

The Payment and Settlement Systems in the Republic of China (Taiwan)

October 2010

Central Bank of the Republic of China (Taiwan)

Preface

Payment and settlement systems are a critical part of the financial infrastructure that fosters the development of a country's economy and financial markets. Their operation is closely related to the central bank's mandate to conduct its monetary policies and maintain financial stability. In recent years, associated with technological innovation and the trend toward mergers and acquisitions, the transactions of payment and settlement systems have increased, and requests for improved efficiency in the operation of these systems have grown. Furthermore, the potential systemic risk resulting from payment and settlement systems has attracted a lot of attention. As a result, an increasing number of central banks have constructed safe and efficient payment and settlement systems according to the standards of internationally recognized principles, and disclosed their roles and policies subject to their oversight responsibilities regarding the payment systems.

The Central Bank of the Republic of China (Taiwan) (CBC) Interbank Funds Transfer System (CIFS) plays a pivotal role in payment and settlement systems in Taiwan. The CIFS links with important domestic payment systems and securities settlement systems to form the framework of payment and settlement systems in Taiwan. In recent years, according to internationally recognized principles, the CBC has implemented numerous reforms. The CIFS has been comprehensively transformed into a real-time gross settlement (RTGS) system, and extended its services to financial markets, such as bonds, bills and stocks, for final settlement denominated in New Taiwan dollars. Through these reforms, the domestic payment infrastructure framework has almost been completed and is able to effectively cope with systemic risk.

This report aims to introduce current situation in Taiwan's payment and settlement systems and their relationships with the CBC. We hope that stakeholders from various fields can understand the role of the CBC and its persisting reforms. It is expected that all system operators, participants and relevant authorities can strive to strengthen the domestic financial infrastructure in accordance with the policy to promote safe and efficient payment and settlement systems.

The Payment and Settlement Systems in the Republic of China (Taiwan)

Table of Contents

1. Introduction	3
2. An Overview of the Payment and Settlement Systems	
2.1 Definition and Types	5
2.2 Settlement Modes	6
3. Main Payment Instruments	
3.1 Cash	10
3.2 Non-Cash Instruments	11
4. Current Situation of Important Payment and Settlement Systems	
4.1 The CBC Interbank Funds Transfer System	16
4.2 Other Funds Transfer Systems	20
4.3 Securities Settlement Systems	27
5. The Relationship Between the CBC and Payment and Settlement Systems	
5.1 The International Trends and Developments in Payment and Settlement Systems Oversight	36
5.2 The CBC's Role in Payment and Settlement Systems	39
6. The CBC's Ongoing Reforms	43
Appendix 1 Core Principles for Systemically Important Payment Systems	45
Appendix 2 Recommendations for Securities Settlement Systems	46
Appendix 3 Glossary	49

1. Introduction

Funds transfer systems and securities settlement systems (hereafter payment and settlement systems) are important financial infrastructure. The smooth settlement of a variety of payments and obligations arising from economic activities relies on safe and efficient payment and settlement systems. To achieve its policy of maintaining monetary and financial stability, central banks have adopted various policy tools to influence financial activities, among which the national payment and settlement systems are key to the effective implementation of policy. In general, important payment systems provide services for the settlement of large-value funds transfers related to call loans, foreign exchange and securities markets. During the past decade, the transaction value processed via major payment systems in Taiwan increased in the wake of financial liberalization and emerging e-payments. The total transaction value in 2008 reached NT\$409 trillion^{*}, as much as 31 times GDP for the same year. In other words, 8-business-days' transaction volume processed through major payment systems amounted to the whole year's GDP in 2008. Therefore, overseeing the payment systems effectively to prevent from systemic risks has become one of the CBC's major functions.

During the last decade, great changes for payment and settlement systems occurred to enhance safety and efficiency. Specifically, significant progress was made regarding approaches to risk mitigation. For instance, the RTGS mechanism was introduced for large-value interbank funds transfer systems, and a delivery-versus-payment (DVP) mechanism was adopted for securities settlement systems. In addition, advanced information technology was applied to improve operational functions and the speed of information transmission to reduce costs, and automated processing procedures were integrated with back-office operations so as to improve efficiency.

Moreover, many international financial organizations announced reports on how to design and assess important payment and settlement systems for their member countries' compliance, such as the "Core Principles for Systemically Important Payment Systems" (Core Principles) issued by the Committee on Payment and Settlement Systems of the Bank for International Settlements (BIS-CPSS) and the "Recommendations for Securities Settlement Systems" issued by BIS-CPSS and the Technical Committee of the International Organization of Securities Commissions (IOSCO). Both reports have been regarded as major guidelines worldwide for competent authorities.

In recent years, the CBC has followed the Core Principles to reconstruct domestic

^{*} This amount is an aggregate transaction value covering the CIFS, Check Clearing System and the Financial Information Service Co., Ltd.'s Interbank Remittance System.

payment and settlement systems with a view to promoting system safety and efficiency, such as reshaping the CIFS into an RTGS system and moving the short-term Bills Clearing System (BCS) and Central Government Securities Settlement (CGSS) System toward the DVP processing mode. Currently, the CBC is engaged in assessing systemically important domestic payment systems according to a variety of criteria raised in the Core Principles. Those systems that have not yet complied with the said criteria shall be required to improve so that domestic payment and settlement systems may possess complete soundness as a requirement for further development.

This report is organized into six chapters. Following this introduction, the second chapter provides an overview of the payment and settlement systems, and the third describes the main domestic instruments for payments. The fourth chapter presents current situation of the CIFS, other funds transfer systems and securities settlement systems in Taiwan. In the fifth, the role of the CBC in Taiwan's payment and settlement systems is discussed. Finally, a brief comment is made on the CBC's ongoing reforms.

2. An Overview of the Payment and Settlement Systems

The transaction value handled by the payment and settlement systems in recent years has grown rapidly in the wake of deregulation of financial markets and the rapid spread of electronic financial services; as a result, payment and settlement systems have come to be an essential infrastructure that contributes to the effective operation of financial markets. This chapter summarizes the payment and settlement systems in terms of their definitions, types and settlement modes to promote public awareness of these systems.

2.1 Definition and Types

The payment and settlement systems in this report comprise the payment systems for funds transfers and the securities settlement systems for securities delivery. In a monetary economic society, all transactions of commodities, services and financial investments must transfer money values via payment instruments to deal with obligations between creditors and debtors. Apart from the use of notes and coins, no matter whether the payment vehicles used are paper-based, card-based or electronic-based, every payment has to go through a series of transmitting, exchanging, processing and settling the payment order.

The payment system refers to a system that deals with the transfer of money values, and its components include infrastructure such as payment instruments, internet protocols, system participants (involving financial institutions, clearing institutions and settlement banks) as well as laws, regulations, rules, standards, market practices and contract arrangements. Additionally, the securities settlement system refers to a full set of institutional arrangements that deal with confirmation, match, clearance and settlement of securities trades as well as the safekeeping of securities. Each one is described as follows.

2.1.1 Funds Transfer Systems

Funds transfer systems may be divided into large-value payment systems and retail payment systems according to the size and type of transaction that they deal with.

2.1.1.1 Large-Value Payment Systems

In general, large-value payment systems are mainly used to settle payments in relation to financial market activities, such as those that occur in the money market, securities market or foreign exchange market. The large-value payment system sets no minimum value required per payment; however, the value of each transaction transferred through such a system is often enormous. For example, the average value of each transaction

handled by the CIFS in 2008 reached NT\$356 million, compared to Fedwire's US\$5.8 million (or NT\$191 million*) and BOJ-NET's ¥3,488 million (or NT\$1,275 million*), respectively, in the same year. Moreover, for the majority of such payments, timeliness is of critical importance, and if not handled effectively, systemic risk may arise, and the stability of the whole financial system may even suffer potential impacts.

2.1.1.2 Retail Payment Systems

Retail payment systems are mainly used to deal with individual or firms' payments resulting from retail activities. A variety of retail transactions settled via such kinds of systems may, in general, be divided into two types of payments: cyclic and non-cyclic.

Cyclic payment refers to those payments made regularly, and the amount is often fixed, e.g. insurance premiums, utility fees, as well as periodical payroll or pensions paid by companies, etc. Non-cyclic payments are contingent and non-fixed in value, e.g. payments for an individual's shopping, or for a business' sales and purchases. If anything should happen to these retail payment systems that involve mass transaction volumes, there may be a notable impact on payment efficiency and consumer rights, even though the actual money value is often so small that it has little chance of bringing about systemic risk.

2.1.2 Securities Settlement Systems

Securities settlement systems are mainly used to make confirmation, match, clearance and settlement for trading securities as well as provide depository services for safekeeping securities. When trading securities that relate to funds transfers, a securities settlement system must ensure that funds settlement will be achieved through a certain funds transfer system, which may be either built into or independent of the settlement system. To prevent the settlement system operators from the principal risk, i.e. the seller delivers a security but does not receive payment or the buyer makes a payment but does not receive delivery, the BIS-CPSS suggests adopting a DVP mechanism as the best practice in order to deal with funds settlement and securities delivery simultaneously.

2.2 Settlement Modes

In accordance with the difference of timing and procedures for various settlements, funds transfer systems settlement arrangements may be classified into three types: Deferred Net Settlement (DNS), RTGS and Hybrid Settlement. In addition, securities settlement systems often adopt the DVP mechanism to ensure the safety of both funds settlements

* These two values are calculated at the exchange rate posted by the Bank of Taiwan on December 31, 2008.

and securities deliveries while involving funds payment.

2.2.1 DNS

Most large-value payment systems in the 1980s adopted DNS, in which payment orders, after acceptance by the system, accumulated at a Central Processing Unit (CPU) until a certain designated time or close-off time during business hours. These were then cleared via batch jobs by calculating participants' net receivables or net payables bilaterally or multilaterally, and ultimately settled with net balances to accomplish settlement finality.

Although DNS helps to reduce overall settlement balances among participants so as to save liquidity, settlement finality is completed only at a certain designated time or close-off time during business hours. Therefore, if one participant should fail to pay its obligation when due, then all payment orders already processed by the system may need to be rewound. As a result, other participants could face settlement risks.

2.2.2 RTGS

The RTGS mode was widely adopted by many countries in the 1990s. The difference between the RTGS and DNS modes is the arrangement of settling the payment order, which according to RTGS is dealt with transaction-by-transaction (i.e. based on the gross). Once a payment order is accepted by the system, it is executed right away if the balances (or credits available) of the payer's settlement accounts are sufficient to cover this payment obligation, then the transaction after settlement is irrevocable, meaning settlement finality is achieved. This settlement arrangement may effectively reduce the potential risks faced by the participant in the course of settlement, but it raises the participant's demand for liquidity because they must have sufficient liquidity to settle payments transaction-by-transaction. To streamline the system operation, the central bank will usually provide liquidity accordingly.

If the balances of a participant's settlement accounts are not enough, the RTGS mode has two alternatives: one is to send the payment order back to the issuing participant which then re-issues it when settlement account balances become sufficient; another one is to hold the payment order at the CPU temporarily and re-execute it when settlement account balances are sufficient.

2.2.3 Hybrid Settlement

To achieve final settlement rapidly with low settlement balances, more and more large-value payment systems have adopted an arrangement of hybrid settlement in recent years. A typical hybrid settlement system is an arrangement whereby payment orders are

first collected and accumulated at the CPU once they are accepted by the system. Further, they are continuously, or frequently, offset with those payment orders issued by other participants during business hours. At the same time, they are settled immediately only if the balance of the participant's settlement account is sufficient to cover the amount of its own net payable. Each transaction after settlement is irrevocable. Those payment orders un-settled will be held in a queuing system temporarily until the next round of netting and settling.

The hybrid settlement mode requires less demand for liquidity than the RTGS mode due to netting balances. Furthermore, after every round of netting balances, the finality is immediately effected by settling the balances of net receivables or payables, so it reduces settlement risks more than DNS, offers the same liquidity-saving advantage as DNS, and has no less security than the RTGS.

2.2.4 DVP

DVP is an arrangement linking securities delivery with funds settlement in a securities settlement system; it aims to ensure that a securities delivery occurs almost at the same time as the funds transfer. In general, there are three approaches to achieving DVP:

2.2.4.1 Model 1

An arrangement that settles transfer instructions for both securities and funds on a transaction-by-transaction (gross) basis, with final (unconditional) transfer of securities from the seller to the buyer (delivery) occurring at the same time as the final transfer of funds from the buyer to the seller (payment).

2.2.4.2 Model 2

An arrangement that settles securities transfer instructions on a gross basis but settles funds transfer instructions on a net basis, i.e. the final transfer of securities from the seller to the buyer (delivery) is settled transaction-by-transaction (gross), while the final transfer of funds from the buyer to the seller (payment) is done with the balances of netting receivables and payables.

2.2.4.3 Model 3

An arrangement that settles transfer instructions for both securities and funds on a net basis, i.e. final transfers of both securities and funds are settled with the netting receivables and payables at the end of the processing cycle.

Since DVP ensures that the seller delivers securities simultaneously once the buyer makes payments, it may effectively prevent principal risks, so it is widely adopted worldwide by

securities settlement systems.

3. Main Payment Instruments

Payment instruments can be classified as cash and non-cash. Originally, cash was the most important medium of exchange in early societies. Once cash was used to pay for goods and services, the transaction between the buyer and the seller was final. As societies developed and commercial transactions became more complex, to cope with the increased need for convenience of trading activities, a variety of non-cash instruments were brought into use, such as bills of exchange, ATM cards, credit cards, credit transfers and so forth, which have all been used to substitute for cash. The following sections present the main payment instruments utilized in Taiwan.

3.1 Cash

Cash is an indispensable tool for the public to transact payments in ordinary life. Currently in Taiwan, currency in circulation issued by the CBC includes notes with denominations of NT\$2000, 1000, 500, 200, 100 and coins with denominations of 50, 20, 10, 5, 1. Historically, the ratio of currency in circulation to M1A was kept between 33% and 41% during the period from 1961 to 1985. Afterwards, this ratio began to gradually decline year by year along with the increasing use of bills of exchange and ATM cards. However, this ratio stabilized to between 24% and 28% during the period from 2001 to 2008 (see Table 1). That means that cash is still an important payment instrument to the public in Taiwan, even though emerging non-cash instruments have replaced cash's functions to some extent.

