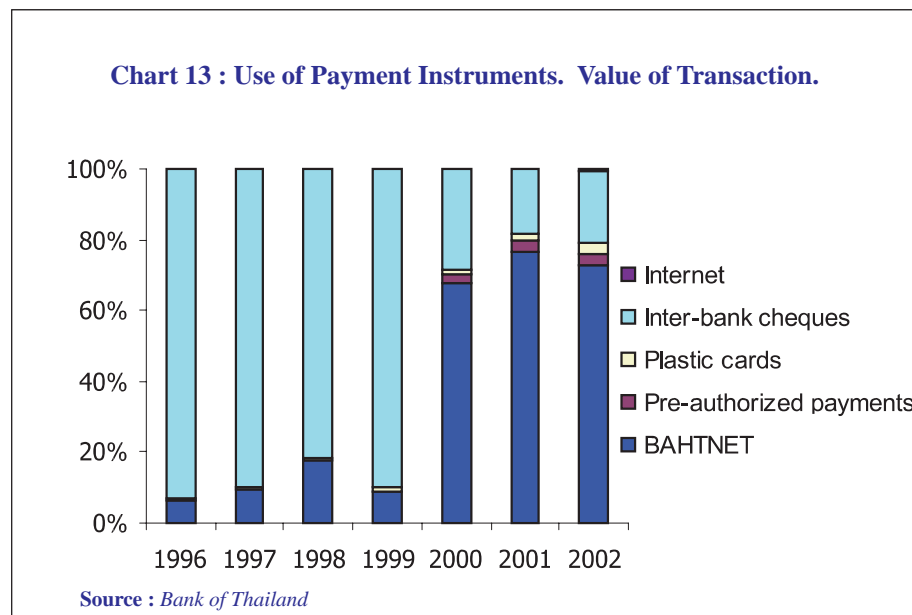
4.3.4 Internet Banking

Internet banking started in 2000 with five banks seeking approval in offering the service through the Internet.⁴

⁴ Krung Thai Bank, Kasikornbank, Bank of Asia, Tokyo-Mitsubishi Bank, Deutsche Bank.

4. Payment System Statistics

The number of transaction volume and value remained low at approximately 3.3 million transactions valued at 280 million Baht. In 2002, the number of banks seeking approval increased by six bringing the total to 11 banks, and increasing the total number of transactions to 6.2 million transactions or 8.6 billion Baht.⁵ In 2002, positive growth prospects and increased strength in the Thai economy brought about a clear growth of transactions by the business sector. Also, seven more commercial banks⁶ sought approval for providing Internet banking services, bringing the total to 18 banks. Transactions increased to nearly ten million and were valued as high as 730.5 billion Baht, with a majority of transactions originating from B2B e-commerce of Thai commercial banks and foreign commercial bank branches.

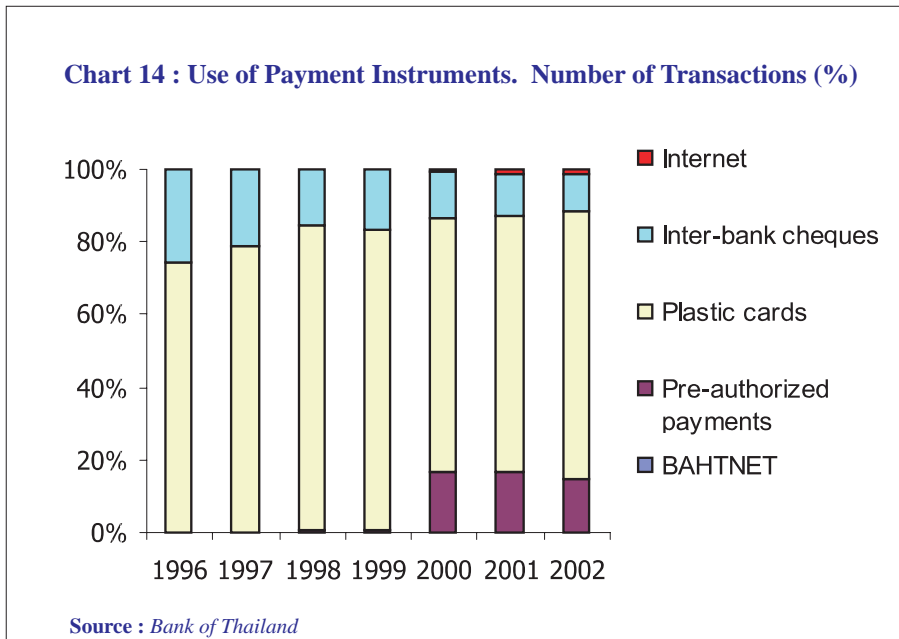


⁵ Bangkok Bank, Bank of Ayudhya, Siam Commercial Bank, Citibank, Hong Kong Shanghai Bank, Mizuho Corporate Bank.

⁶ Thai Military Bank, Bank Thai, BNP Paribas, Standard Chartered, JP Morgan Chase, ABN Amro NV, Bank of America.

4. Payment System Statistics

Chart 13 shows the proportion of transaction values for various payment instruments. Prior to introducing measures for financial institutions to channel four types of transactions through BAHTNET, including inter-bank lending, foreign exchange transactions, funds transfer of non-resident Baht accounts, and bonds and securities trading, inter-bank cheques was the payment instrument with the highest proportion at approximately 90 percent. After introducing the measure on March 10, 2000, BAHTNET, which is an inter-institution large-value funds transfer system, had the largest proportion of transaction values at 70 percent. Inter-bank cheque proportions were reduced as the second highest at 20 percent. Chart 14, however, shows plastic cards - ATM and credit cards - as the payment instrument with the highest proportion of transaction volume. Pre-authorized funds transfers and inter-bank cheques follow this, respectively.



4. Payment System Statistics

4.4 Inter-Bank Cheque Clearing

Cheques are a popular payment means, particularly in the business sector, due to its convenience in usage, low fees, and use as legal evidence.

The Bank of Thailand has provided inter-bank electronic cheque clearing services since July 16, 1996 for Bangkok and its vicinity. Provincial cheque clearing services started on September 15, 1997 for areas outside Bangkok and its environs. Provincial cheque clearing comprises of (1) cheque collection in the same clearing district and (2) bill for collection (B/C).

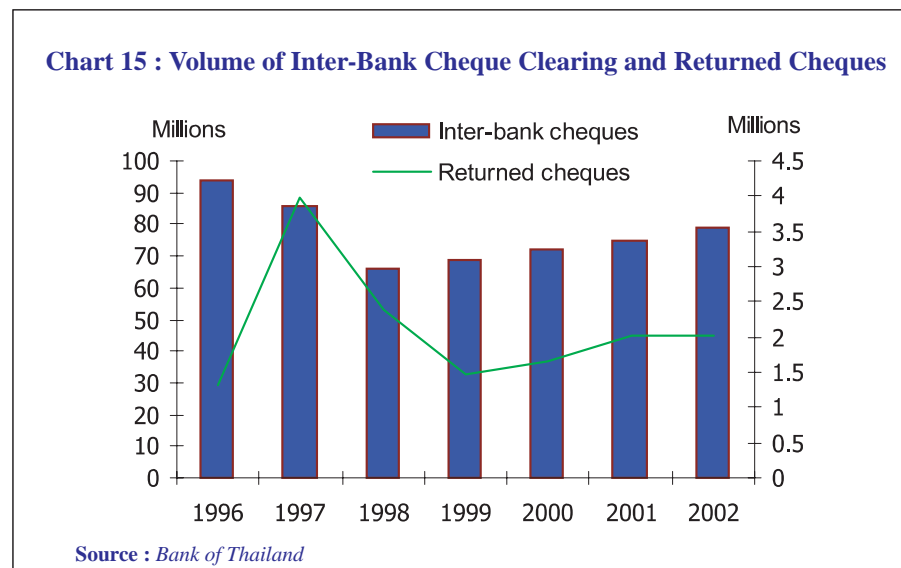


Chart 15 shows the volume of inter-bank cheques and returned cheques during 1996-2002. In 1997 the number of cheques started to decrease due to economic problems and fell to its lowest level in 1998. Economic recovery led to volume increases, but growth was relatively minimal at three to five percent due to alternative and convenient electronic payment channels.

4. Payment System Statistics

The proportion of inter-bank cheques mainly comprises of cheques in Bangkok and its environs with an average ratio of 75 percent. But this proportion slightly decreased in 2002 due to the increased rate of cheque usage in the provinces.

The Bank of Thailand's objective to reduce risk in the payments system that is posed by high-value cheques led to the introduction of measures for financial institutions to move four types of transactions from cheques into BAHTNET. This included inter-bank lending, foreign exchange trading, funds transfer of non-resident Baht accounts, and bonds and securities trading. The average value per cheque decreased sharply from 1–1.6 million Baht between 1996-1999 to 0.4 million Baht in 2000, and to approximately 0.2 million Baht between 2001–2002. These changes were mainly for cheques in Bangkok and its environs, as there were minor changes in the average value per cheque for provincial cheques with value per cheque between 0.1–0.08 million Baht. Comparatively, clear changes were seen for cheques for Bangkok and its environs where the value per cheque was as high as 2.1 million Baht in 1997. After the economic crisis, the value reduced to 1.4 million Baht in 1998 and 1.3 million Baht in 1999, and in 2000, when measures were introduced to move high-value cheques into BAHTNET, the value decreased to 0.5 million Baht per cheque, and by 2001–2002 to 0.3 million Baht per cheque.

Chart 15 shows major changes for returned inter-bank cheques, which are primarily due to the lack of funds, when the economic crisis started in 1997. The volume of returned cheques increased sharply with a ratio of nearly five percent of the total number of inter-bank cheques, which rose from 1.4 percent in 1996. However, this ratio has a declining trend during 1998-1999, with a slight increase in 2001-2002. In 2002, the ratio of returned cheques was approximately 2.5 percent of total inter-bank cheques.

4. Payment System Statistics

4.5 Postal Payments

Postal payment services can be divided into four major groups: domestic money order, domestic postal orders, postcheque, and international money order. Domestic money orders are the most popular and have the highest volume of transactions with an annual average of 86 percent of total transaction volumes and annual average of 96 percent of total transaction value.

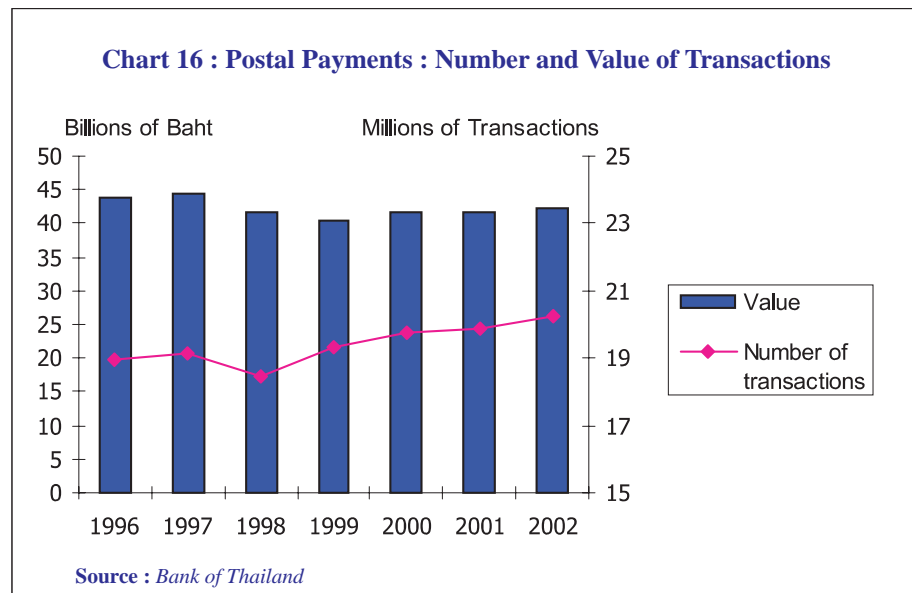


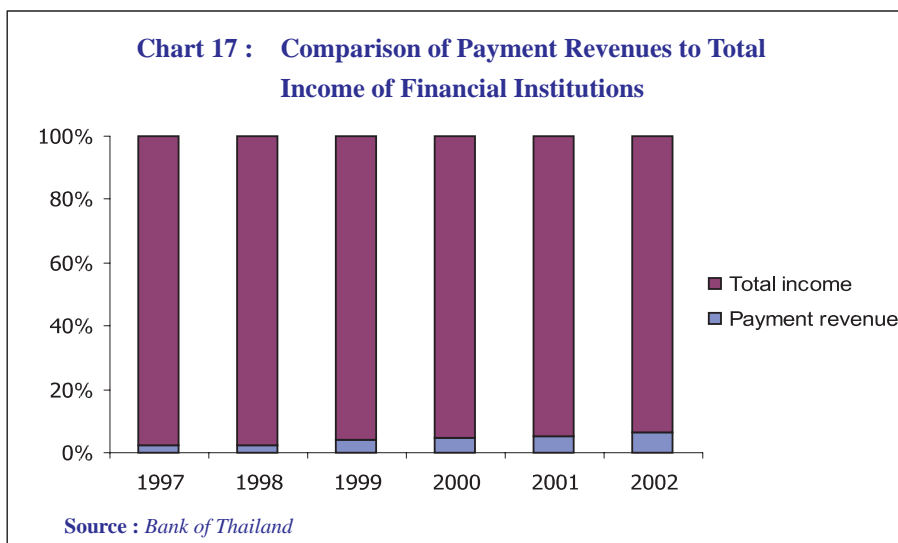
Chart 16 shows the total number and value of transactions for postal payments. After the economic crisis of 1997, the decline in the number and value of transactions could be clearly seen in 1998. However, improved economic prospects in 1999 adjusted the number of transactions upwards, but with slightly lower values, due to the continued economic recession that led to fewer postal payments. Since 2000, there were improvements to postal payment services, along with the use of on-line technology for nationwide communications under the Counter Automation System Project (CA).

4. Payment System Statistics

In addition, there was an expansion of the Pay@Post service for various agencies such as payments for water supply, electricity, fixed-line telephone, mobile phone, credit card bills, goods, life insurance, annual automobile taxes, and others. Although there has been a continued growth rate for both the transaction volume and value, this has been very low at one to two percent annually. This is due to the popularity of other electronic payment channels and the limitations of cash usage for postal payments, which has been suitable for low-value transactions. The average value per transaction for postal payments in 2002 was approximately 2,100 Baht, slightly decreased from around 2,300 Baht in 1996.

4.6 Sources of Payment Revenues

After the economic crisis, the income of financial institutions, comprising of interest and dividend income, and non-interest income, continued to have a downward trend, but there was an increase in the growth rate prospects for payment income.



4. Payment System Statistics

Chart 17 shows continued growth in the ratio of payment revenues as compared to the total income of commercial banks, increasing from two percent in 1997 to seven percent in 2002. Thai commercial banks maintain the largest share at an approximate average of 84 percent. However, there was a large decline in the growth rate for Thai commercial bank payment revenues in 2002 from 20 percent in 2001 to ten percent in 2002, when compared to foreign commercial bank branches, where the growth rate changed from negative in 2001 to three percent in 2002.

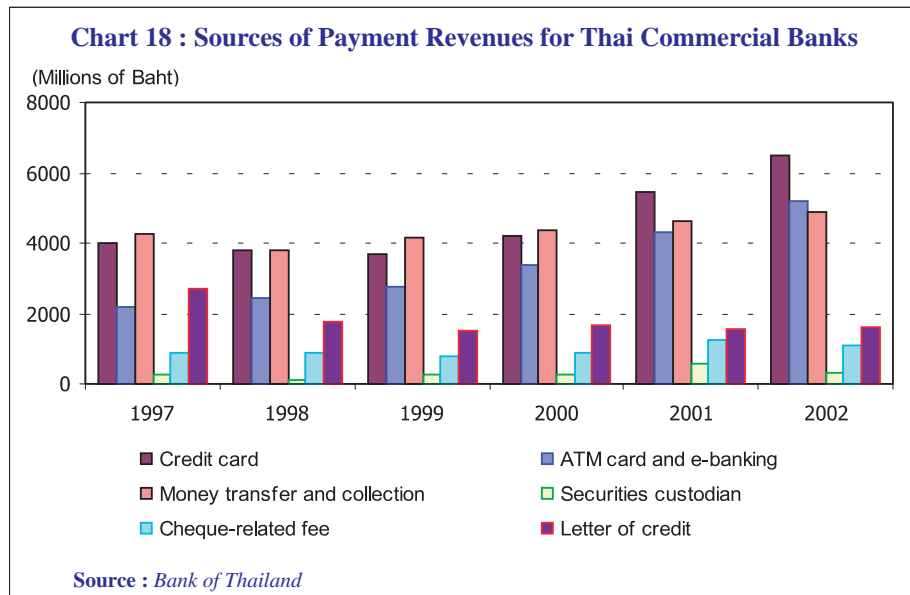
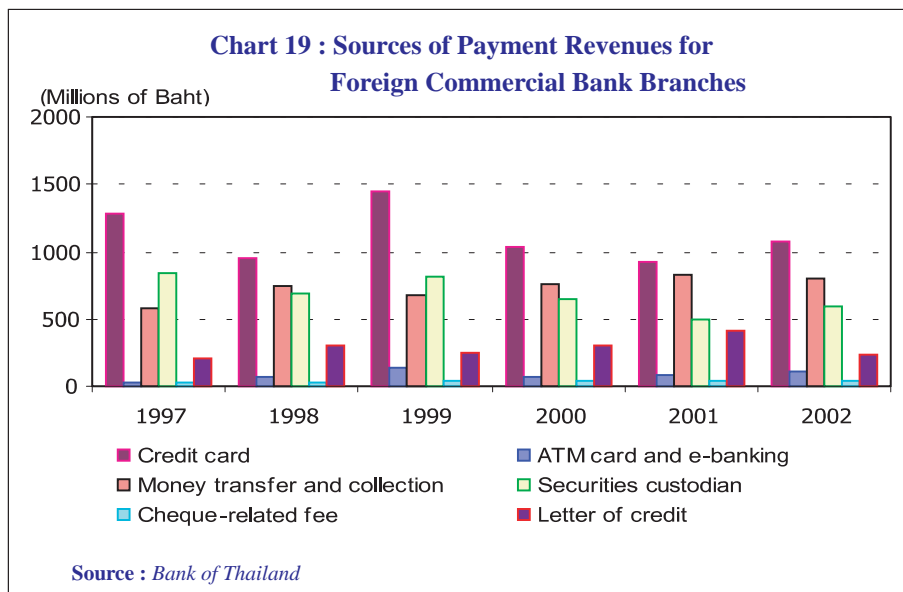