Table 1

The Ratio of Currency in Circulation to M1A

	NT\$100 million, %							
Year-end	2001	2002	2003	2004	2005	2006	2007	2008
Currency in Circulation (CC)	5,257	5,273	6,082	6,698	7,304	7,587	7,626	8,335
M1A*	19,187	20,905	25,247	27,779	29,831	30,700	31,566	32,223
CC/M1A	27.39	25.22	24.08	24.11	24.48	24.71	24.15	25.87

* M1A=Currency in Circulation (held by the general public) + Checking Deposits and Demand Deposits (held by individuals, firms and non-profit groups).

Source: Financial Statistics Monthly, Central Bank of the R.O.C. (Taiwan)

3.2 Non-Cash Instruments

This section presents the main non-cash instruments, including bills of exchange, ATM cards, credit cards, credit transfers, direct debits and e-money.

3.2.1 Bills of Exchange

Bill of exchange refers to a written paper strip used to pay a specified sum on demand and issued according to the Negotiable Instruments Act. In Taiwan, bills of exchange include checks, promissory notes and drafts, and each one has its distinctive features with the purpose of payment, credit or remittance. Since 1997, the volume and value of bills of exchange collected by banks for clearance have declined yearly in response to the rise of e-payments. This implies that other non-cash instruments have gradually replaced paper-based instruments. As indicated in Table 2 below, the total clearance of bills of exchange in 2008 registered 134.66 million by volume and NT\$20,580.6 billion by value, compared to 171.51 million and NT\$37,975.2 billion in 2001, representing decreases of 21% by volume and 46% by value, respectively, during 2001-2008.

Table 2

The Volume and Value of Bills of Exchange Collected for Clearance

	10 thousand, NT\$100 million							
Year	2001	2002	2003	2004	2005	2006	2007	2008
Volume	17,151	16,279	15,835	15,964	15,454	14,920	14,460	13,466
Value	379,752	319,850	282,278	265,969	239,612	238,790	225,265	205,806

Source: Taiwan Clearing House

3.2.2 ATM Cards

ATM cards are machine-readable plastic cards issued by financial institutions to card-holders for the purpose of cash withdrawals, funds transfers, balance inquiries and so on. They consist of magnetic-strip cards and IC-chip cards according to the different data storage media used. To prevent the information and password in magnetic-strip ATM cards from being pirated (illegal duplication) and stolen in the course of data transmission, the Bankers Association of the Republic of China urged domestic banks to replace all magnetic-strip cards with IC-chip cards. The existing functions of interbank fund transfers in magnetic-strip ATM cards remained in force until March 2006. From then on, the infrastructure of the ATM card market in Taiwan has completely migrated to an IC-chip platform. Just as the old magnetic-strip cards could function, the new IC-chip ATM cards are able to make interbank cash withdrawals, funds transfers, bill payments,

tax payments, and balance inquiries. In addition, they can also make debits for the use by consumers while shopping.

As of year-end 2008, the number of ATM cards in circulation registered 72.64 million, and total transaction value through the shared ATM system reached NT\$11,087.6 billion in 2008, increasing by 36% and 74%, respectively, compared to 53.24 million and NT\$6,377.5 billion in 2001 (see Table 3).

Table 3
Cards in Circulation and Transaction Value of ATM Cards

10 thousand, NT\$100 million

Year-end	2001	2002	2003	2004	2005	2006	2007	2008
Cards in Circulation	5,324	5,836	6,376	6,824	7,337	7,190	7,425	7,264
Value	63,775	69,093	71,806	84,698	90,737	87,497	94,410	110,876

Source: Website of the Financial Supervisory Commission, Executive Yuan (<http://www.fscey.gov.tw>)

3.2.3 Credit Cards

Credit cards are issued by banks to grant the holder a credit line, under which the holder may consume first and pay later. The holder also has the option to pay in full or partial amounts by the end of a specified period. The use of credit cards has become prevalent in Taiwan. Together with the rapid development of electronic commerce, the use of credit cards for on-line shopping has increased as well. Many banks have issued multi-functional credit cards to allow the holder to withdraw cash in advance and to extend revolving credit. To prevent credit cards from being stolen and counterfeited, domestic banks have also actively pushed to move into IC-chip credit cards so as to enhance card use security.

As of year-end 2008, the number of credit cards in circulation registered 33.95 million and total transaction value reached NT\$1,394.1 billion in 2008, compared to 24.13 million and NT\$771.9 billion in 2001, representing increases of 41% and 81%, respectively, during 2001-2008 (see Table 4).

Table 4
Cards in Circulation and Transaction Value of Credit Cards

10 thousand, NT\$100 million

Year-end	2001	2002	2003	2004	2005	2006	2007	2008
Cards in Circulation	2,413	3,159	3,785	4,418	4,549	3,832	3,643	3,395
Value	7,719	8,736	9,989	12,545	14,210	13,805	14,135	13,941

Source: Website of the Financial Supervisory Commission, Executive Yuan (<http://www.fscey.gov.tw>)

3.2.4 Credit Transfers

A credit transfer is a payment agreement made between the payer and the bank for the purpose of transferring the payer's funds to specified accounts of payees. This kind of payment is not only applied to remote remittances or large-value funds transfers in order to avoid delivering real cash, but also suitable for regular, recurrent payments with small values, such as firms' payrolls or dividend issuances. Most credit transfers are processed through interbank electronic funds transfer systems, for example: the CIFS for large-value funds transfers; the Financial Information Service Co., Ltd.'s Interbank Remittance System (FISC-IRS), which provides a variety of remittance services for the public and government; Taiwan Clearing House's Automated Clearing House (TCH-ACH); or the Nationwide Bill/Tax Payment System (mainly used to pay bills and taxes). The last two systems are generally used for small-value funds transfers.

3.2.5 Direct Debits

A direct debit is an agreement between the payee and the banks made for the purpose of moving funds from the payer's banking accounts into the payee's banking accounts, e.g. to collect utilities (water, electricity) fees, insurance fees and so on. Before executing direct debits, the payee must obtain letters of authorization stating that payers agree to debit from their banking accounts.

3.2.6 E-Money

E-money refers to a device that holders can use to prepay and store value electronically with cards or networks and later use to pay for goods and services at contract shops. In recent years, domestic banks have issued a chip-based stored value card by the name of "E-Money Smart Pay", which is the main e-money product in Taiwan and can be used for shopping or bill payment. Each card is allowed to store a money value of no more than NT\$10,000, and its residual value is redeemable. Some international organizations such as VISA and MasterCard have proposed to introduce their e-money products into the domestic market for many years, but these projects are still in their pilot phases, mainly due to consumers' payment habits and huge investment costs required to establish the systems. For these reasons, the transaction volume and value of e-money are still somewhat limited.

To promote the application scope of e-money products, the Act Governing the Issuance of Electronic Stored Value Cards was approved by the Legislative Yuan and signed into force by the nation's President in January 2009. In the future, the "Easy Card", an electronic stored value card designed for the public to pay transportation fees only, will widen its range of application to include shopping and paying bills. With the scope of the

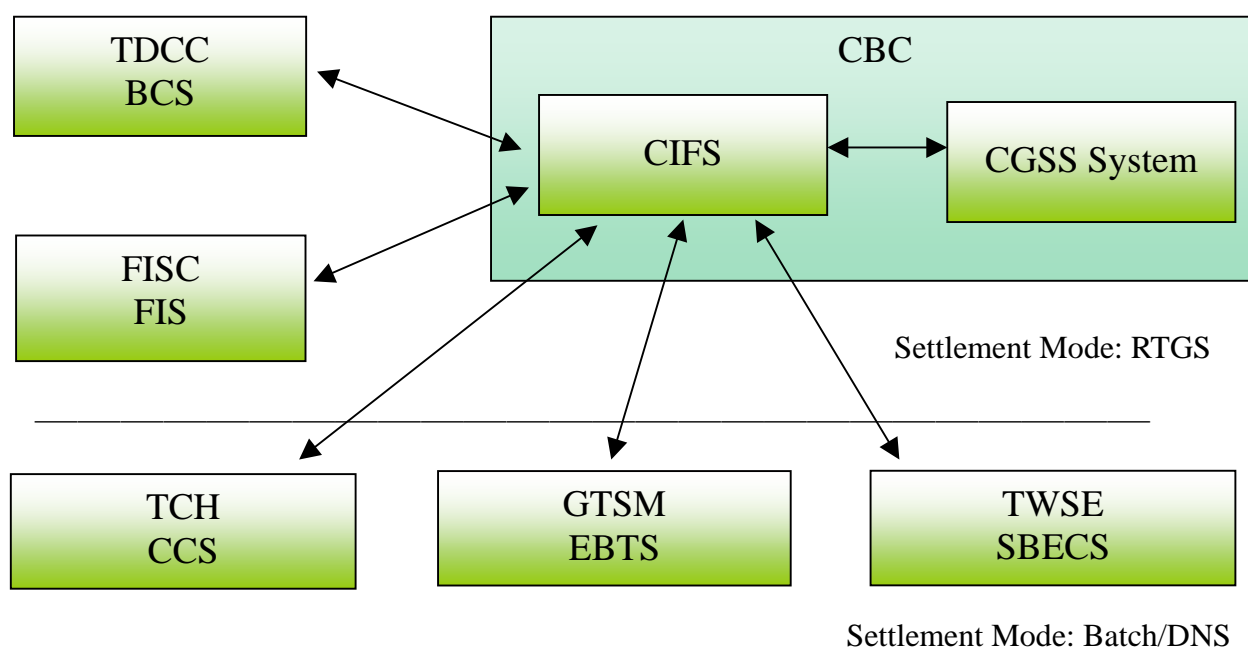
Easy Card expanded to allow multipurpose uses, the development of e-money in Taiwan is likely to forge ahead into a new era.

4. Current Situation of Important Payment and Settlement Systems

Acting as the hub of the nation's payment and settlement systems in Taiwan, the CBC's CIFS links with the following systemically important payment systems: CBC's Central Government Securities Settlement (CGSS) System; FISC's Financial Information System (FISC-FIS); TCH's Check Clearing System (TCH-CCS); Taiwan Depository and Clearing Corporation's Bills Clearing System (TDCC-BCS); Taiwan Stock Exchange Corporation's Securities Book-Entry Clearing System (TWSE-SBECS); and GreTai Securities Market's Electronic Bond Trading System (GTSM-EBTS) (see Chart 1). In this chapter, the first section introduces the CIFS, the second covers other funds transfer systems, and the third describes the securities settlement systems.

Chart 1

Framework of Payment and Settlement Systems in Taiwan



4.1 The CBC Interbank Funds Transfer System (CIFS)

4.1.1 System Features

The CIFS is a large-value electronic payment system, launched in May 1995 with the purpose of improving the efficiency of funding across domestic financial institutions. Financial institutions may apply to access the CIFS if they have the CBC's approval to open a deposit account of the CBC. In addition to dealing with interbank funding, reserves requirement adjustment and funds settlements in financial markets, such as call loans, foreign currency trades, and bond and bill trades, the CIFS also provides interbank final settlement services to clearing institutions such as TCH, FISC, TDCC and TSEC.

To assist the FISC-FIS to smooth its operations, the CBC permits financial institutions to open a pool account, called the "Interbank Funds Transfer Guarantee Special Account" (Guarantee Account), so as to warrant the clearing of every interbank payment dealt with by the FISC-FIS. In addition, the CBC approves the TWSE and the GTSM to open settlement accounts and to connect their clearing systems with the CIFS in order to deal with the final settlement of net clearing balances resulting from financial market transactions with respect to TWSE-listed stocks, GTSM-listed stocks and bonds. These arrangements not only help financial institutions to centralize their liquidity management, but also increase settlement security with risk-free central bank money as the settlement asset.

The CIFS is primarily designed with both real time and designated time transfers. Since designated time settlement arrangement is designed to execute total final settlement only at the end of the business day, it might introduce settlement risks to other participants if any participant fails to settle its payment obligations. To contain such risks and comply with the Core Principles recommended by the BIS, the CIFS has adopted the RTGS arrangement since September 2002, under which every payment order initiated by the financial institution for settling interbank funds transactions shall be executed and settled immediately in terms of real-time and transaction-by-transaction conditions if balance amounts or credit lines of the payer's banking accounts are sufficient. Then the transaction with final settlement shall be irrevocable so as to protect participating financial institutions from systemic risks by effectively excluding deficient payments from the system.

In response to the increased demand for liquidity on account of implementing the RTGS and in order to streamline the system operation, the CBC took the following supplementary actions:

4.1.1.1 Provide Intraday Overdrafts

Employing pledges backed with eligible collaterals, such as central government bonds, treasury bills and CBC CDs, financial institutions may apply to the CBC for liquidity accommodation with a view to settlement. To avoid potential abuse, an intraday overdraft is calculated by multiplying the amount of the overdraft with the time span of the credit extension (measured by minutes), and the CBC may charge this liquidity accommodation according to its Accommodation Rate with Collateral. Once a certain intraday overdraft is not refunded by a participating financial institution by the deadline, such that it must be carried over to the next business day, the CBC may begin to charge this financial institution a penalty interest rate, which is calculated by multiplying the amount of the un-refunded overdraft with the time span of the credit extension in terms of 1.2 times the CBC's Accommodation Rate without Collateral. If the un-refunded overdraft is carried over to the next business day, the penalty interest rate shall be doubled, and the CBC, starting from the third business day, may suspend this default financial institution's access to an intraday overdraft temporarily. If a financial institution has its intraday access suspended by the CBC twice within a year, this bank will have its qualification to apply for the intraday overdraft function called to a halt for a certain period.