Chart 18 shows the structure of payment revenues of Thai commercial banks. A major source is revenue from credit card fees, which has the largest proportion and high growth prospects since 2000. This is followed by revenue from ATM cards and electronic banking where Thai commercial banks have given more importance to during these past three years, and from money transfer and collection where growth rates have been relatively constant and changed slightly.

4. Payment System Statistics

Similarly, the major source of payment revenue for foreign commercial bank branches was from credit card fees, which have improved since 2001. Also, there has been good growth prospects for revenues from securities custodian, and ATM and electronic banking since 2001, although their share may be lower than aforementioned sources. (Chart 19).

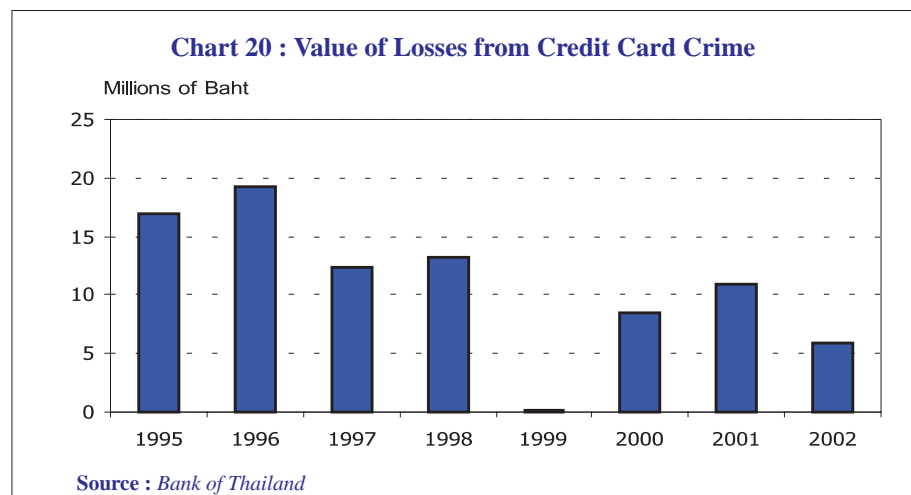


4.7 Credit Card Crime

Although credit cards have received wide popularity among consumers, due to their increased usage promotion during these past three years by local and foreign commercial banks, and also non-financial institutions, credit card crime has created a lack of confidence in credit card payments. This has led to card payment values that are not relatively high with value per credit card of approximately 1,950 Baht per day in 2001 and low increases to 2,240 Baht per day in 2002.

4. Payment System Statistics

Credit card losses mainly arise from card fraud from cardholders, or from co-operation between merchants and cardholders. Chart 20 shows credit card losses reported to the Economic Crime Investigations Division[u1] of the Royal Thai Police, which are proportionately low. While credit card losses were approximately 5.8 million Baht, the value of credit card transactions was 168 billion Baht, or 0.003 percent, in 2002.



5. Key Developments in the Payments System

5.1 Domestic Developments

5.1.1 Bank of Thailand Payment Services

The Bank of Thailand, acting as the country's central bank and provider of major payment services, has increased its role in the oversight of payment systems belonging to both financial institutions and non-financial institutions, while reducing its own role as payment service provider in the future. Increasing efficiency and reducing risks in the payments system have been emphasized, with efficiency improvements made in payment services owned and provided by the Bank of Thailand during 2002, and future efficiency improvement and developments plans. This includes the following :

5.1.1.1 BAHTNET

The Bank of Thailand has provided BAHTNET services for funds transfer through real-time gross settlement (RTGS) and for securities transfer with similar features together with delivery versus payment. The latter services started on December 11, 2001. In order to serve user demands for more efficiency, the Payment Systems Group and the Information Technology Group have enhanced BAHTNET in the areas of data preparation, data inquiry, and report downloading. These services started on February 2002. In addition, an evaluation form for BAHTNET was developed for users to evaluate and comment on further improvements to the service, which would be used as information to develop improvement guidelines by the Payment Systems Group.

- **ILF Improvements**

The Payment Systems Group and the Information Technology Group have jointly developed improvements in

5. Key Developments in the Payments System

the intraday liquidity facilities (ILF) system. This includes moving bonds used as collateral for ILF into the book entry system, calculating their values based on mark to market, and determining haircuts with variable rates based on the type of bonds to reduce the market risk and credit risk to the lender - the Bank of Thailand. In addition, the ILF system has been improved to respond to business requirements and to link automatically with other systems. The new ILF system is expected to be in service in July 2003.

- **Acceptance of New BAHTNET Users**

In 2002 the Payment Systems Group accepted five new users of BAHTNET. These are divided into two finance companies, including Ayudhya Investment and Trust Public Company Limited and Bualuang Finance, and three securities companies, including KGI Securities (Thailand) Plc., SCB Securities Co., Ltd., and SG Asia Credit Securities Co., Ltd. In addition, there were two additional associated users, including the National Securities Company Limited and the Bank of Thailand Accounting Group's General Expense Section. Both new and associated users started to use the service on June 2002.

- **Promoting Efficiency and Reducing Risks in the Delivery versus Payment of Government Securities**

The Bank of Thailand has considered improving efficiency and reducing risks in government securities payments by conducting studies and holding discussions with the following parties: Bank of Thailand internal departments, consultants from the Reserve Bank of Australia and the World Bank, Ministry of Finance, Office of the Securities and Exchange Commission, the Stock Exchange of Thailand, Thailand Securities Depository Co., Ltd. and financial institutions. In sum the implementation guidelines are as follows: increase delivery versus payment, promote scripless

5. Key Developments in the Payments System

securities, prepare legal foundations for net settlement, and consider moving the function of delivery versus payment of government securities to other institutions.

- **Studies on BAHTNET Cross-Border Linkage**

The Bank of Thailand formed a working group to study guidelines for linking Thai and international payment systems on January 1, 2002. The objective was to examine the feasibility for the linkages in order to reduce risks in the trading of foreign exchange and securities transactions, and also to increase the efficiency of retail payment systems. The Payment Systems Group served as the head of the working group and its secretariat.

As for BAHTNET cross-border linkage, three models were reviewed to examine their suitability for Thailand. They include the following : Continuous Linked Settlement (CLS), Hong Kong - Payment versus Payment (HK-PvP), and EMEAP-PvP. Comments from commercial banks were also considered, while the report is expected to be completed within 2003.

5.1.1.2 ECS

- **Project on Efficiency Improvements in the Cheque Clearing System**

The objective of the project is to improve the efficiency of the inter-bank cheque collection system. The project's time frame is between 2002–2004 and is made of two sub-projects as follows :

(1) Project on three-day bill for collection (B/C-3D) across clearing houses. The objective is to speed up the bill for collection time from six to three working days, with the use of signature image technology to verify the payer's signature

5. Key Developments in the Payments System

and to allow member banks to authorize cheque payments for paying banks at the center rather than at branch levels. The B/C-3D system started services since February 14, 2003 with the initial phase covering Bangkok for B/C that have payer bank branches in the central region. Nationwide coverage is expected in the future.

(2) Project on cheque truncation. The objective is to develop inter-bank cheque collection with the use of cheque image in substitute of physical cheques. This allows for cost reductions for cheques, particularly for sorting and transportation costs, and reduces the risk of losses in the collection process. Also, it serves as a key foundation for the development and expansion of the cheque collection area in Bangkok. The Bank of Thailand has improved cheque standards and announced it effective since January 1, 2003, in order to support cheque image development in the proceeding phases.