4.1.1.2 Incorporate Queuing Mechanism

Once a payment order is initiated by a participating institution with insufficient account balances to cover it, the payment order will temporarily be held by the Queue system according to its priority, which may fall into four categories of interbank transactions: (1) financial institutions' accrued funds payable to the CBC; (2) financial institutions' accrued bills of exchange payable, accrued net bills of exchange payable, and funds transfers to the CBC's Guarantee Account, or for securities settlements to the CBC's Guarantee Account for Interbank Clearing Businesses; (3) financial institutions' forward payments to refund call loans at maturity; and (4) interbank funds transfers or other payments. The system mechanism is designed to keep payment orders in the queue line until the deficiency of current accounts is made up in order to avoid inputting payment orders repeatedly. The queue system adopts the principle of Bypass FIFO (first in first out) to handle payment orders according to their priority ranks, i.e. for the same category, payment orders are executed in the manner of first-in-first-out and by-pass. If the available balance is not sufficient to settle the next payment order, latter ones will simply be moved forward to be executed. Only when all payment orders of the same category are settled will the execution be moved to the next category. When the system runs to close off, all payment orders with insufficient available balances that are still held in the queue line will be revoked by the system directly.

4.1.1.3 Set Requirements for Throughput Ratio

To control the daily flow of payment orders on the CIFS, the CBC has stipulated throughput ratio requirements so as to avoid deferring payments and thereby affecting participants' funding schedules. According to the required throughput ratio, all banks shall finish their daily transaction value by at least 50% (30% for bills finance companies) no later than 14:30, and at least 80% (for both banks and bills finance companies) no later than 16:30.

4.1.2 Recent Important Reforms

4.1.2.1 Incorporating BCS into the CIFS

To promote the clearing efficiency of short-term bills, avoid default-delivery risk and prevent bills from being counterfeited, lost or stolen, the Ministry of Finance in March 1999 joined with the CBC and the FISC to set up a task force, which was assigned to promote an institutional arrangement for creating a central bills depository clearing and settlement system and to establish the Debt Instrument Depository & Clearing Corporation (DIDC, which was merged into the TDCC in 2006) responsible for constructing a system with information and communication technologies and to stipulate rules for system operation. In April 2004, the bills clearing system was brought into operation. Since this system is designed to handle bills with central depository registration and book-entry delivery, and to settle funds with DVP mode through linking with the CIFS, it may promote the delivery efficiency of bills transactions and effectively contain the default risk of funds settlement.

4.1.2.2 Incorporating Payments for the Settlement of Stock Transactions into the CIFS

Since July 2007, all final settlements, resulting from clearing stock transactions (both TWSE-listed and GTSM-listed stocks) in the TWSE-SBECS and clearing bond transactions in the GTSM-EBTS, have been executed across settlement accounts (TWSE, GTSM) and current accounts (banks) in the CIFS in order to improve the delivery efficiency of stock exchanges and to reduce the settlement risks of funds transfers. Starting from July 2008, the CBC has further allowed the payments related to block trades in the securities markets to be settled through the CIFS so as to be consistent with the settlement of transactions for securities firms and to improve the safety of funds settlement.

4.1.2.3 Incorporating Payments Related to the CGSS System into the CIFS

To contain systemic risk and improve safety and efficiency in the settlement of the domestic government bonds market, the CBC linked the CIFS with the CGSS System in

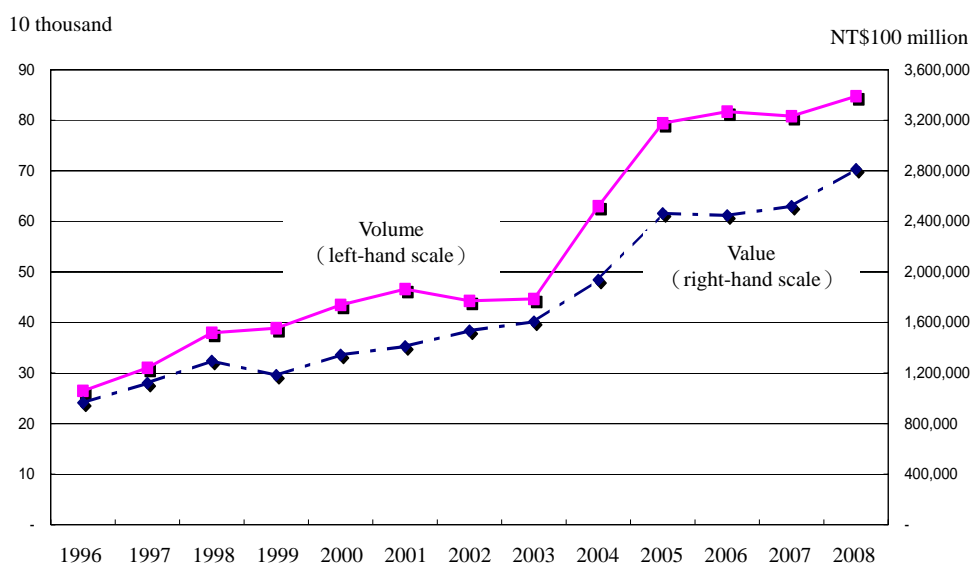
April 2008 so that fund settlements, principal redemptions and interest payments in the CGSS System are now dealt with by the CIFS using DVP mode.

With the reforms mentioned above, the CIFS has come to be an electronic funds transfer hub for the domestic banking industry by extending its original service scope of large-value interbank payments and final settlements for clearing institutions such as the TCH and FISC to include all NTD interbank funds settlements for bond, bill and stock markets. Thus far, a complete system framework of national payment infrastructure has been well established in Taiwan.

4.1.3 Transaction Statistics

During 2008, total transactions in the CIFS registered 0.847 million by volume and NT\$281,280 billion by value. As indicated by Chart 2, both volume and value handled by the CIFS has increased steadily since 1995. Especially after the CIFS was linked with the BCS in 2004, the growing trend became even more pronounced.

Chart 2
Historical Operation of CIFS



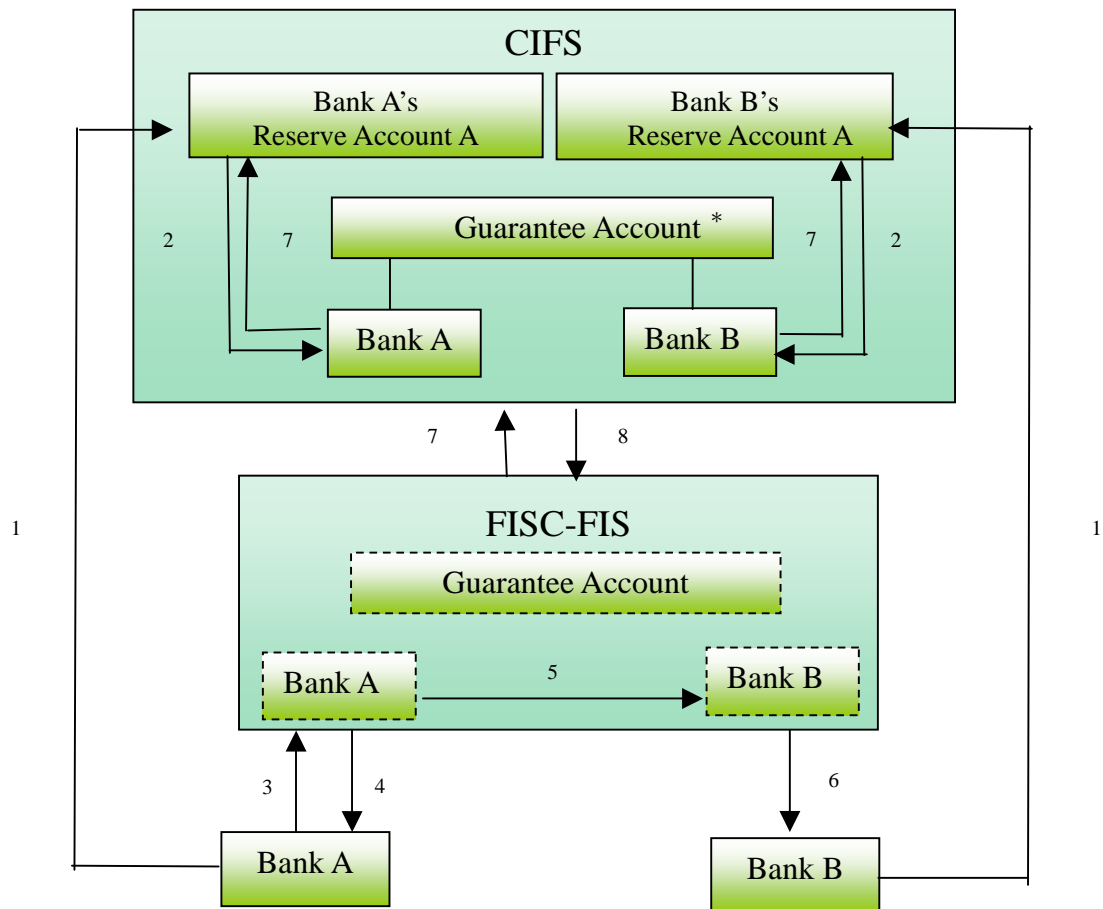
Source: The Central Bank of the R.O.C. (Taiwan)

4.2 Other Funds Transfer Systems

4.2.1 FISC-FIS

The FIS was established by the Financial Information System Group, the predecessor of the FISC, to promote financial information services. The main business function of the FISC is to operate an interbank on-line network by which provides cash withdrawals and funds transfers via Automated Teller Machines (ATMs) as well as interbank remittance services. The FISC-FIS provides real-time interbank funds transfer services, using the funds deposited by financial institutions in the Guarantee Account as the basis to guarantee clearance for every transaction. At the beginning of (or during) the business day, each participating bank usually transfers funds from its Reserve Account A to the Guarantee Account in order to meet the needs for daily interbank payments. At the close-off time, all residual funds in the Guarantee Account shall be transferred back to its Reserve Account A, except for leaving a fixed portion for 24-hour ATM operations. The settlement flow of the FISC-FIS is described in Chart 3.

Chart 3
Settlement Flow of FISC-FIS



*The Guarantee Account is a pool account composed of banks' sub-accounts.

Notes:

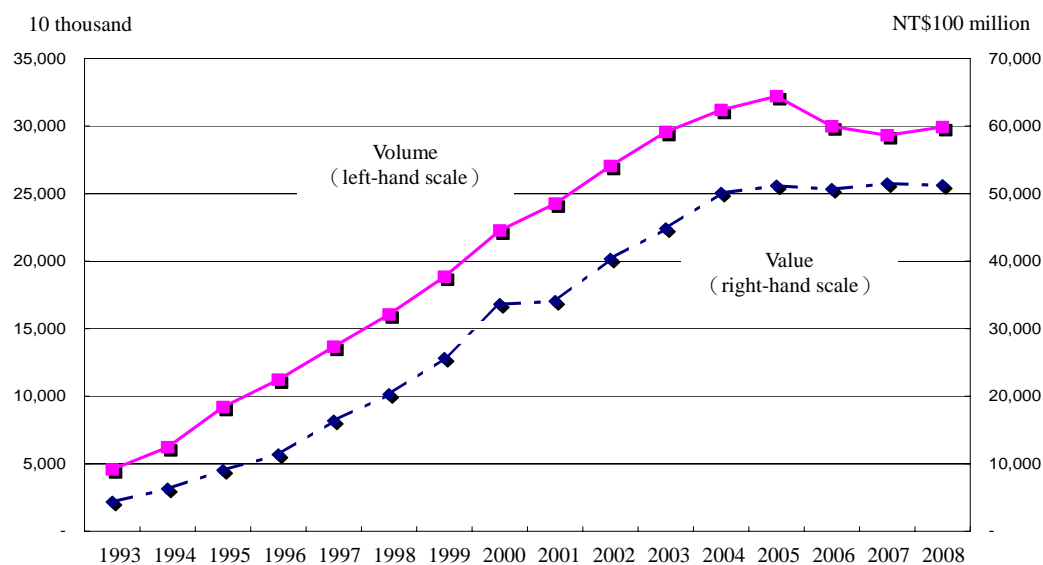
1. Each bank transfers funds from its Reserve Account A to the Guarantee Account through CIFS at the beginning of (or during) the business day.
2. Funds are transferred from Bank A's (Bank B's) Reserve Account A to the Guarantee Account.
3. Bank A initiates a payment order to FISC-FIS.
4. FISC-FIS acknowledges the receipt of Bank A's payment order.
5. FISC-FIS checks whether Bank A's account balances are sufficient to cover this payment. If yes, it then transfers money value from Bank A's account to Bank B's account.
6. FISC-FIS informs Bank B whose account's money value has been added to.
7. FISC-FIS informs CIFS to start the transfer operation and CIFS transfers funds from the Guarantee Account to Bank A's (Bank B's) Reserve Account A.
8. CIFS informs FISC-FIS that it has completed the transfer.

The FISC-FIS is mainly composed of three sub-systems as below:

4.2.1.1 Shared ATM System

The shared ATM system was launched in January 1987 to provide the public with financial services such as 24-hour interbank withdrawals balance inquiries, interbank funds transfers, cash advance with credit cards, cross-border withdrawals and so forth. During 2008, total interbank withdrawals and funds transfer transactions handled by this system registered 299 million by volume and NT\$5,121 billion by value (see Chart 4).