5.1.1.3 SMART

- **Project on Electronic Retail Payment Systems Improvement**

The project aims to improve the efficiency of electronic inter-bank retail payment systems to serve as a payments infrastructure for funds receipts and payments from the government sector, along with the market's payment needs in the present and business expansion in the future. The time frame of the project is between 2001-2003, with activities carried out in 2002 including the following :

(1) Encourage the government sector to utilize electronic payment systems for funds transfer transactions. From 2003 to 2005, the Bank of Thailand will act as the sending bank in the SMART system for the Comptroller General's

5. Key Developments in the Payments System

Department under the project to reform the payments system. This is particularly for salary payments, wages, and government pensions. Salary payments under the Comptroller General's Department and government pensioners in 2002 were effected through the system in January 2003.

(2) Improve electronic retail payment systems. The project aims at improving efficiency in the areas of convenience and speed for both users in the public and private sectors. The plan includes extending the data sending period for member banks, speeding up settlement time, and developing an on-line report downloading system.

(3) Study on the development guidelines for a cross-border payment system for ASEAN member countries (ASEANPay). The project aims to increase the competitive capabilities of ASEAN member countries. The first meeting was held on October 18, 2002 between the Bank of Thailand and the Monetary Authority of Singapore and Bank Negara Malaysia. The following phase would involve the preparedness of each country and the feasibility for joint development.

The Bank of Thailand will have a role in the oversight of systemically important payment systems (SIPS), whereby the failure of one participant may have major consequences to the whole national payments system. Therefore, oversight of their management is required, including design and operations that are efficient, safe and compliant with international standards such as the BIS Core Principles for Systemically Important Payment Systems. The Bank of Thailand will organize seminars to increase understanding and to welcome comments from relevant parties, and will evaluate the payment system according to the BIS Core Principles accordingly.

5. Key Developments in the Payments System

5.1.2 Private Sector Payment Services

Thailand presently has a wide range of payment means and services as commercial banks compete in introducing financial products and services to respond to different customer groups. New product development has focused on convenience, speed, safety and around-the-clock services (Anytime, Anyplace, Anywhere).

In addition to the competition between commercial banks, non-bank private companies have also started to provide more payment services, particularly for credit cards and goods and service payments (Bill Payment). Therefore, commercial banks have developed new financial products and services such as self-service machines, Web ATM, and sub-branch/kiosks in order to provide customer convenience and to maintain their market share.

5.1.2.1 *Self Service Machine, Web ATM*

Many commercial banks have applied new financial technologies to provide customer services. One of these services is the self-service machine that provides 24-hour services such as express drop box, passbook update machine, cash deposit machine, and ATMs. This is to serve customer needs, create a technology leader image, increase market share, compete with private sector counter services, and reduce branch-level costs.

ATMs initially focused on services such as cash withdrawal, and intra-bank and inter-bank funds transfer. Presently, commercial banks have expanded and developed ATM services to provide convenience, speed and replace counter services. Customers may effect payments for goods and services, taxes, mobile phone fees, utility charges, international distance call charges, pre-paid card payments, and student registration fees,

5. Key Developments in the Payments System

for example. In addition, Web ATMs have been developed to allow customers to purchase goods and to make payment through ATMs such as in reserving cinema tickets and in making airline reservations, and others.

5.1.2.2 Sub-Branch/Kiosks

Commercial banks have presently introduced new forms of sub-branch and kiosks services, which emphasize modern layouts for the branches and the availability of equipment to provide customer convenience in using various financial services efficiently. The location for these new types of branches are focused in business areas, department stores, universities, and office buildings to provide customer convenience in effecting daily transactions without having to spend more time in visiting a bank.

5.1.2.3 Debit Card

During the past two years, commercial banks have sought to expand the market for debit cards by adding features such as cash withdrawals like ATM cards, payment for goods and services through the Internet, and e-cash overdraft like credit cards. In addition, some commercial banks have added security in using the cards by requiring the cardholder's signature when purchasing goods or services.

Commercial banks target the customer group for debit cards differently from credit cards by focusing on teenagers, students, and people with no fixed income or without the full qualifications for a credit card application.

There has recently been an effort by a group to cooperatively use debit cards. This involves a project to use debit cards for transportation fees (Mass Transit Electric Railway of Thailand; Bangkok Mass Transit Authority, Micro Bus, BTS electric train) and for goods and services payment at convenience shops such as C. P. Seven Eleven. This is currently open for bidding by private companies.

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5.1.2.4 *Credit Card*

Credit cards have expanded rapidly during the past two years due to the competition from non-bank private companies and department stores that have expanded the customer base much more widely than commercial banks. This encompasses low and middle income customers that commercial banks have been unable to service as they are restricted by the minimum salary regulations set by the Bank of Thailand.

The number of credit card holders increased sharply from 2.1 million cards during the second quarter of 2001 to 2.8 million cards in the second quarter of 2002. The value of credit card payments rose from 35,179.5 million Baht to 44,605.7 million Baht, respectively. However, the Bank of Thailand issued new regulations to assure consumer equitability by monitoring that commercial banks and non-banks do not take advantage of consumers. The trend for credit card usage continues to grow due to the increase of card service points, commercial bank market creation, and customer base expansion.

5.1.2.5 *E-Money*

Use of e-money started in Thailand since 1999. They were used for the payment of the microbus fare, and goods and services at university bookstores. E-money usage in Thailand has not been widespread due to the high technology cost and the limited scope of service area. It is mainly used at educational institutions for registration payments, which dominantly uses ATM and debit cards in substitution. Growth trends for debit cards are stronger than e-money.

5.1.2.6 *Internet Banking*

Internet banking and on-line banking are recent services provided by commercial banks to both corporate and general customers. There is still room for market expansion

5. Key Developments in the Payments System

for Internet banking in Thailand, as commercial banks are able to provide customers, both locally and abroad, with 24-hour services. A majority of commercial banks have turned to promoting Internet banking due to its convenience, speed, cost reductions of branches, and the modern banking image.

There is a continuing growth trend for Internet banking due to market creation by commercial banks and the increase in Internet subscribers. Commercial banks have turned to competition in Internet banking, from simply providing financial information to providing funds transfer and payment systems, which includes own-account transfer, third-party funds transfers, good and services payment, and e-Bill Presentment and Payment (eBPP).

In addition to intra-bank services, there are also inter-bank funds transfer services, including companies, shops, and individuals through the Internet (e-pay). This includes seven commercial banks as follows: Bangkok Bank, Kasikornbank, Bank of Ayudhya, Bank Thai, Thai Military Bank, Siam Commercial Bank, and Krung Thai Bank.

5.1.2.7 Mobile Banking

Commercial banks have sought to expand their market and customer base through the mobile banking channel. Mobile banking remains limited as users need WAP technology, which has high service charges.

5.1.2.8 E-Commerce

In addition to Internet banking and mobile banking, e-commerce expansion has led commercial banks to increase payment gateway services that cover both B2B supply chain and B2C between business and customers whom are also commercial bank customers.

5. Key Developments in the Payments System

Moreover, commercial banks have cooperated with the Revenue Department in collecting tax payments through the Internet. Corporate taxes were collected during the past year and services have expanded to personal tax payment presently. Thailand is the second country in ASEAN, in addition to Singapore, where taxes can be paid through the Internet.

5.1.2.9 Postal Payment

The post office presently has an increasing role in providing payment services, in addition to domestic money orders, domestic postal orders and international money orders. During the past three years, the postal office has expanded its scope of payment service widely to include the following: goods and services payments, utilities payment, various fee payments (Pay at Post) such as for mobile phones, overseas calls, tax payments, car registration, visa fees, and credit card payments for foreign commercial bank branches. New modern technology and office improvements provided improved customer convenience and efficiency.

As postal offices are located nationwide, service expansion has provided customers with a convenient financial services delivery channel, while payment services may have an increasingly important role in the future.

5.2 International Developments

5.2.1 International Trends in New Payment Instruments

Popular non-cash payment methods in most developed countries, particularly Europe, are credit transfers. Direct debit, card payment, and postal service follow this, respectively. This is similar to many countries in the Asian region. However, the majority of payment means in Asia remains to be cash and cheques.

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Nevertheless, card and mobile payments are the payment means where there is an increasing trend for wider popularity in the future.

5.2.1.1 Card Payment

An advantage of card payments is the capability to change the features according to diverse consumer needs. This includes credit cards, debit cards, stored-value cards, or retailer cards. The major issues which providers of payment cards should take into consideration are as follows:

(1) Setting of payment card features that are suitable to the diverse needs of card users in order to expand their base

(2) Development of new technology that guarantees the safety of card usage. European countries have increasingly faced major problems in credit card fraud, while the security technology that is widely known is the chip and PIN (personal identification number) system. This enables the verification of both cardholder and card, where the PIN is used in substitute of the current signature, while the chip prevents forgery. The United Kingdom has set 2005 as the year whereby payment cards are required to have both chip and PIN.

5.2.1.2 Mobile Payment

Mobile payments will become an important payment means for micro payments. Countries that are expected to have high usage rates include Japan, the United States, the United Kingdom, and Germany. As for Thailand, the key problems and obstacles that are barriers to mobile payments include the lack of a suitable business model, particularly the share of revenue between commercial banks and mobile phone service providers, which have been set highly individually. This is partly explained by the government concession paid by the phone company that has resulted in high service charges.

5. Key Developments in the Payments System

5.2.2 CLS Developments

The establishment of the CLS Bank is a result of the cooperation between central banks and commercial banks of the G10 member countries, which have sought to eliminate and reduce foreign exchange settlement risk or Herstatt risk.

CLS Bank was established under United States legislation and overseen by the Federal Reserve Bank of New York. CLS Bank will provide settlement services for seven major currencies as follows: US Dollar (USD), Euro (EUR), Japanese Yen (JPY), Pound Sterling (GBP), Swiss Franc (CHF), Australian Dollar (AUD), and Canadian Dollar (CAD). Although the buyer and seller may be at different locations, the system would be payment versus payment (PVP), where the CLS Bank will open an account at the central bank of each major currency in order to use the real time gross settlement (RTGS) system as a channel for funds transfer with members. This service started on September 9, 2002 where the following phase will be incorporating six more currencies as follows: Danish Kroner, Norwegian Krone, Swedish Krona, Singapore Dollar, New Zealand Dollar, and Hong Kong Dollar.

6. Related Developments

6.1 Domestic Developments

6.1.1 BIS Core Principles Compliance Project

The project aims to evaluate the compliance of systemically important payment systems to the BIS Core Principles for SIPS, along with their application. A Thai language handbook of the BIS Core Principles was distributed in 2002 and an initial compliance assessment of payment systems owned by the Bank of Thailand was carried out. This created awareness for the related parties in the Bank of Thailand towards the safety, efficiency, and standards of the payments system operated by the central bank. Also, it serves as a key foundation for introducing measures and as a response to the central bank's strategic plan for 2003-2007 that stipulates adequate and BIS Core Principles compliant payment systems by 2004.

6.1.2 Related Legal Developments

The Bank of Thailand has improved related legislation, during the absence of an explicit payment systems legislation, to give it more power in overseeing payment systems owned or provided by non-financial institutions due to the original scope of responsibilities that has specifically focused on financial institutions. The private sector has presently entered into business areas that are similar to financial institutions such as credit card issuance and electronic money. Improved legislation is sought to create confidence in the efficiency and safety of the national payments system. Legislative improvements include Article 5 of the draft Financial Institutions Business Act, which is under review by a joint committee, or Article 66 of the draft Bank of Thailand Act, which is currently under improvements to give more oversight power of the payments system to the Bank of Thailand. As for the Electronic Transactions Act, which has

6. Related Developments

been effective since April 3, 2002 and guarantees the equivalent status of electronic data as paper, the issuance of a successive Royal Decree is required. The Bank of Thailand and NECTEC is currently conducting joint studies on the suitable guidelines for legislation that will oversee risks and efficiency in the payments system.

6.2 International Developments

6.2.1 Guidelines and Regulations in the Payments System

The Bank for International Settlements (BIS) has set policies, standards, and best practices related to payment systems to strengthen financial stability as follows:

6.2.1.1 Core Principles for Systemically Important Payment Systems

This includes ten core principles to create safety and efficiency in systemically important payment systems that have the potential to cause systemic risk, having wider implications to the financial system. Also, the BIS has provided guidelines in considering the features of systemically important payment systems.

6.2.1.2 Policy Issues for Central Banks in Retail Payments

In formulating policy to increase efficiency and safety in retail payment systems and retail payment means, the central bank should consider the following issues :

- Identifying legal or regulatory limitations that are obstacles towards the development of retail payments

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- Promoting competition in retail payments
- Promoting retail payment standards and related infrastructure
- Reviewing or improving central bank payment services to create efficiency and safety, and in addition, ensuring transparency, such as in reviewing access and pricing policies

6.2.2 Cooperation with International Organizations

6.2.2.1 *e-ASEAN Initiative*

In 2000 the ASEAN group concluded an agreement called e-ASEAN Initiative to strengthen the technological capabilities of the region and to increase competitiveness on the world economic arena. In Thailand the National Information Technology Committee established a special subcommittee on e-Thailand, which is chaired by the Minister of Science, Technology and Environment. The subcommittee established a working group on e-Government chaired by M.R. Chatu Mongkol Sonakul. The meeting of the working group and the subcommittee on March 7, 2001 concluded with resolutions to support the implementation of the e-Government project in order to promote and support government agencies in providing more electronic services.

The Bank of Thailand cooperated with the National Electronics and Computer Technology Center (NECTEC) and many government agencies in implementing the e-Government project, which was organized as pilot projects to see concrete results within a two-year period. Government

6. Related Developments

agencies involved in the projects include the following: Office of the Permanent Secretary, Office of the Prime Minister, Office of the Civil Service Commission, National Economic and Social Development Board, Bureau of the Budget, Office of the Auditor General of Thailand, and the National Statistical Office. Areas where the Bank of Thailand is directly involved include public sector management, particularly public-private financial management and standard online public information services such as for citizens, the business sector, and the public sector. This can be summarized as follows:

- Establishment of a public sector payment gateway to support electronic commerce activities. This is jointly developed by the public and private sectors and includes a project to set-up a payment gateway for funds transfer between them. This encompasses the Bank of Thailand and other related government and private agencies such as the Revenue Department, the Comptroller General's Department, and the Office of the Auditor General of Thailand, commercial banks, and other financial institutions.
- Providing online public information services needed by citizens and the business sector, and maximizing the usage of public information such as the Bank of Thailand's Data Management System (DMS).

6.2.2.2 The Executives' Meeting of East Asia-Pacific Central Banks and Monetary Authorities (EMEAP)

EMEAP is the cooperation among central banks of member countries in the Asia-Pacific region and includes 11 central banks as follows: Australia, People's Republic of China,

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Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, and Thailand. EMEAP has a Working Group on Payment and Settlement Systems to conduct joint studies and exchange views on areas of common interest. The working group holds bi-annual meetings with the recent eighth meeting organized by the Reserve Bank of Australia at Sydney during November 21-22, 2002. The Bank of Thailand participated in the meeting of the EMEAP Working Group on Payment and Settlement Systems. This recent meeting focused on the joint consideration among member countries on regional cooperation in payment systems reform, oversight of payment and settlement systems, and sharing of oversight experiences. The working group published two reports as follows : EMEAP Red Book, published in 2002; and Report on Foreign Exchange Settlement Risk in the East Asia-Pacific Region, published in 2001.

- **EMEAP Red Book**

The working group saw the importance of the changing payments infrastructure among member countries and so organized updates to the EMEAP Red Book, which was published in July 2002. Updates were in compliance with the Committee on Payment and Settlement Systems (CPSS) of the G-10 central banks and the Blue Book published by the European Central Bank.

- **Report on Foreign Exchange Settlement Risk in the East Asia-Pacific Region**

The working group conducted a joint study into foreign exchange settlement risk and prepared a report of the research findings. The objective is to create awareness at both management and operational levels in order to promote good

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implementation in the region and to seek alternative ways in minimizing foreign exchange settlement risk. The working group carried out a survey of commercial bank foreign currency trading practices among member countries to identify the value of foreign exchange settlement risk, the duration of risk exposure, and the assessment of current foreign exchange settlement operations. The research results led the working group in making recommendations for both the central bank and commercial banks.

- **EMEAP Expert Program**

The Bank of Thailand sent a Payment Systems Group executive to participate in the EMEAP Expert Program at the Bank of Japan to conduct a joint study and prepare a report on EMEAP-PvP under the topic General Concept and Outline Specification of EMEAP-PvP during January 22 - March 30, 2001.

6.2.2.3 The South East Asian Central Banks Research and Training Centre (SEACEN)

SEACEN was established in 1982 and includes 11 south-east Asian central banks from the following: Indonesia, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand, Korea, Taiwan, and Mongolia. In 2001 SEACEN organized a joint study into payment and settlement systems that covered the subject of the present payments infrastructure and the related risks. Two workshops were held during April 5–6, 2001 and July 11–13, 2001 at Kuala Lumpur, Malaysia. Seminar results led to the publication of a country report that covers an introduction and description of member countries in four major areas, including the following: present payment systems, importance of payment systems to financial stability, consumer protection, and policy and new payment system developments.