Chart 4
Historical Operation of Shared ATM System

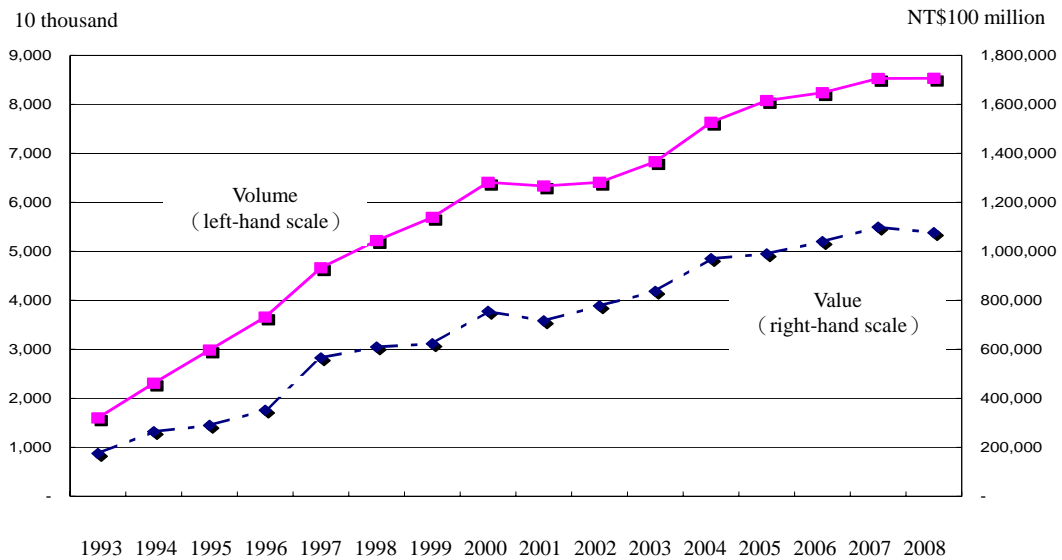


Source: The Financial Information Service Co., Ltd.

4.2.1.2 Interbank Remittance System (IRS)

The IRS was brought into operation in August 1987 to provide treasury funds transfer services to government and financial institutions as well as interbank funds transfer services to corresponding banks, besides general credit funds transfers to individuals and firms. During 2008, total transactions dealt with by this system registered 85 million by volume and NT\$107,626 billion by value (see Chart 5).

Chart 5
Historical Operation of IRS

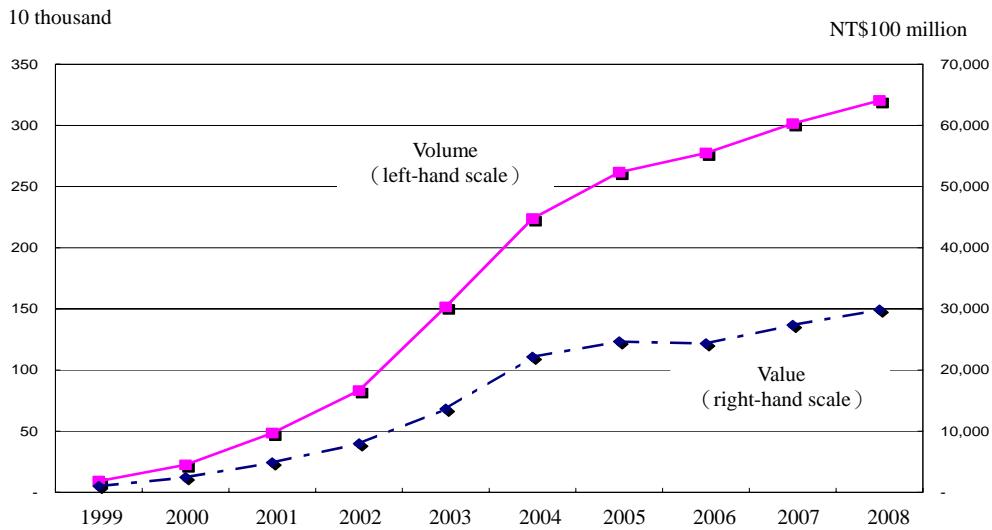


Source: The Financial Information Services Co., Ltd.

4.2.1.3 Financial Electronic Data Interchange (FEDI) System

The FEDI system was launched in January 1997 to provide firms with a direct channel to connect with their corresponding banks for financial services. The client user may directly execute funds payments and transfers at its office through this FEDI system to connect with its corresponding banks after passing the security code validation and electronic signature authorization. During 2008, total transactions dealt by this system registered 3.2 million by volume and NT\$2,985 billion by value (see Chart 6).

Chart 6
Historical Operation of FEDI System



Source: The Financial Information Services Co., Ltd.

Additionally, the FISC-FIS also includes the following sub-systems: Direct Debit; Nationwide Bill/Tax Payment; Internet Banking; Mobile Banking; and Financial XML. These systems operations in 2008 are summarized in Table 5.

Table 5
Operations of FISC Sub-Systems in 2008

System	10 thousand, NT\$100 million	
	Volume	Value
Nationwide Bill/Tax Payment	2,379	804
Internet Banking	1,900	4,018
Direct Debit	31	3
Financial XML	21	699
Mobile Banking	7	52

Source: The Financial Information Service Co., Ltd.

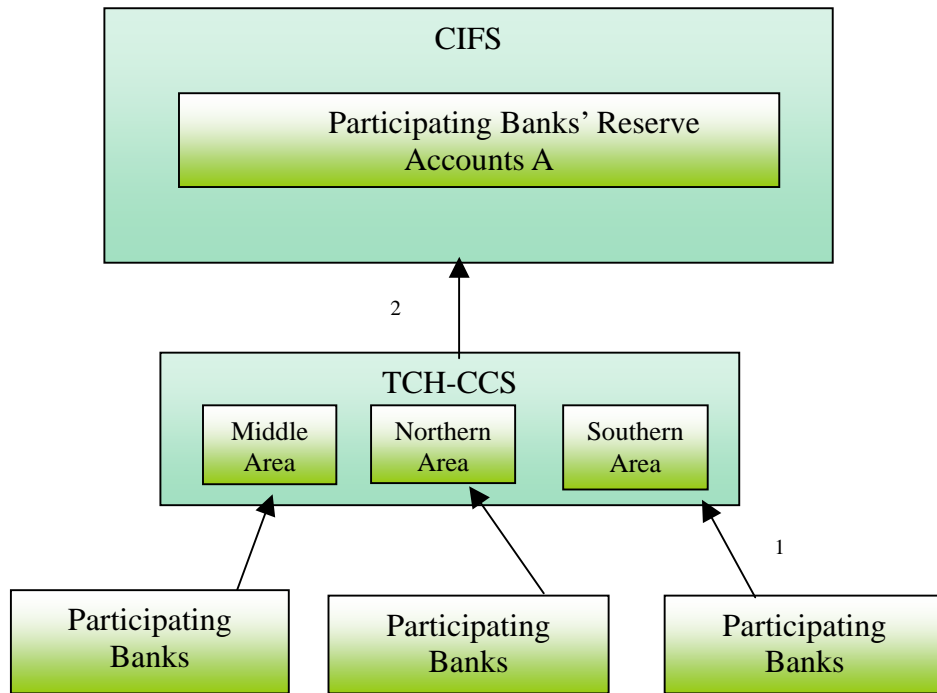
4.2.2 TCH-CCS

4.2.2.1 MICR-CCS

Until 2002, there were 16 domestic clearing houses in Taiwan, and each one operated individually within its own area. Under the CBC's guidance, with a view to integrating their resources for fully effective application, the 16 domestic clearinghouses were merged into a non-profit legal entity under the name of "Taiwan Payments Clearing System Development Foundation" in November 2002, under which the TCH was established to continue handling the check clearing business and to use the business site of the previous Taipei Clearinghouse as its headquarters. The other clearing houses were reorganized into regional branches of the TCH.

Currently, almost all of the check-clearing transactions are handled by magnetic ink character recognition machines (MICRs) to apply automation to the check clearing process throughout Taiwan, except in remote countryside areas, such as eastern Taiwan, including Hwa-Lien and Taitung, and the outlying Penghu islands, where check clearing remains a manual process. Furthermore, the TCH has followed the so-called principle of "clear locally, settle centrally" to handle the check clearing business in western Taiwan, which is divided into three clearing areas. All paper checks collected by participating banks in each area are respectively sent to three clearing centers: Taipei in northern Taiwan, Taichung in middle Taiwan and Kaoshing in southern Taiwan for centralized clearance, and the net accrued balances payable or receivable are then sent to the CIFS for centralized settlement. The details of the check settlement flow are summarized in Chart 7. The volume of this check clearing system has declined year by year on account of emerging electronic payments. During 2008, total transactions processed by this check clearing system registered 134.66 million by volume and NT\$20,580.6 billion by value (see Chart 8).

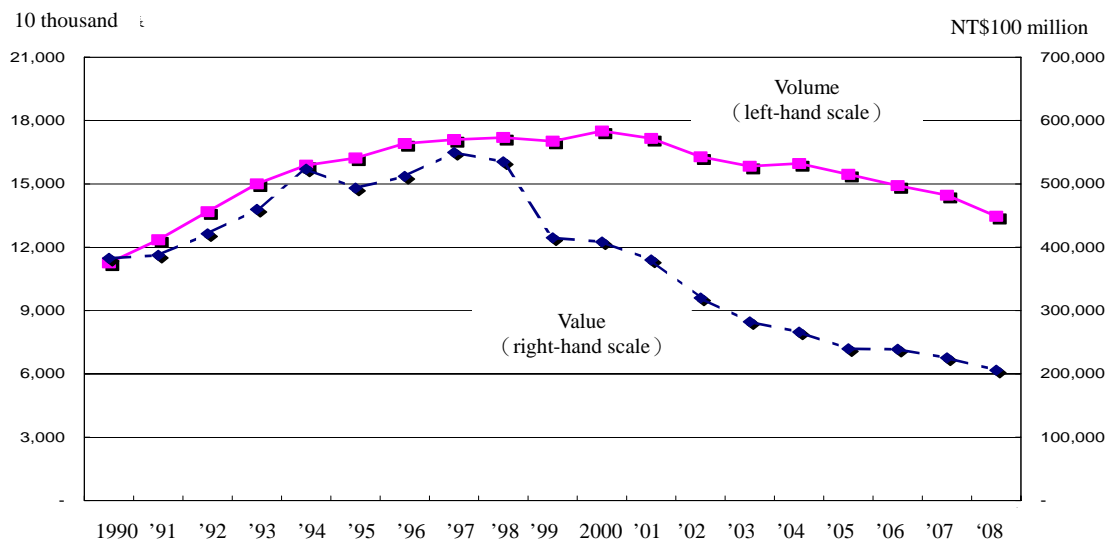
Chart 7
Settlement Flow of TCH-CCS



Notes:

1. Paper checks collected by participating banks will be sent to regional branches of TCH and then the aggregated checks are sent to a regional clearing center nearby.
2. Resulting net accrued balances payable or receivable are sent to CIFS for final settlement through current accounts that participating banks hold with the CBC.

Chart 8
System Operation of TCH-CCS



Source: Taiwan Clearing House

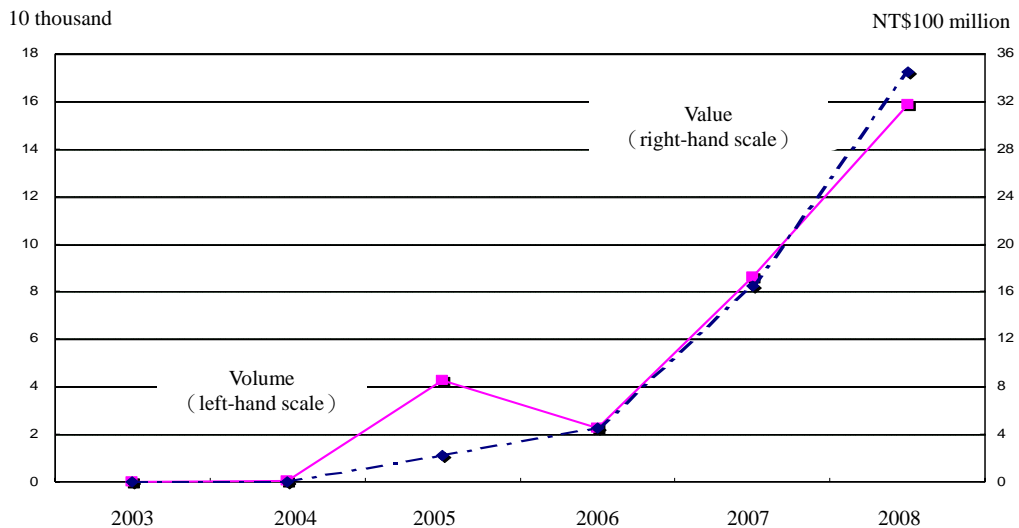
4.2.2.2 ACH System

The ACH system was launched by the TCH in June 2002. Financial institutions may use disks, magnetic tapes or electronic media to record some recurrent and regular payment transactions, such as payrolls, dividends, utilities fees, taxes for their clients, firms and individuals, and then transmit these media data through networks or transportation delivery to the TCH for batch processing. The resulting outcomes will be returned to banks for subsequent funds transfers across relevant clients' accounts, while resulting net accrued balances payable and receivable between banks will be sent to the CIFS for final settlement. During 2008, total transactions dealt with by this ACH system registered 53.58 million by volume and NT\$1,442 billion by value (see Chart 9).

4.2.2.3 E-Check System

To develop a funding solution for electronic commerce, the TCH launched an E-Check system for banks' applications on September 29, 2003. So far, a total of 9 financial institutions have accessed this system. The TCH has further implemented a shared platform of designated payees' accounts for those banks without access to this E-Check system. The TCH has been promoting the E-Check system since its inception, and during 2008, total E-Checks drawn registered 0.15 million by volume and NT\$3.4 billion by value (see Chart 10).