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In 2002 the SEACEN Research Institute and the CPSS jointly organized a seminar on Payment and Settlement Systems for Emerging Economies for member country central banks during August 5-8, 2002 at Bali, Indonesia. The aim is for seminar participants to have an understanding of the BIS Core Principles for payment systems, large-value payment systems, and the related risks. In addition, the SEACEN Research Institute organized the first meeting of directors of central banks on the topic of the oversight of the payment and settlement systems and framework for regional cooperation in the PSS reform during August 9, 2002 at Bali, Indonesia. This provided the opportunity for central bank executives to exchange experiences in the regulatory oversight of payment and settlement systems. Also covered were legal issues related to regulation, risk management, oversight policies and guidelines, and regional cooperation framework.

6.2.2.4 APEC Working Group on Electronic Financial Transactions Systems (APEC WG/E-FITS) Sixth Meeting During June 20-21, 2002

The APEC Working Group on Electronic Financial Transactions Systems (APEC WG/E-FITS) was established as a result of the seventh meeting of APEC finance ministers to support regional cooperation among member countries in creating efficiency and confidence for effecting electronic financial transactions in the banking, securities, insurance and financial business sectors.

The Bank of Thailand represented Thailand as a participant in the second, third and fourth working group meetings in 2001, the fifth meeting in 2002, and later served

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as host for the sixth meeting during June 20-21, 2002. This allowed member countries to jointly make additional comments and to consider approving the final report. APEC WG/E-FITS covers the following: developments, current status, problems and obstacles, legal issues for payment systems, regulation of cross-border transactions, cooperation in the development of electronic financial transactions among APEC member countries. The study examines two areas, namely vertical approach for sectoral case study and horizontal approach case study.⁷ The meeting included 23 representatives from 11 member countries, namely Australia, Brunei, Canada, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Singapore, Taiwan, and Thailand. The final report was presented at the APEC Deputies Meeting and the APEC Ministers Meeting organized at Mexico during September 3–6, 2002.

⁷ The Bank of Thailand's Payment Systems Group prepared a vertical case study on the BAHTNET initiative in Thailand.

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8. Statistical Tables

Table 1: Basic statistical data

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|----------|----------|----------|----------|----------|----------|----------|
| Population (millions) | 60.11 | 60.81 | 61.46 | 61.66 | 61.87 | 62.30 | 63.02 |
| GDP (THB billions) | 4,611.00 | 4,732.60 | 4,626.40 | 4,637.10 | 4,916.50 | 5,123.40 | 5,399.60 |
| Exchange rate vis-à-vis USD (at year-end) | 25.34 | 31.37 | 41.37 | 37.84 | 40.16 | 44.48 | 43.28 |

Source: Bank of Thailand, Department of Local Administration, National Economic&Social Development Board

Table 2: Technological infrastructure

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Total fixed network telephone subscribers (millions) | 4.33 | 4.90 | 5.00 | 5.20 | 5.67 | 6.11 | 6.56 |
| TOT | 2.49 | 2.51 | 2.58 | 2.72 | 2.92 | 3.17 | 3.35 |
| TA | 1.00 | 1.28 | 1.32 | 1.33 | 1.57 | 1.76 | 2.01 |
| TT&T | 0.84 | 1.11 | 1.10 | 1.15 | 1.18 | 1.18 | 1.20 |
| Total mobile telephone subscribers (millions) | 1.73 | 2.07 | 1.96 | 2.34 | 3.64 | 8.00 | 17.41 |
| Postpaid | 1.73 | 2.07 | 1.96 | 2.29 | 3.12 | 4.84 | 4.51 |
| Prepaid | - | - | - | 0.05 | 0.52 | 3.16 | 12.90 |
| Total Internet users (millions) | 0.07 | 0.22 | 0.67 | 1.50 | 2.30 | 3.50 | 4.80 |
| Penetration rates | | | | | | | |
| Fixed network telephone (%) | 0.07 | 8.06 | 8.14 | 8.43 | 9.16 | 9.81 | 10.41 |
| Mobile telephone (%) | 0.03 | 3.40 | 3.19 | 3.80 | 5.88 | 12.84 | 27.63 |
| Internet (%) | neg. | neg. | 1.09 | 2.43 | 3.72 | 5.62 | 7.62 |

Table 3: Settlement media used by non-banks (at year-end, in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Banknotes and coins | 371 | 400 | 376 | 587 | 475 | 512 | 583 |
| Transferable deposits | 119 | 94 | 123 | 102 | 118 | 138 | 167 |
| Narrow money supply (M1) | 423 | 428 | 441 | 575 | 525 | 579 | 664 |
| <i>Memorandum items:</i> | | | | | | | |
| Broad money supply (M2) | 3,726 | 4,339 | 4,753 | 4,854 | 5,032 | 5,243 | 5,379 |

Source: Bank of Thailand

Table 4: Settlement media used by banks (at year-end, in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--|------|------|------|------|------|-------|-------|
| Balances held at central bank | 75 | 74 | 80 | 50 | 52 | 46 | 48 |
| Required reserves | 251 | 255 | 275 | 282 | 292 | 308 | 315 |
| Free reserves | 49 | 216 | 509 | 477 | 889 | 1,065 | 1,117 |
| Transferable deposits at other banks | 10 | 14 | 6 | 33 | 33 | 36 | 37 |
| <i>Memorandum item:</i> | | | | | | | |
| Institutions borrowing from central bank | 54 | 313 | 155 | 48 | 26 | 17 | 19 |

Source: Bank of Thailand

Table 5: Indicators of the use of various cashless payment instruments. Volume of transactions (in thousands)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------------------|--------|--------|--------|--------|--------|---------|---------|
| Cheque | 93,878 | 85,778 | 66,242 | 68,609 | 72,059 | 74,497 | 78,717 |
| Payments by credit card | nav. | nav. | nav. | nav. | nav. | nav. | nav. |
| BAHTNET | 100 | 178 | 243 | 255 | 644 | 748 | 803 |
| SMART (Media Clearing) | - | 261 | 1,428 | 2,790 | 4,107 | 5,758 | 7,362 |
| Direct Debit/Direct Credit (Inhouse) | nav. | nav. | nav. | nav. | 89,050 | 100,414 | 105,698 |

Source: Bank of Thailand

Table 6: Indicators of the use of various cashless payment instruments. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------------------|---------|---------|--------|--------|--------|--------|--------|
| Cheque | 123,276 | 138,735 | 76,663 | 66,895 | 26,949 | 16,785 | 18,799 |
| Payments by credit card | 149 | 149 | 147 | 151 | 178 | 234 | 286 |
| BAHTNET | 8,177 | 14,525 | 16,465 | 6,603 | 64,317 | 70,900 | 67,095 |
| SMART (Media Clearing) | - | 8 | 60 | 82 | 121 | 183 | 274 |
| Direct Debit/Direct Credit (Inhouse) | nav. | nav. | nav. | nav. | 1,818 | 2,589 | 2,836 |

Source: Bank of Thailand

Table 7: Notes and coins 1996-2002. At year-end (in THB millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Notes: | 355,354 | 383,675 | 358,957 | 568,345 | 454,359 | 490,242 | 559,169 |
| 500,000 THB | - | - | - | - | 113 | 118 | 118 |
| 1,000 THB | 138,761 | 177,760 | 171,318 | 322,147 | 253,439 | 298,453 | 367,403 |
| 500 THB | 150,539 | 139,713 | 123,405 | 172,319 | 126,537 | 115,803 | 108,987 |
| 100 THB | 45,117 | 42,042 | 41,936 | 50,462 | 50,561 | 51,638 | 57,446 |
| 60 THB | 352 | 396 | 399 | 404 | 413 | 417 | 439 |
| 50 THB | 6,709 | 9,088 | 7,299 | 7,040 | 6,926 | 6,896 | 6,529 |
| 20 THB | 9,646 | 10,091 | 10,382 | 11,682 | 12,211 | 13,161 | 14,648 |
| 10 THB | 4,191 | 4,345 | 3,979 | 4,052 | 3,920 | 3,517 | 3,360 |
| 5 THB | 123 | 123 | 123 | 123 | 123 | 123 | 123 |
| 1 THB | 107 | 107 | 107 | 107 | 107 | 107 | 107 |
| 50 Satang | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Coins: | 16,306 | 17,246 | 17,821 | 19,051 | 20,761 | 22,229 | 23,924 |

Source: Bank of Thailand

8. Statistical Tables

Table 8: Institutional infrastructure (at end-December 2002)

| | Number of Institutions | Number of Branches | Number of Accounts | Value of Accounts (THB millions) |
|---|------------------------|--------------------|--------------------|----------------------------------|
| Central bank | 1 | 4 | 1,201 | 519,001 |
| Commercial banks | 13 | 3,637 | 44,983,370 | 4,626,006 |
| Specialized banks: | | | | |
| Government Savings Bank | 1 | 586 | 28,824,269 | 522,619 |
| Government Housing Bank | 1 | 69 | 359,243 | 192,969 |
| Bank for Agriculture and Agricultural Cooperative | 1 | 515 | 10,588,203 | 275,028 |
| Branches of foreign banks | 18 | 18 | 194,266 | 257,552 |
| Post Office | 1 | 1,148 | - | - |

Source: Bank of Thailand, Communications Authority of Thailand

Table 9: Payment instructions handled by selected interbank settlement systems. Volume of transactions (in thousands)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------|--------|--------|--------|--------|--------|--------|--------|
| <i>Paper-based:</i> | | | | | | | |
| ECS | 70,793 | 65,166 | 52,476 | 51,379 | 53,313 | 55,186 | 58,139 |
| Provincial Cheque | 23,085 | 20,612 | 13,766 | 17,230 | 18,746 | 19,311 | 20,578 |
| <i>Automated:</i> | | | | | | | |
| BAHTNET | 100 | 178 | 243 | 255 | 644 | 748 | 803 |
| SMART (Media Clearing) | nap. | 261 | 1,428 | 2,790 | 4,107 | 5,758 | 7,362 |

Source: Bank of Thailand

Table 10: Payment instructions handled by selected interbank settlement systems. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------|---------|---------|--------|--------|--------|--------|--------|
| <i>Paper-based:</i> | | | | | | | |
| ECS | 120,782 | 136,679 | 75,422 | 65,510 | 25,436 | 15,181 | 16,987 |
| Provincial Cheque | 2,494 | 2,056 | 1,241 | 1,386 | 1,513 | 1,604 | 1,812 |
| <i>Automated:</i> | | | | | | | |
| BAHTNET | 8,177 | 14,525 | 16,465 | 6,603 | 64,317 | 70,900 | 67,095 |
| SMART (Media Clearing) | nap. | 8 | 60 | 82 | 121 | 183 | 274 |

Source: Bank of Thailand

Table 11: Transfer instructions handled by securities settlement systems. Volume of transactions (in millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------------|------|------|------|------|------|------|------|
| <i>Bond registry system:</i> | | | | | | | |
| Equity securities | - | - | - | - | - | - | - |
| Government securities | neg. | neg. | neg. | neg. | neg. | neg. | neg. |
| <i>Book-entry system:</i> | | | | | | | |
| Equity securities | 1.86 | 1.26 | 1.03 | 1.12 | 1.00 | 1.00 | 1.00 |
| Government securities | neg. | neg. | neg. | neg. | neg. | neg. | neg. |

Source: Bank of Thailand and Thailand Securities Depository Co., Ltd.

Table 12: Transfer instructions handled by securities settlement systems. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------------|------|------|------|------|------|-------|-------|
| <i>Bond registry system:</i> | | | | | | | |
| Equity securities | - | - | - | - | - | - | - |
| Government securities | 17 | 115 | 958 | 800 | 988 | 612 | 69 |
| <i>Book-entry system:</i> | | | | | | | |
| Equity securities | 299 | 234 | 174 | 251 | 161 | 177 | 237 |
| Government securities | 14 | 135 | 88 | 70 | 345 | 1,016 | 2,091 |

Source: Bank of Thailand and Thailand Securities Depository Co., Ltd.

Table 13: Number of participants in selected payment and settlement systems

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------------|------|------|-------|--------|--------|--------|---------|
| BAHTNET | 87 | 82 | 82 | 76 | 77 | 69 | 65 |
| ECS | 33 | 39 | 38 | 38 | 38 | 36 | 36 |
| Provincial Cheque Clearing | nav. | 19 | 19 | 17 | 17 | 17 | 17 |
| SMART (Media Clearing) | - | 26 | 27 | 26 | 27 | 28 | 27 |
| <i>Bond registry system:</i> | | | | | | | |
| Equity securities | - | - | - | - | - | - | - |
| Government securities | nav. | nav. | 5,328 | 13,141 | 16,540 | 23,173 | 132,345 |
| <i>Book-entry system:</i> | | | | | | | |
| Equity securities | 77 | 102 | 64 | 59 | 58 | 56 | 57 |
| Government securities | nav. | nav. | 55 | 418 | 974 | 1,053 | 1,202 |

Source: Bank of Thailand and Thailand Securities Depository Co., Ltd.

Table 14: Number of ATMs 1996-2002

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------|-------|-------|-------|-------|-------|-------|-------|
| Total | 4,284 | 4,835 | 5,188 | 5,322 | 5,901 | 6,385 | 7,885 |

Source: Bank of Thailand

8. Statistical Tables

Table 15: Number of payment cards 1996-2002

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Total | 17,529,000 | 19,933,000 | 17,604,645 | 19,095,005 | 22,447,422 | 26,350,803 | 30,222,146 |
| Credit card | 1,972,000 | 2,010,000 | 1,906,645 | 1,629,301 | 1,765,640 | 2,567,961 | 3,419,988 |
| ATM card | 15,557,000 | 17,923,000 | 15,698,000 | 17,465,704 | 20,681,782 | 23,782,842 | 26,802,158 |

Source: Bank of Thailand

Table 16: Use of ATMs 1996-2002. Number of transactions (in thousands)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Total | 274,737 | 323,719 | 370,830 | 333,585 | 383,599 | 456,602 | 557,949 |

Source: Bank of Thailand

Table 17: Use of ATMs 1996-2002. Value of transactions (in THB millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|
| Total | 656,744 | 780,814 | 818,562 | 938,150 | 1,286,850 | 1,827,270 | 2,210,404 |

Source: Bank of Thailand

Table 18: Use of Thai payment instruments 1996-2002. Number of transactions (in thousands)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Total | 368,715 | 409,936 | 438,744 | 405,239 | 549,459 | 638,019 | 750,529 |
| Electronics total | 100 | 439 | 1,671 | 3,045 | 93,801 | 106,920 | 113,863 |
| Direct Debit/Direct Credit (Inhouse) | nav. | nav. | nav. | nav. | 89,050 | 100,414 | 105,698 |
| SMART (Media Clearing) | - | 261 | 1,428 | 2,790 | 4,107 | 5,758 | 7,362 |
| BAHTNET | 100 | 178 | 243 | 255 | 644 | 748 | 803 |
| Payment cards total | 274,737 | 323,719 | 370,830 | 333,585 | 383,599 | 456,602 | 557,949 |
| Credit card | nav. | nav. | nav. | nav. | nav. | nav. | nav. |
| ATM card | 274,737 | 323,719 | 370,830 | 333,585 | 383,599 | 456,602 | 557,949 |
| Cheque total | 93,878 | 85,778 | 66,242 | 68,609 | 72,059 | 74,497 | 78,717 |

Source: Bank of Thailand

Table 19: Use of Thai payment instruments 1996-2002. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|--------------------------------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|
| Total | 132,258 | 154,198 | 94,153 | 74,669 | 94,670 | 92,518 | 91,500 |
| Electronics total | 8,177 | 14,533 | 16,525 | 6,685 | 66,256 | 73,672 | 70,205 |
| Direct Debit/Direct Credit (Inhouse) | nav. | nav. | nav. | nav. | 1,818 | 2,589 | 2,836 |
| SMART (Media Clearing) | - | 8 | 60 | 82 | 121 | 183 | 274 |
| BAHTNET | 8,177 | 14,525 | 16,465 | 6,603 | 64,317 | 70,900 | 67,095 |
| Payment cards total | 805 | 930 | 966 | 1,089 | 1,465 | 2,061 | 2,497 |
| Credit card | 149 | 149 | 147 | 151 | 178 | 234 | 286 |
| ATM card | 656 | 781 | 819 | 938 | 1,287 | 1,827 | 2,210 |
| Cheque total | 123,276 | 138,735 | 76,663 | 66,895 | 26,949 | 16,785 | 18,799 |

Source: Bank of Thailand

Table 20: Use of postal payment instruments 1996-2002. Number of transactions (in millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Postal payments total | 18,958 | 19,142 | 18,457 | 19,292 | 19,727 | 19,891 | 20,274 |
| Domestic money order | 16,080 | 16,320 | 15,800 | 16,780 | 17,260 | 17,500 | 18,060 |
| Domestic postal order | 2,780 | 2,730 | 2,570 | 2,430 | 2,400 | 2,330 | 2,158 |
| Postcheque | 0.030 | 0.030 | 0.024 | 0.020 | 0.005 | 0.004 | 0.001 |
| International money order | 0.068 | 0.062 | 0.063 | 0.062 | 0.062 | 0.057 | 0.055 |
| Incoming | 0.065 | 0.060 | 0.061 | 0.060 | 0.060 | 0.055 | 0.052 |
| Outgoing | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.003 |