Chart 10
Historical Operation of E-Check System



Source: Taiwan Clearing House

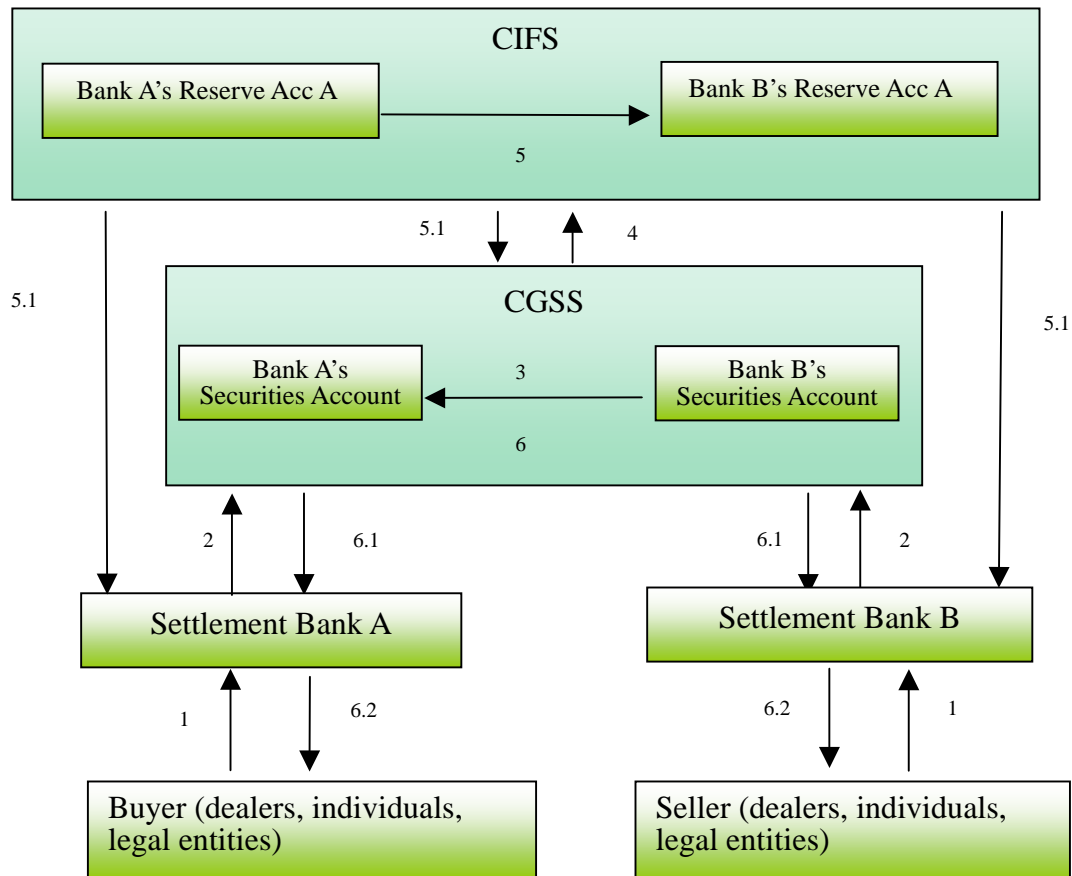
4.3 Securities Settlement Systems

4.3.1 CGSS System

The CBC implemented the Central Government Bonds Settlement System in book-entry (dematerialized) form in September 1997. In October 2001, treasury bills were then incorporated into the book-entry system. The CGSS System adopted the RTGS mechanism to register the issuance of central government bonds and treasury bills and, through the connection between the CBC and settlement banks, to deal with the issuance, redemption, transfer and interest and principal payments of government securities in computerized book-entry form. Currently, almost all the transactions of central government securities are processed in dematerialized form.

With the adoption of an interbank DVP mechanism in April 2008, the CGSS System was connected to the CIFS. This connection facilitates book-entry transactions related to issuance, redemption and secondary market transactions of government securities to be transferred through the CIFS. The DVP mechanism ensures that the transfer of securities from the seller to the buyer is final if and only if the transfer of funds from the buyer to the seller is final. Consequently, principal risk is effectively eliminated as there are no potential risks that the seller of a security could have delivered the security without receiving funds payment or that the buyer of a security could have paid for the transaction without receiving the security. Therefore, the operation of this system promotes the safety and efficiency of domestic government securities settlement. In addition, interest and principal payments within the CGSS System settled through the CIFS enhance the efficiency of large-value payments. The settlement flow of the CGSS System is shown in Chart 11.

Chart11
Settlement Flow of CGSS System

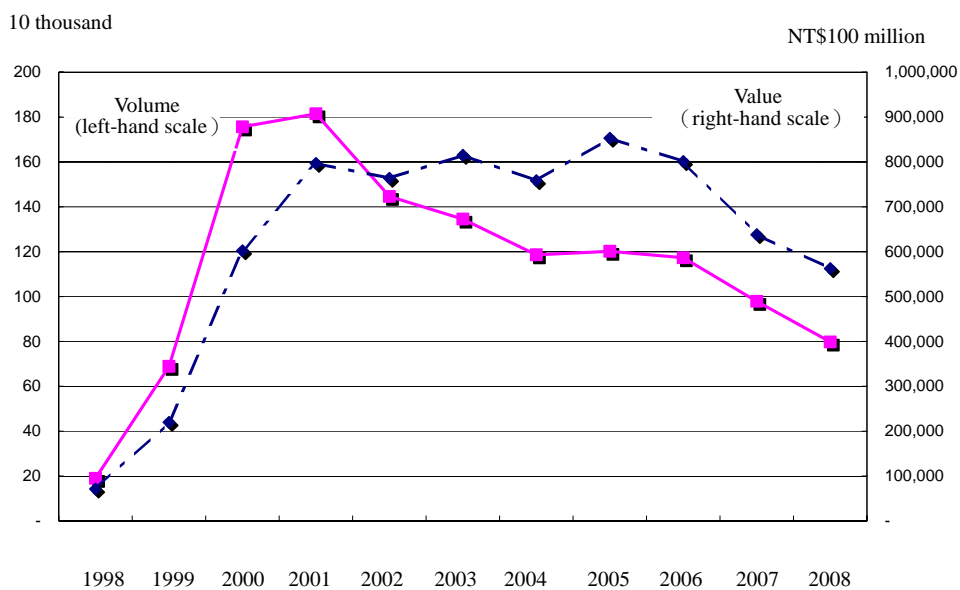


Notes:

1. Left: The buyer informs Settlement Bank A of the trade.
Right: The seller informs Settlement Bank B of the trade.
2. Left: Settlement Bank A informs CGSS System of securities to be delivered and requests payment.
Right: Settlement Bank B informs CGSS System of payment to be paid and requests delivery of securities.
3. CGSS System blocks securities position after matching.
4. CGSS System informs CIFS to transfer funds.
5. CIFS transfers funds by debiting Settlement Bank A's account and crediting Settlement Bank B's account.
5.1 CIFS informs CGSS System of the completion of funds transfer.
6. CGSS System transfers securities by debiting Settlement Bank B's securities account and crediting Settlement Bank A's securities account.
6.1 CGSS System informs Settlement Bank A/B of the completion of securities delivery.
6.2 Left: Settlement Bank A implements the settlement by debiting the buyer's deposit account and crediting the buyer's securities account.
Right: Settlement Bank B implements the settlement by debiting the seller's securities account and crediting the seller's deposit account.

Transactions transferred through the CGSS System began declining in November 2001, after outright trades between securities dealers were required to be settled through the GTSM-EBTS. Furthermore, following decreasing securities market trades, the overall volume and value of CGSS transactions significantly shrank after 2005. During 2008, total transactions transferred by the CGSS System registered 0.79 million by volume and NT\$56,235.7 billion by value (see Chart12).

Chart 12
Historical Operation of CGSS System

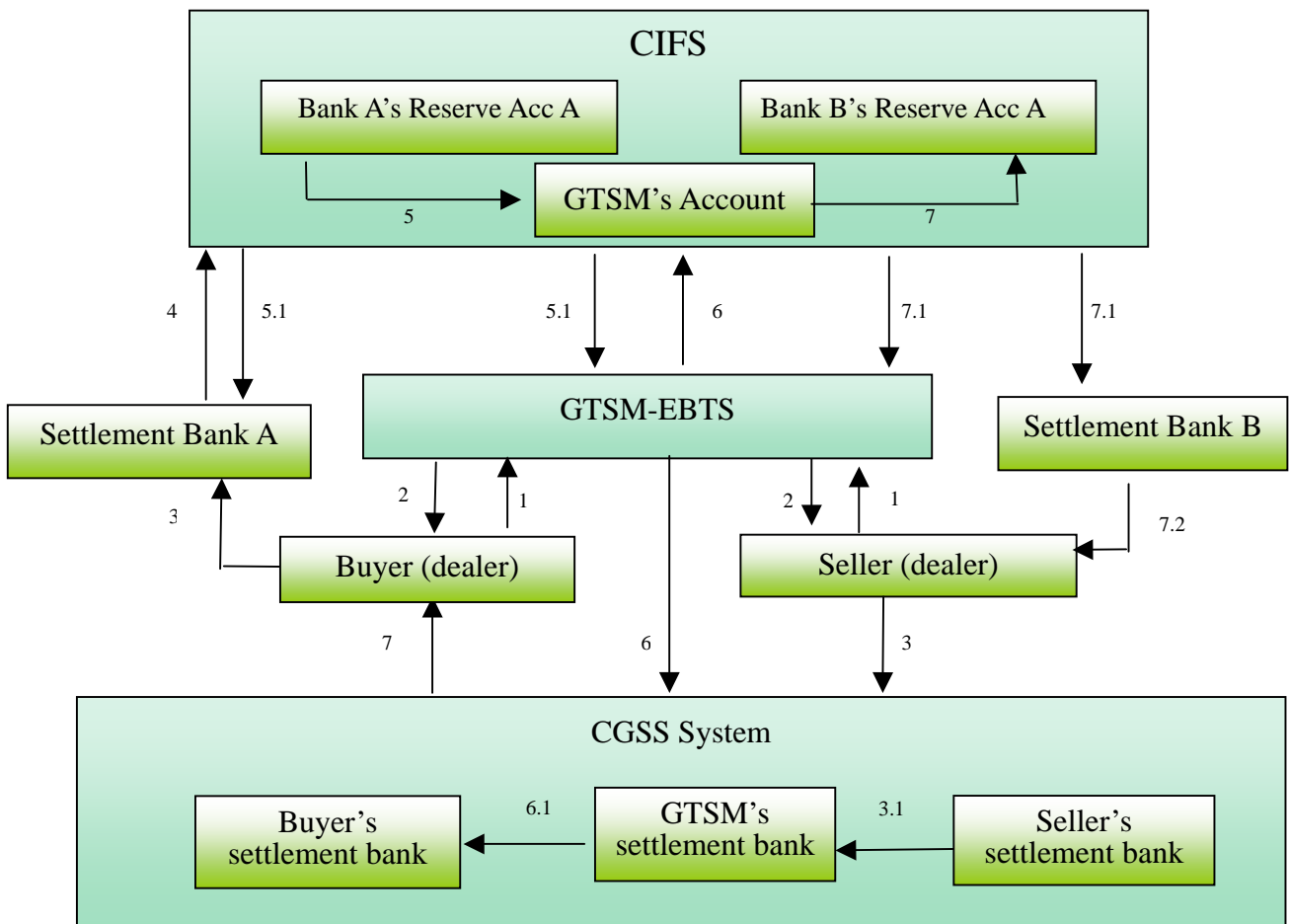


Source: The Central Bank of the R.O.C. (Taiwan)

4.3.2 GTSM-EBTS

Most outright trades in Taiwan’s bond market originate from the issuance of government bonds, with more than 90% transferred in netting process through the GTSM-EBTS. The GTSM originally implemented the clearing of EBTS payments through its accounts at the Bank of Taiwan or Cathay United Bank. To promote the safety and efficiency of securities dealers, in July 2007, the GTSM was permitted to hold a settlement account at the CBC. This account and the reserve accounts A of securities dealers’ correspondent settlement banks enable payments between the GTSM and securities dealers to be settled through the CIFS. The settlement flow of the EBTS is shown in Chart 13. During 2008, total transactions handled by the GTSM-EBTS registered NT\$53,711.7 billion by value (see Chart 14).

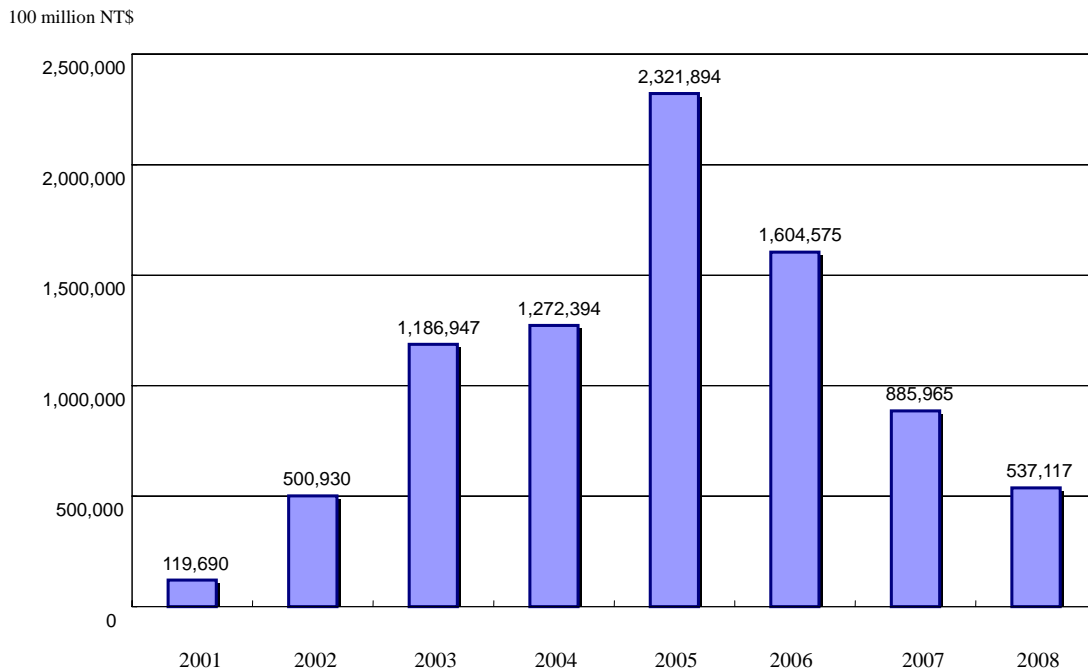
Chart 13
Settlement Flow of GTSM-EBTS



Notes:

1. The buyer inputs the message of bidding or trading.
2. GTSM informs the buyer of netting balance after clearing.
3. Left: The buyer deposits the amount of net debit balance.
Right: The seller informs CGSS System of the securities to be delivered.
- 3.1 CGSS System transfers securities position from the seller's settlement bank account into GTSM's settlement bank account.
4. Settlement Bank A transfers funds through CIFS.
5. CIFS Debits Bank A's reserve account A.
5.1 Left: CIFS informs Bank A of debiting its reserve account A.
Right: CIFS informs GTSM-EBTS of debiting Bank A's reserve account A.
6. Upper: GTSM informs CIFS to transfer funds into Bank B's reserve account A.
Lower: GTSM informs CGSS System to transfer securities position.
- 6.1 CGSS System transfers securities position from GTSM's settlement bank account to the buyer's settlement bank account.
7. Left: CGSS System informs the buyer of the settlement of securities; Right: CIFS credits Bank B's reserve account B.
- 7.1 Left: CIFS informs the GTSM-EBTS of crediting Bank B's reserve account A.
Right: CIFS informs Bank B of crediting its reserve account A.
- 7.2 Settlement Bank B informs the seller of the settlement of funds.