Source: Communications Authority of Thailand

Table 21: Use of postal payment instruments 1996-2002. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Postal payments total | 43.96 | 44.51 | 41.54 | 40.56 | 41.51 | 41.76 | 42.34 |
| Domestic money order total | 42.31 | 42.94 | 39.76 | 38.90 | 39.92 | 40.18 | 40.77 |
| Domestic postal order | 0.70 | 0.67 | 0.64 | 0.63 | 0.64 | 0.65 | 0.63 |
| Postcheque | 0.13 | 0.12 | 0.13 | 0.11 | 0.04 | 0.03 | 0.01 |
| International money order | 0.82 | 0.78 | 1.01 | 0.92 | 0.91 | 0.90 | 0.94 |
| Incoming | 0.80 | 0.76 | 0.99 | 0.90 | 0.89 | 0.88 | 0.90 |
| Outgoing | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.04 |

Source: Communications Authority of Thailand

Table 22: Sources of payment revenues of Thai commercial banks (in THB millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|-------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Total | nav. | 14,319 | 12,815 | 13,131 | 14,761 | 17,744 | 19,589 |
| Credit card | nav. | 4,021 | 3,790 | 3,709 | 4,220 | 5,448 | 6,489 |
| ATM card and e-banking | nav. | 2,179 | 2,427 | 2,734 | 3,394 | 4,327 | 5,209 |
| Money transfer and collection | nav. | 4,248 | 3,803 | 4,142 | 4,348 | 4,605 | 4,877 |
| Securities custodian | nav. | 266 | 129 | 237 | 250 | 563 | 313 |
| Cheque-related fee | nav. | 904 | 878 | 795 | 904 | 1,232 | 1,106 |
| Letter of credit | nav. | 2,701 | 1,788 | 1,514 | 1,645 | 1,569 | 1,585 |

Source: Bank of Thailand

8. Statistical Tables

Table 23: Sources of payment revenues of foreign bank branches (in THB millions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|-------------------------------|------|--------------|--------------|--------------|--------------|--------------|--------------|
| Total | nav. | 2,966 | 2,781 | 3,360 | 2,849 | 2,782 | 2,852 |
| Credit card | nav. | 1,279 | 946 | 1,447 | 1,041 | 931 | 1,076 |
| ATM card and e-banking | nav. | 24 | 63 | 138 | 63 | 79 | 110 |
| Money transfer and collection | nav. | 578 | 738 | 673 | 764 | 830 | 806 |
| Securities custodian | nav. | 841 | 695 | 819 | 644 | 491 | 593 |
| Cheque-related fee | nav. | 32 | 31 | 37 | 36 | 44 | 38 |
| Letter of credit | nav. | 211 | 307 | 247 | 301 | 408 | 229 |

Source: Bank of Thailand

Table 24: Daily averages of BOT payment services. Volume of transactions

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|----------------------------|------|---------|---------|---------|---------|---------|---------|
| BAHTNET | nav. | 721 | 996 | 1,042 | 2,608 | 3,042 | 3,277 |
| ECS | nav. | 263,829 | 215,066 | 209,711 | 214,971 | 224,335 | 237,302 |
| Provincial Cheque Clearing | nav. | 55,734 | 70,613 | 76,514 | 77,866 | 78,500 | 83,993 |
| SMART (Media Clearing) | nav. | 1,110 | 5,761 | 11,375 | 16,549 | 23,517 | 30,051 |

Source: Bank of Thailand

Table 25: Daily averages of BOT payment services. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|----------------------------|------|------|------|------|------|------|------|
| BAHTNET | nav. | 59 | 68 | 27 | 260 | 288 | 274 |
| ECS | nav. | 553 | 309 | 267 | 103 | 62 | 69 |
| Provincial Cheque Clearing | nav. | 5.0 | 5.7 | 6.2 | 6.5 | 6.5 | 7.4 |
| SMART (Media Clearing) | nav. | 0.0 | 0.2 | 0.3 | 0.5 | 0.8 | 1.1 |

Source: Bank of Thailand

Table 26: Peak day figures of BOT payment services. Volume of transactions

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|----------------------------|------|---------|---------|---------|---------|---------|---------|
| BAHTNET | nav. | 1,384 | 1,556 | 1,684 | 4,468 | 4,908 | 5,109 |
| ECS | nav. | 549,122 | 471,926 | 537,593 | 541,738 | 525,726 | 629,130 |
| Provincial Cheque Clearing | nav. | nav. | nav. | nav. | 192,268 | 196,266 | 229,252 |
| SMART (Media Clearing) | nav. | 16,432 | 37,040 | 62,480 | 65,428 | 118,440 | 155,623 |

Source: Bank of Thailand

Table 27: Peak day figures of BOT payment services. Value of transactions (in THB billions)

| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|----------------------------|------|-------|------|------|------|------|-------|
| BAHTNET | nav. | 109 | 189 | 229 | 518 | 501 | 967.2 |
| ECS | nav. | 1,741 | 559 | 505 | 450 | 118 | 160.3 |
| Provincial Cheque Clearing | nav. | nav. | nav. | nav. | 10.5 | 12.2 | 14.8 |
| SMART (Media Clearing) | nav. | 0.6 | 2.2 | 2.1 | 2.7 | 4.9 | 8.0 |

Source: Bank of Thailand

Table 28: Use of internet banking

| | 2000 | 2001 | 2002 |
|---|-----------|-----------|-----------|
| No. of agreements | 21,102 | 97,101 | 254,989 |
| Volume of transactions | 3,300,000 | 6,243,407 | 9,990,969 |
| Value of transactions (in THB billions) | 0.3 | 8.6 | 730.5 |

Source: Commercial banks

Table 29: Use of on-line retail funds transfer (ORFT)

| | 2000 | 2001 | 2002 |
|---|---------|-----------|-----------|
| Cross-bank money transfer | | | |
| Volume of transactions | 527,309 | 3,198,146 | 5,988,770 |
| Value of transactions (in THB billions) | 2.5 | 15.4 | 38.1 |

Source: Processing Center Co., Ltd.

Table 30: Credit card crime

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|-----------------|------------|------------|------------|------------|---------|-----------|------------|-----------|
| Number of cases | 63 | 44 | 70 | 61 | 41 | 40 | 29 | 20 |
| Losses (THB) | 16,991,363 | 19,191,312 | 12,396,043 | 13,218,719 | 162,356 | 8,529,421 | 10,984,911 | 5,822,708 |

Source: Royal Thai Police

9. Notes to Statistical Tables

| Symbols used | Definition |
|---------------------|--|
| “_” | No data |
| “nav.” | Data not collected or not available |
| “neg.” | Data has very low values as compared to other data in the same table |
| “0” | Data equals to or is near zero |

- Table 1**
- GDP at current prices
 - Data for 2002 are estimated figures
 - Foreign exchange rates are annual averages
 - Population data from Department of Local Administration

- Table 2**
- Data on fixed telephone from TOT Corporation Public Company Limited
 - Data on mobile phone from Monetary Policy Group, Bank of Thailand
 - Prepaid mobile phone services started on July 1999
 - Data on Internet subscribers from National Electronic and Computer Technology Center (combined with other agencies, including Internet Thailand for 1997-1998, ISP Club for 1999–2000, and the National Statistical Office for 2001.

- Table 3**
- Data on banknotes and coins are in circulation outside the Bank of Thailand
 - Transferable deposits are demand deposits held by businesses, the household sector, and other financial institutions.

9. Notes to Statistical Tables

- Tables 5–6**
- Data on cheques are based on inter-bank volume and values, including cheques in Bangkok and the metropolitan areas (ECS), and provincial cheques
 - Data on BAHTNET include total volume and values processed through the system, including inter-bank, intra-bank, multilateral funds transfer, and pre-authorized direct debit transactions
 - Data on SMART are based on inter-bank volume and values, with services starting in 1997
 - Data on direct debit and direct credit are based on intra-bank transactions
 - Data on credit cards are only based on transaction values

Tables 9–10 See Tables 5–6

Tables 11–12 Equity securities settlement are only processed through the scripless book entry system

- Table 15**
- Data on number of credit cards for 1996–1997 are rounded
 - Data on number of ATM cards for 1996–1998 are rounded

Tables 16–19 Data on number and value of ATM transactions for 1999 are approximations due to the incomplete reporting of data during the first half of the year.

Tables 18–19 See Tables 5–6

9. Notes to Statistical Tables

Tables 22–23 See data on commercial bank operations in Table 10 on income and expenses of commercial banks (Bank of Thailand homepage on www.bot.or.th)

Tables 28 Data on Internet banking for 2002 are based on a total of 18 Thai commercial banks and foreign commercial bank branches

Table 30 Data on credit card crime from Economic Crime Investigations Division of the Royal Thai Police

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