Chart14
Transaction Value of Outright Trades of Government Securities
Using GTSM-EBTS



Source: Website of the GreTai Securities Market (<http://www.otc.org.tw>)

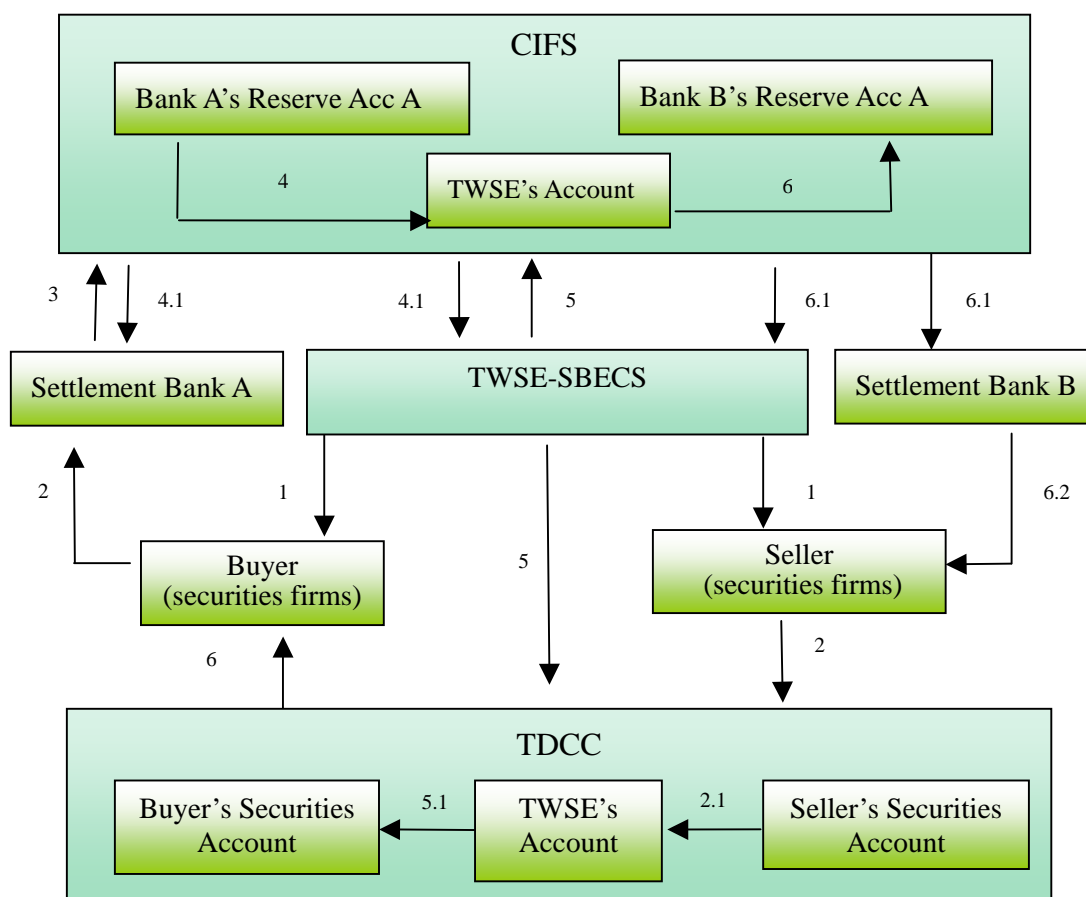
4.3.3 TWSE-SBECS

Securities clearing and settlement for stock market transactions used to be in materialized form before 1989. In response to expanding settlement transactions due to active trading in stock markets, the TWSE, the Fuhwa Securities Finance Co., Ltd. and some securities firms co-sponsored to establish the Taiwan Securities Central Depository Corporation (TSCD, reorganized as the TDCC in 2006) to deal with the custody and book-entry settlement of securities. The TSCD adopted book-entry form for funds and securities settlement in February 1995 with TWSE-listed stocks in the custody of the TSCD and delivered in book-entry form. The funds settlement between the TWSE and securities firms was processed through the TWSE's account employing the book-entry payment system of Cathay United Bank. To reduce liquidity needs, in August 2003, the netting balance of GTSM-listed stock transactions cleared through the GTSM was combined into the netting balance of TWSE-listed stock transactions. The combined netting balance was settled by the TWSE through the Cathay United Bank settlement account.

To promote securities settlement efficiency and reduce the potential risks of funds settlement, since July 2007, the combined netting balance of TWSE-listed stock and GTSM-listed stock transactions originally cleared by the TWSE have been settled through the CIFS on the settlement account of the TWSE and the reserve accounts of

securities firms' correspondent settlement banks held at the CBC. The relevant settlement flow is shown in Chart 15. During 2008, 778.9 billion units of TWSE-listed stocks were traded with a value of NT\$26,115.4 billion as shown in Chart 16. Over the same period, 102 billion units of GTSM-listed stocks were traded with a value of NT\$3,285.5 billion as shown in Chart 17.

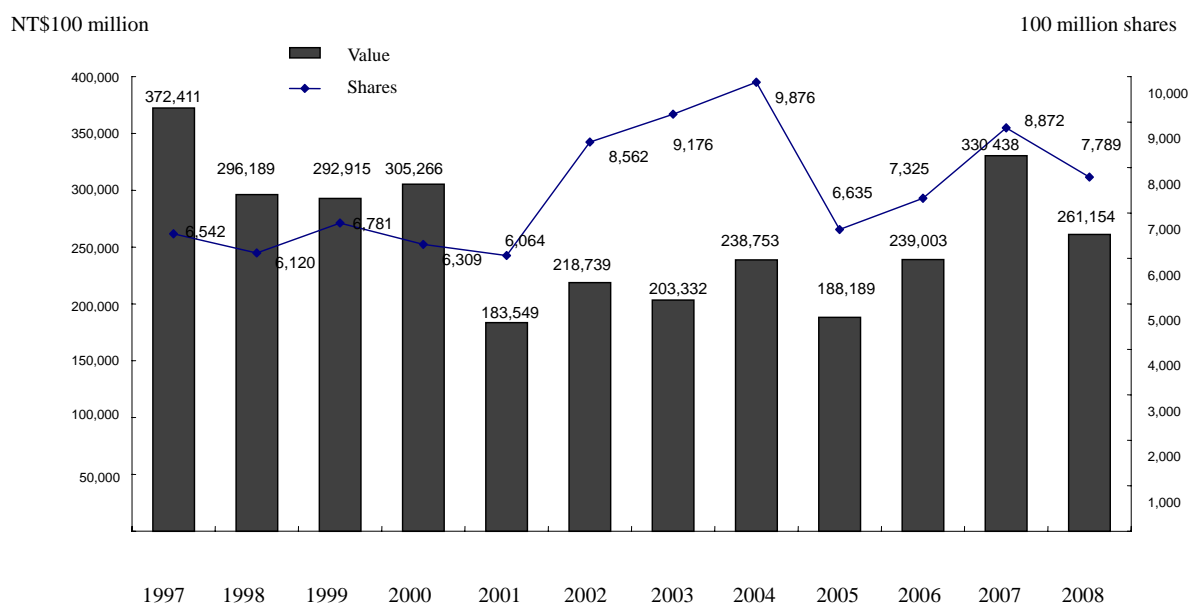
Chart15
Settlement Flow of TWSE-SBECS



Notes:

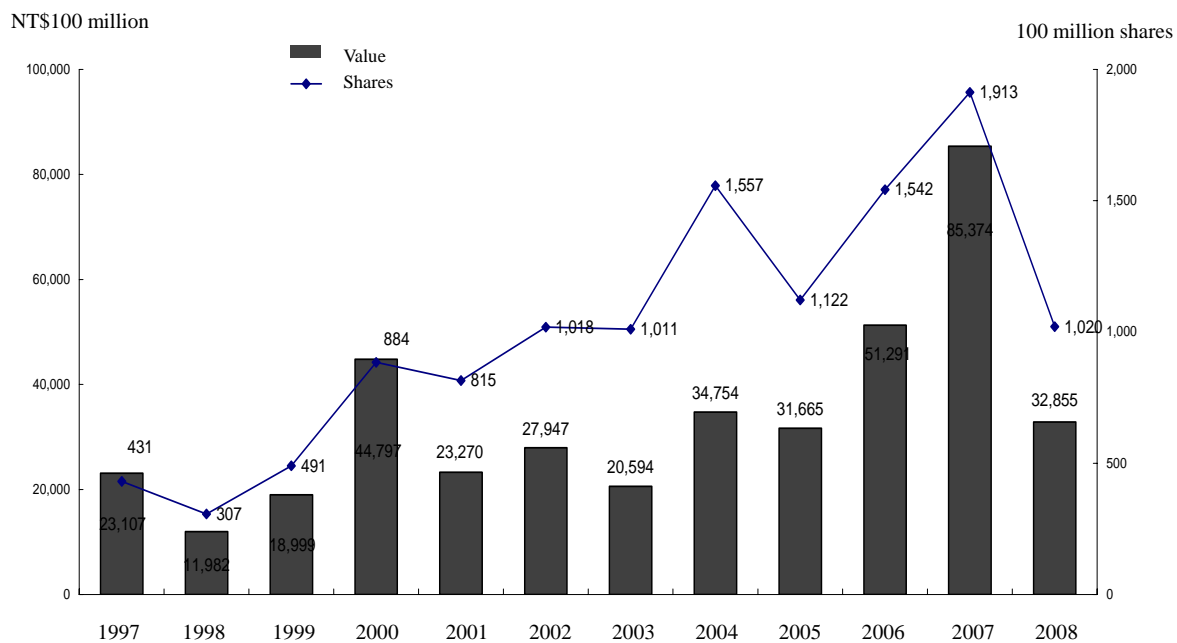
1. The buyer/seller receives the message of netting balance.
2. Left: The buyer deposits net payable amount of funds into Settlement Bank A.
Right: The seller informs the TDCC to transfer securities position.
2.1 TDCC transfers securities position from the seller's securities account to TWSE account.
3. Settlement Bank A deposits funds through its reserve account A in CIFS.
4. CIFS transfers netting balance from Bank A's reserve account A to TWSE account.
4.1 Left: CIFS informs Bank A of debiting its account.
Right: CIFS informs SBECS of debiting Bank A's account.
5. Upper: SBECS informs CIFS to credit Bank B's reserve account A.
Lower: SBECS informs TDCC to transfer securities position.
5.1 TDCC transfers securities position from TWSE account to the buyer's securities account.
6. Left: TDCC confirms the success of securities settlement.
Right: CIFS transfers netting balance from TWSE account to Bank B's reserve account A.
6.1 Left: CIFS informs SBECS of crediting Bank B's reserve account A.
Right: CIFS informs Bank B of crediting its reserve account A.
6.2 Settlement Bank B informs the seller of the success of funds settlement.

Chart 16
Trading Volume and Value of TWSE-listed Stocks in SBECS



Source: Website of the Financial Supervisory Commission, Executive Yuan (<http://www.fscey.gov.tw>)

Chart 17
Trading Volume and Value of GTSM-listed Stocks in SBECS

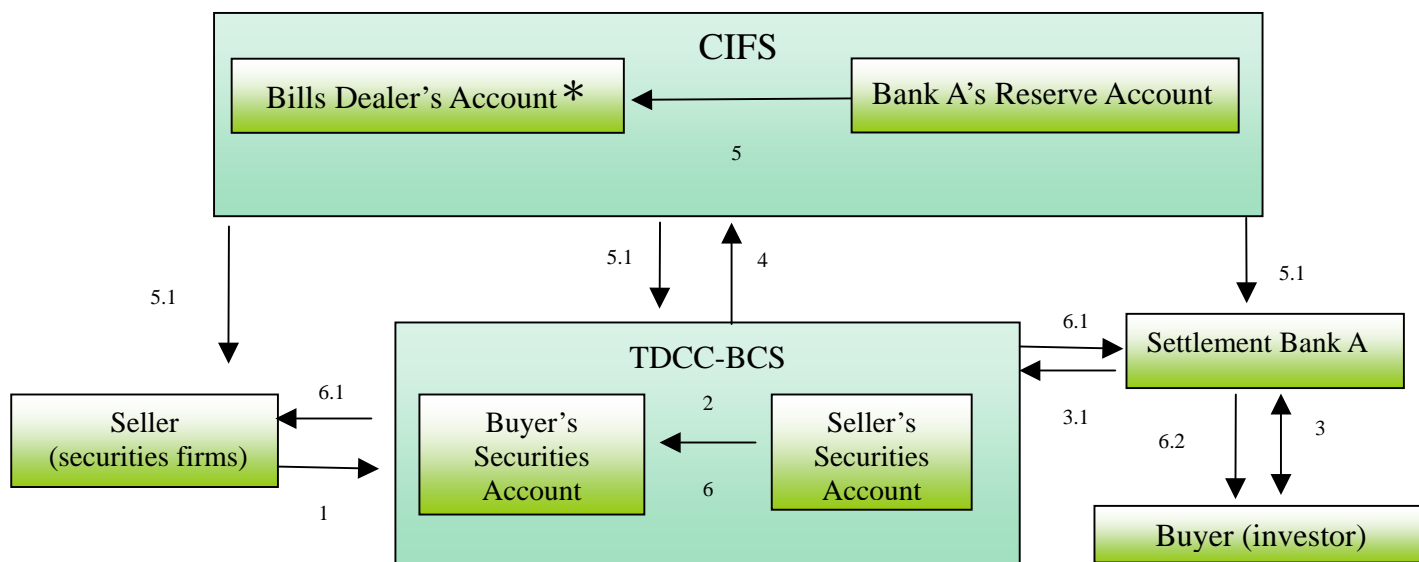


Source: Website of the Financial Supervisory Commission, Executive Yuan (<http://www.fscey.gov.tw>)

4.3.4 TDCC- BCS

Funds payments for bills market transactions were originally implemented through either the issuance of notes with the Bank of Taiwan as the payer, or the transfer through the IRS or the CIFS. On the other side, securities were settled through receiving physical securities or their receipts issued by custodian banks. To improve the efficiency of clearing and settlement and prevent default risks, the Ministry of Finance and the CBC coordinated to promote the system for the clearing and settlement of short-term bills. In April 2004, the DIDC was founded and put in charge of the custody, registry and computerized book-entry operation of short-term bills with funds settled in real time through the CIFS. In 2006, the DIDC and the TSCD were merged into the TDCC. The flow chart depicting the settlement operation of the BCS is shown in Chart 18.

Chart 18
Settlement Flow of TDCC-BCS



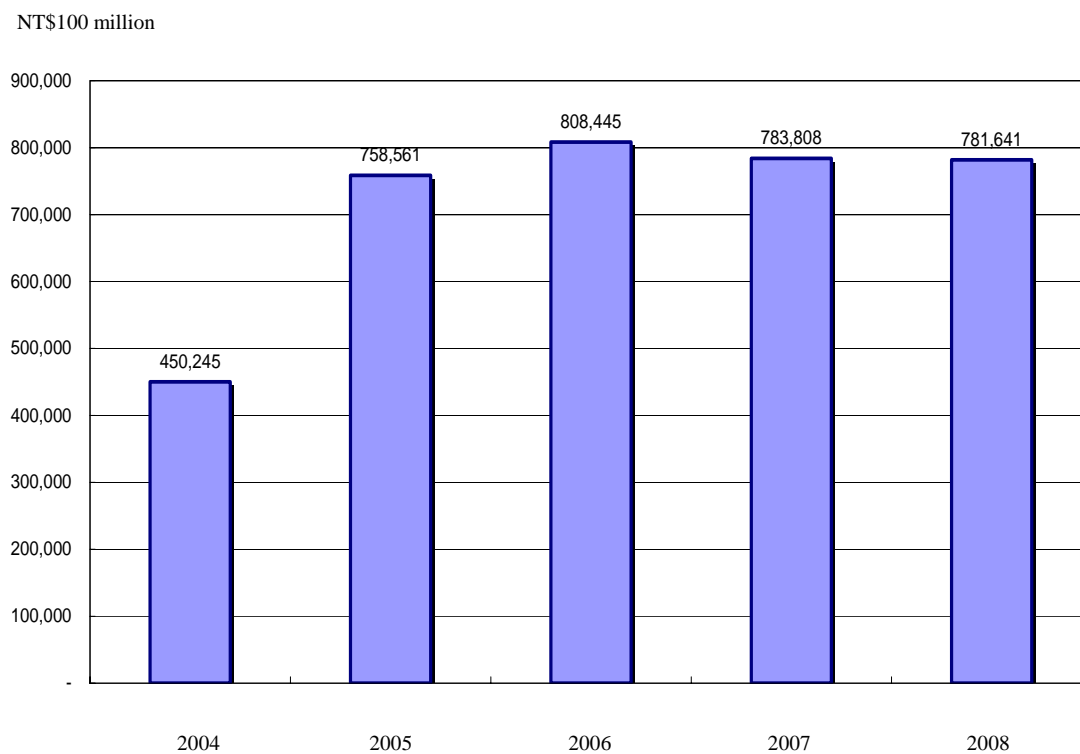
* The accounts of bills finance companies held at the CBC are entitled “Other Financial Institutions’ Deposit Account”.

Notes:

1. The seller inputs the message of settlement through BCS.
2. BCS blocks securities position.
3. The buyer confirms the settlement message.
 - 3.1 Settlement Bank A confirms the settlement message.
4. BCS informs CIFS to transfer funds.
5. CIFS transfers funds from Bank A’s account to the bills dealer’s account.
 - 5.1 CIFS informs BCS of the success of funds transferal.
6. BCS transfers securities position from the seller’s securities account to the buyer’s securities account.
 - 6.1 BCS informs Settlement Bank A and the seller of the success of securities settlement.
 - 6.2 Settlement Bank A informs the buyer of the success of securities settlement.

Transactions processed through the BCS during 2008 totaled approximately NT\$78,164.1 billion (see Chart 19), with most of the transactions related to issuance, redemption, outright purchase and repurchase agreements of financing commercial paper.

Chart 19
Trading Value in TDCC-BCS



Source: Website of the Taiwan Depository & Clearing Corporation (<http://www.tdcc.com.tw>)

5. The Relationship Between the CBC and Payment and Settlement Systems

Similar to central banks in other countries, the CBC has the responsibility to maintain the stability of the financial system by ensuring the smooth operation of payment and settlement systems so as to prevent systemic risk. Therefore, it has persisted in fostering the safety and efficiency of payment and settlement systems. As an operator of both the CIFS and the CGSS System, the CBC provides settlement accounts for the participants of important payment and settlement systems, and suggests modifications regarding the operational rules of other payment and settlement systems. Owing to these actions, the CBC plays a central role in Taiwan's payment and settlement systems. The first section of this chapter outlines international trends and developments in payment and settlement system oversight. The second section introduces the role of the CBC in Taiwan's payment and settlement systems.

5.1 The International Trends and Developments in Payment and Settlement Systems Oversight

Based on the concern for safety and efficiency, most countries designate their central banks to be an operator of at least one systemically important payment and settlement system. Since central banks are able to provide risk-free, sufficient and competitively neutral central bank money as settlement assets to ensure the smooth transfer of funds within the financial system, to prevent systemic risk, to help the implementation of monetary policy and, as a result, to achieve the policy objective of financial stability. In addition, the sound operation of payment and settlement systems is relevant to the performance of monetary policy and the stability of the financial system. Therefore, it has become an international trend that central banks are responsible for the oversight of payment and settlement systems. The following paragraphs present an international overview of the role that central banks play as the operators and overseers of payment and settlement systems.

5.1.1 Central Banks as the Operators of Payment and Settlement Systems

The trades between financial institutions related to money markets, securities markets and foreign exchange markets are commonly associated with large-value interbank settlements. If these settlements can not be dealt with by the relevant payment and settlement systems smoothly, payment obligations may be delayed and, in the worst cases, systemic risk could arise, affecting the stability of the financial system. Under such

circumstances, only central banks can act as the lender of last resort to intervene and solve the problems effectively. Therefore, central banks play an operational role regarding these payment and settlement systems in most countries. These systems are shown in Table 6.

Table 6

Large-value Payment and Settlement Systems of Central Banks in Some Countries

Country	System
Euro System	TARGET
Japan	BOJ-NET
Singapore	MEPS
Sweden	K-RIX
United Kingdom	CHAPS
United States of America	Fedwire

Source: "The Role of Central Bank Money in Payment Systems" published by CPSS, BIS, August 2003, which was translated into Chinese by the CBC and published in October 2006.

Retail payment systems with large-volume and small-value transaction characteristics have little potential to cause systemic risk. With the consideration of encouraging innovation and competitiveness, retail payment systems are operated by private institutions in many countries. Nevertheless, due to their historical background, or the lack of substitute systems in the short term, these systems may be recognized as important payment systems, which could possibly affect the efficiency of the entire payment system should a disruption occur, and consequently they are operated by central banks in some countries. Examples are: the Check Clearing System and the ACH system operated by the Federal Reserve Banks, the CEC system operated by the National Bank of Belgium, and the RPS system operated by the Deutsche Bundesbank.

5.1.2 Central Banks as the Overseers of Payment and Settlement Systems

Maintaining sound currency circulation, promoting financial stability, and implementing monetary policy have always been the most important responsibilities of central banks. The safety and efficiency of payment and settlement systems is significantly relevant to these responsibilities of central banks. Therefore, most central banks in the world are given the responsibility for the oversight of payment and settlement systems, particularly the systemically important payment and settlement systems which may impose systemic

risk on the overall financial system.

Central banks are given oversight responsibility through similar procedures of authority. Some countries might implement modifications to central bank acts, while others might add new payment and settlement regulations to validate the oversight role of central banks in payment and settlement systems shown as follows.

1. The Reserve Bank Act was amended in 1998 to establish the Payments System Board in Australia. The Board is responsible for determining the Reserve Bank's payments system policy to contribute to controlling risk in the financial system and promoting the efficiency of the payments systems and competition in the market for payment services. Moreover, the Payment Systems and Netting Act and the Payment Systems (Regulation) Act authorize legal status regarding the operation of payment systems and give the Reserve Bank extensive powers over the regulation of payment systems.
2. The Bank of Korea Act was revised in 2003 to give the Bank of Korea (BOK) the authority of holistic management and oversight of the payment and settlement systems in Korea. The BOK also operates the large-value payment system, BOK-Wire, and provides a daylight credit mechanism for financial institutions to ensure the safety and efficiency of payment systems.
3. The Bank of Japan Law was revised in 1997. One of the objectives for the Bank of Japan as stipulated in Paragraph 2, Article 1 of the Bank of Japan Law, is "to ensure smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of stability of the financial system."
4. The Payment Clearing and Settlement Act (PCSA) was promulgated in Canada in 1996. Under the Act, the Bank of Canada is responsible for the regulatory oversight of clearing and settlement systems to contain systemic risk. Clearing and settlement systems with the potential to create systemic risk may be designated by the Bank of Canada as subject to the PCSA. As such, they are therefore required to implement appropriate risk control and management arrangements.

A number of other countries that have not stipulated any explicit statutory documents with regard to oversight of payment systems have announced policy statements and memoranda to define the roles and responsibilities for their central banks in this regard. Moreover, some of these countries established risk management policies to manage and control payment system risk. For example, the Board of Governors of the Federal Reserve System discloses the role of Federal Reserve System in payment systems through policy statements. The Board also requires private large-value payment and securities settlement systems to establish risk management arrangements to reduce overall settlement risk.

The role and responsibilities of the Bank of England (BOE) for the oversight of payment and settlement systems were formalized in the Memorandum of Understanding with Her Majesty's Treasury (HMT) and the Financial Services Authority (FSA) before 2009. The BOE publishes the Payment Systems Oversight Report annually to describe the objectives for oversight of payment systems, to introduce the processes and procedures used by the BOE in conducting oversight, to explain in more detail some of the issues that have been the focus of the BOE's oversight activities in the recent past, and to outline some priorities for the year ahead in the United Kingdom. Moreover, with respect to the importance of statutory responsibilities on oversight, the Banking Act was modified in February 2009, adding statutory responsibilities for the BOE to oversee interbank payment systems which might influence the stability of the financial system in the United Kingdom, giving the BOE powers to establish guidelines for operators of payment systems and request these operators to stipulate and modify their regulations and operation procedures and provide information to underpin the statutory basis for the BOE on oversight of payment systems.

5.2 The CBC's Role in Payment and Settlement Systems

5.2.1 Operate Both the CIFS and the CGSS System

The CBC established the CIFS in 1995 to provide electronic transfers for financial institutions to transfer funds, to adjust reserve positions, to settle interbank loans, to settle payments related to foreign currency transactions in domestic currency and transactions of bonds and notes, and to deal with the final settlement of the CCS and the FIS with the objective of promoting the safety and efficiency of funds transfers. The CIFS adopted the RTGS mechanism in 2002, which significantly reduced systemic risk in the financial system. Then the BCS and the SBECS connected with the CIFS in 2004 and in 2007, respectively, which enabled payments of these two systems to be settled by the CIFS. Therefore, the CIFS is regarded as the pivot of overall funds transfers within the national financial system.

In addition to the CIFS, the CBC has implemented and operated the CGSS System since 1997. Since then, the CBC has taken the role of Central Securities Depository and handled payments related to the issuance, redemption, transfer and payment of interest and principal of central government bonds and treasuries in dematerialized form. This saves substantial costs for the issuance of government bonds and also promotes the safety and efficiency of delivery in the secondary bond market. Moreover, the system connected to the CIFS and adopted the interbank DVP mechanism in April 2008.

5.2.2 Provide Final Settlement Service

Implementing final settlement in central bank money can prevent risks as a result of insolvency of settlement institutions and provide the advantages of removing the need to rely on competitors to provide settlement services and liquidity saving for participants. Therefore, the Core Principles and the Recommendations for Securities Settlement Systems suggest the settlement assets used in systemically important payment and settlement systems had better be the liability of central banks, i.e. to settle in central bank money. The CIFS deals with funds transfers between financial institutions, and between the CBC and financial institutions. In addition, the aggregate receivables or payables of each financial institution within the IRS, CCS, BCS and the SBECS are processed through the CIFS. It meets the international safety requirements for settlement assets to implement final settlement in central bank money through the accounts held by financial institutions at the CBC.

5.2.3 Oversee Systemically Important Domestic Payment and Settlement Systems

5.2.3.1 Oversight Basis

The CBC oversees domestic payment and settlement systems pursuant to the laws, regulations and agreements as follows:

1. Laws and regulations:

- (1) The proviso, “Financial payment systems are under the authority of the CBC” of Paragraph 1, Article 2 of the Organic Act Establishing the Financial Supervisory Commission, Executive Yuan.
- (2) The last part of Article 32 of the Central Bank of the Republic of China (Taiwan) Act, “Regulations governing checks clearance and settlement of accounts among banks shall be stipulated by the Bank.” Pursuant to this section, the CBC enacts the Regulations Governing the Administration of Negotiable Instrument Clearing Business by the CBC.
- (3) Article 37 of the CBC Act, “The Bank shall undertake the floatation and the redemption of government bonds, issued domestically or abroad, and treasury bills. The Bank may delegate, whenever necessary, the above to other financial institutions.” Pursuant to the section, the CBC enacts the Directions for the Operation of Book-Entry Central Government Securities.
- (4) Article 47-3 of the Banking Act, “A financial information service business which intends to engage in an interbank funds transfer clearing service shall obtain the Competent Authority’s approval. If such business also involves

large-value funds transfer clearing, the approval of the CBC is also required. Regulations with respect to the approval and management of such business shall be prescribed by the Competent Authority after consulting with the CBC.”

- (5) Paragraph 1, Article 7 of the Act Governing Bills Finance Business, “A firm conducting centralized custody, settlement, and clearing of short-term bills is not allowed to engage in the above business until receiving approval from the Competent Authority. However, if the clearing business involves large-value funds transfers, approval from the CBC shall also be required.”

2. Agreements

- (1) Financial institutions that apply for approval to participate in the CIFS should submit documents to the Department of Banking of the CBC and agree to abide by the Directions for the Central Bank of the Republic of China (Taiwan) to Govern Electronic Interbank Funds Transfer and Settlement.
- (2) Financial institutions that apply to be settlement banks of the CGSS System should submit their financial reports and relevant documents to the Department of the Treasury of the CBC and agree to abide by the Directions for the Operation of Book-Entry Central Government Securities to implement relevant operations.

5.2.3.2 Oversight Practices

1. The CIFS: operated and governed by the CBC.
2. The CGSS System: operated and governed by the CBC.
3. The CCS: governed by the CBC and regulated through the Regulations Governing the Administration of Negotiable Instrument Clearing Business by the Central Bank of the Republic of China (Taiwan).
4. The FISC-FIS: in addition to consulting with the CBC pursuant to relevant laws and regulations when the competent authority implements or revises related laws and regulations, or permits some other businesses, the FISC, a clearing institution which settles through the CIFS, should abide by the Directions for the Central Bank of the Republic of China (Taiwan) to Govern Electronic Interbank Funds Transfer and Settlement and submit the implementation and modification of operational rules to the CBC for approval.
5. The TDCC-BCS: the payments related to bills transactions are transferred through the CIFS, and the TDCC is also one of the clearing institutions which settles

through the CIFS. Therefore, the CBC adopts the same oversight arrangements to the BCS as it does to the FISC.

6. The TWSE-SBECS: the netting balance of payments related to TWSE-listed and GTSM-listed stocks cleared by the TWSE and GTSM is settled through the CIFS. Moreover, the payments related to block trades in the securities markets are also settled through the CIFS. Additionally, these two institutions are the clearing institutions that settle their payments through the CIFS. Apart from permitting these two institutions to hold settlement accounts with the CBC for transferring funds and limiting their account balances to be zero at the end of every business day, the CBC exercises the same oversight arrangements as the BCS.

5.2.4 Cooperative Oversight with Other Authorities

The CBC focuses on the safety and efficiency of payment and settlement systems for its role as both operator and overseer of payment and settlement systems. However, other financial supervisory authorities may also focus on these issues due to their sharing responsibility for relevant issues. After the integration of financial supervision, the Financial Supervisory Commission (FSC) has taken most of the responsibilities for the supervision of financial institutions. The oversight of payment and settlement systems, the surveillance of financial markets and the supervision of financial institutions are complementary, and trading value in the TWSE-SBECS can be enormous, so the smooth operation of securities settlement systems is substantially relevant to the stability of financial markets. Therefore, the CBC and the FSC exchange views on issues regarding payment and settlement systems on a timely basis and establish information-sharing arrangements in such a manner as to contribute to achieving these authorities' public policy objectives.

6. The CBC's Ongoing Reforms

In recent years, the CBC has actively enforced reforms in domestic payment systems compliant with the responsibilities of central banks addressed in the Core Principles. In addition to strengthening the functions and governance in the payment and settlement systems it operates, the CBC induces improvements in the clearing systems which settle funds through the CIFS when they do not meet the requirements of the Core Principles. Moreover, the CBC continues to assess private payment and settlement systems against the Core Principles and the assessment results will be used as a reference for future reforms. The following chapter introduces the main reform issues continually conducted by the CBC.

6.1 Promote the Modification of the CBC Act in a Timely Manner

Based on the responsibilities of oversight of payment and settlement systems, the CBC plans to stipulate explicitly the role of the CBC in payment and settlement systems and “to ensure the sound operation of payment systems” as the operational target regarding the modification proposal of the CBC Act. The CBC will promote the modification of the CBC Act in a timely manner.

6.2 Induce Adequate Procedures for Risk Control and Management among Domestic Payment and Settlement Systems

To ensure smooth operation of payment and settlement systems, the CBC shall continue to induce adequate procedures for risk control and management and promote sound and resilient arrangements and business continuity plans among important domestic payment and settlement systems. In addition, the CBC shall continue to urge clearing institutions to strengthen system maintenance and establish contingency plans for prompt completion of daily processing.

6.3 Periodically Review Operations of Systemically Important Domestic Payment and Settlement Systems

To ensure that the operation of domestic payment and settlement systems meets the requirements of the Core Principles, the CBC continues to hold “Promotion for the Sound Operation of Payment Systems” meetings with the FSC, the TDCC, the FISC and the TCH. The TDCC, the FISC and the TCH have to present their review results and improvements against the Core Principles and all participants can exchange opinions on the relevant issues of payment and settlement systems at the meetings. The CBC shall

continue to undertake these activities in the future.

6.4 Assess Systemically Important Domestic Payment and Settlement Systems

The CBC persists in implementing the assessment of systemically important domestic payment and settlement systems against the criteria of the Core Principles. The assessment has been undertaken in two steps. First, what has been implemented in the USA, UK, Japan and Korea shall be followed by the CBC, i.e. to implement assessment of the self-operated CIFS. This assessment was completed in 2007. The second is to request other payment and settlement systems that are not operated by the CBC to implement self-assessments and submit the results to the CBC. Both the FISC and the TCH have completed their self-assessments and submitted the results to the CBC for evaluation. The CBC shall require these two institutions to improve any aspects that have not met the requirements of the Core Principles.

6.5 Urge Clearing Institutions to Strengthen Internal Control and Information Security

Several events related to the leaks of confidential information have occurred at financial institutions and clearing institutions, including leaks of the codes of credit cards to crime groups that make forgeries, and leaks of ATM card information, which resulted in illegal withdrawals. To avoid similar events happening again, the CBC and the FSC continue to collaborate and enforce the implementation of stricter internal controls and information security measures.

6.6 Continue to Observe International Trends Regarding Payment and Settlement System

As the financial environment and information technology develop rapidly, so do the payment and settlement systems. To understand international developments and regulatory trends in payment and settlement systems, the CBC continues to collect and research relevant information and carefully watch the developments in major countries around the world to gain a valuable reference for the implementation and reform of domestic payment and settlement systems.

Appendix 1

Core Principles for Systemically Important Payment Systems

In January 2001, the BIS-CPSS published the Core Principles as an important reference to guide countries in conducting reviews or reforms of domestic payment systems. There are 10 core principles for systemically important payment systems as follows:

1. The system should have a well-founded legal basis under all relevant jurisdictions.
2. The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.
3. The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants, and which provide appropriate incentives to manage and contain those risks.
4. The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.
5. A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.
6. Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk.
7. The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.
8. The system should provide a means of making payments which is practical for its users and efficient for the economy.
9. The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.
10. The system's governance arrangements should be effective, accountable and transparent.

Appendix 2

Recommendations for Securities Settlement Systems

In November 2001, the BIS-CPSS and IOSCO co-published the Recommendations for Securities Settlement Systems, which identifies 19 minimum standards that securities settlement systems should meet. With the recommendations, national authorities that are responsible for the regulation and oversight of securities settlement systems can assess markets in their jurisdiction. The 19 recommendations are as follows:

1. Legal framework

Securities settlement systems should have a well-founded, clear and transparent legal basis in the relevant jurisdictions.

2. Trade confirmation

Confirmation of trades between direct market participants should occur as soon as possible after trade execution, but no later than the trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after the trade execution, preferably on T+0, but no later than T+1.

3. Settlement cycles

Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be evaluated.

4. Central counterparties

The benefits and costs of a central counterparty should be evaluated. Where such a mechanism is introduced, the central counterparty should rigorously control the risks it assumes.

5. Securities lending

Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.

6. Central securities depositories

Securities should be immobilized or dematerialized and transferred by book entry in central securities depositories to the greatest extent possible.

7. Delivery versus payment

Central securities depositories should eliminate principal risk by linking securities transfers to funds transfers in a way that achieves delivery versus payment.

8. Timing of settlement finality

Final settlement should occur no later than the end of the settlement day. Intraday or real-time finality should be provided where necessary to reduce risks.

9. Central securities depositories risk controls to address participants' failures to settle
- Central securities depositories that extend intraday credit to participants, including central securities depositories that operate net settlement systems, should institute risk controls that, at a minimum, ensure timely settlement in the event that the participant with the largest payment obligation is unable to settle. The most reliable set of controls is a combination of collateral requirements and limits.

10. Cash settlement assets

Assets used to settle the ultimate payment obligations arising from securities transactions should carry little or no credit or liquidity risk. If central bank money is not used, steps must be taken to protect central securities depository members from potential losses and liquidity pressures arising from the failure of the cash settlement agent whose assets are used for that purpose.

11. Operational reliability

Sources of operational risk arising in the clearing and settlement process should be identified and minimized through the development of appropriate systems, controls and procedures. Systems should be reliable and secure, and have adequate, scalable capacity. Contingency plans and backup facilities should be established to allow for timely recovery of operations and completion of the settlement process.

12. Protection of customers' securities

Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.

13. Governance

Governance arrangements for central securities depositories and central counterparties should be designed to fulfill public interest requirements and to promote the objectives of owners and users.

14. Access

Central securities depositories and central counterparties should have objective and publicly disclosed criteria for participation that permit fair and open access.

15. Efficiency

While maintaining safe and secure operations, securities settlement systems should be cost-effective in meeting the requirements of users.

16. Communication procedures and standards

Securities settlement systems should use or accommodate the relevant international communication procedures and standards in order to facilitate efficient settlement of cross-border transactions.

17. Transparency

Central securities depositories and central counterparties should provide market participants with sufficient information for them to identify and evaluate accurately the risks and costs associated with using the central securities depository or central counterparty services.

18. Regulation and oversight

Securities settlement systems should be subject to transparent and effective regulation and oversight. Central banks and securities regulators should cooperate with each other and with other relevant authorities.

19. Risk in cross-border links

Central securities depositories that establish links to settle cross-border trades should design and operate such links to reduce effectively the risks associated with cross-border settlement.

Appendix 3

Glossary

payment instrument	the form that a payment message/instruction takes in a particular payment system.
payment	the payer's transfer of a monetary claim on a party acceptable to the payee.
central bank money	the liabilities of central banks including the currencies in circulation which are issued by central banks and the deposits that financial institutions hold in central banks. The deposits are redeemable on demand or with payment instructions and generally used as the instrument to settle liabilities between domestic financial institutions. Central banks have a monopoly of the supply of the above mentioned money.
principal risk	the risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery. In this event, the full principal value of the securities or funds transferred is at risk.
delivery	final transfer of a security or financial instrument.
central counterparty	an intermediary entity that interposes itself between the counterparties to trades, acting as the buyer to every seller and the seller to every buyer.
systemic risk	the risk that the failure of one participant in a financial system to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations when due.
real-time gross settlement	the continuous settlement of funds or securities transfers individually on a transaction by transaction basis. The completed settlement is irrevocable and unconditional, i.e. final settlement.
deferred net settlement	a system that effects the settlement of obligations or transfers between or among counterparties on a net basis at some later time. Final settlement only effects at the designated time or at the end of the business day.
netting	the agreed creation from multiple obligations of a single obligation which is calculated as the sum of positive obligations owing less the sum of negative obligations owed.
unwind	a procedure followed in some clearing and settlement systems in which transfers of securities or funds are settled on a net

basis, with the transfers provisional until all participants have discharged their settlement obligations. If a participant fails to settle, some or all of the provisional transfers involving that participant are deleted from the system, and the settlement obligations from the remaining participants are recalculated. This process of recalculating obligations is known as an unwind.

custody	the safekeeping and administration of securities and other financial instruments on behalf of others.
credit risk	the risk that a counterparty will not settle an obligation for full value either when due or at any time thereafter.
liquidity risk	the risk that a counterparty will not settle an obligation for full value when due, but on some unspecified date thereafter.
settlement	the completion of a transaction through final transfer of securities and funds between the buyer and the seller and an act that discharges financial obligations between two or more parties.
settlement risk	a general term used to designate the risk that settlement in a transfer system will not take place as expected. This risk may comprise both credit and liquidity risk.
settlement institution	the institution across whose books transfers between participants take place in order to achieve funds and securities settlement within a payment and settlement system.
queuing	an arrangement whereby payments are held pending acceptance by a payment system for settlement.
rolling settlement	a procedure in which settlement takes place a given number of business days after the date of the trade. This is in contrast to account period procedures in which the settlement of trades takes place only on a certain day, for example a certain day of the week or month, for all trades that occurred within the account period.
final settlement	the discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional.
clearing	the process of transmitting, reconciling and, in some cases, confirming payments prior to settlement, possibly including the netting of payments and the establishment of net positions for settlement.
delivery versus payment	a link between securities transfers and funds transfers that ensures that delivery occurs if, and only if, payment occurs.
oversight	a public policy activity principally intended to promote the safety and efficiency of payment and securities settlement

systems and in particular to reduce systemic risk.

collateral	an asset or third-party commitment that is accepted by the collateral taker to secure an obligation of the collateral provider vis-à-vis the collateral taker.
business continuity	a payment and settlement system's business continuity arrangements aim to ensure that it meets agreed service levels even if one or more components of the system fail or if it is affected by an abnormal external event. They can include both preventative measures and arrangements to deal with contingencies.
securities settlement system	the full set of institutional arrangements for confirmation, identification, clearance and settlement of securities trades and safekeeping of securities.
central securities depository	an institution for holding securities that enables securities transactions to be processed by means of book entries. Physical securities may be immobilized by the depository or securities may be dematerialized.