

Chapter 2: Payment Systems of China

1. Payment Systems

China's payment systems consist of the nationwide inter-bank system operated by the People's Bank of China (the existing EIS will be replaced by the next-generation CNAPS), regional (cities and counties) payment systems (LCHS), and commercial banks' intra-bank payment systems.

(1) Electronic Interbank System

i. Outline

The Electronic Interbank System (EIS) handles exchange clearing and settlement processing among each financial institution on a nationwide scale. Its development began in 1989, and it went into operation in seven cities in 1991. EIS's National Clearing Center (NCC) that is located in Beijing and functions as a "host," and "relay centers," located in People's Bank of China's (PBC) units (branches and sub-branches) across the country, are connected through the VAST system (a 64–128 Kbps satellite digital interactive system). In January 2002, linkage of PBC sub-branches at the county level was completed, and now more than 2,160 of its units are linked via networks,¹ all together comprising EIS in a narrow sense. Furthermore the ABS System that is located in PBC's relay-center units, and conducts settlement processing of financial institutions' accounts (approximately 20,000) held with branches, based on data received from EIS, and the CEPS System that provides notification of remittance credit entries to many financial institutions, are linked to EIS. Since 1999, there has been a backup center located in Wuxi City, in Jiangsu Province (in the suburbs of Shanghai City).

ii. Payment Structure

The following uses funds payments between distant places and different financial institutions as an example.

- a.* A sending bank's X branch submits a written or electronic payment instruction to a PBC X branch in the same area.
- b.* After withdrawing funds from the sending bank's X branch's deposit account, the PBC X branch transfers the payment instruction via satellite to NCC.
- c.* NCC transmits the payment instruction to a PBC Y branch in the same area as the receiving bank's Y branch, and that PBC Y branch credits the funds to the receiving bank's Y branch's deposit account there.
- d.* The receiving PBC Y branch provides notification of the payment to the receiving bank's Y branch (or the receiving bank's Y branch receives a written payment notification via the clearinghouse.)
- e.* The receiving bank's Y branch credits the funds to the recipient's account.

One-sided entry where debiting and crediting at different times are performed, has been used in this manner.

¹ Number of relay centers is 646 in all over the country. In a small scale of sub-branch at a county level, multiple sub-branches jointly own one relay center.

This system's operating hours are from 8:30 a.m. to 7:30 p.m., and daily transactions average 150,000, amounting to RMB140 billion (in 2001).

If the sending bank's account balance is insufficient, the payment instruction is held in the queue until processing becomes possible, and the payment becomes final once credit processing is conducted. PBC does not permit intra-day overdrafts for the accounts of financial institutions held with it. Hence, if a financial institution does not have sufficient funds, the payment will not be executed. However, there is such a risk that operational factors may lead to overdrafts, and in such cases PBC's internal rules call for a deposit balance adjustment.

With the expansion of EIS, particularly in network linkages between PBC branches and financial institution's branches, STP processing has become possible, so that more than 90 percent of transactions between distant places are settled on a same-day basis at the inter-bank level. Between customers, however, since there are debit processing to EIS on the sending banks side, and credit processing to the customers' accounts on the receiving banks side, and some banks may use manual processing, same-day payment may not be possible in some cases.

Gross payment is performed between banks, and it may be said that RTGS is attained at major branches where immediate processing may be conducted via networks.

There is a remittance charge of RMB4.5 for each transaction.

iii. EIS Revaluation and Pending Issues

It may be appreciated that the updating of systems and networks had significantly increased the speed of payment, but financial institutions' settlement accounts have not been centrally managed, and are inefficiently dispersed among PBC branches and sub-branches. Since there is no clear mechanism for supplying liquidity, financial institutions must deposit excess reserves into each account of their branches. Moreover, since EIS settlement is operated on a gross basis, it is unsuitable for small-value settlements between distant places.

(2) China National Advanced Payment Systems

i. Development History

Starting from the computerization of payment systems designed in the Eighth Five-Year Plan (1991–1995), in 1991 an advisory group was established by five countries' central banks (Japan, USA, UK, Germany, and Switzerland) under an initiative of the World Bank. This group advised PBC on system requirements and bidding methods, and in June 1995 a consortium with NTT DATA Corporation as the core member was established. After that six years were required until delivery of the system to PBC in July 2001, due to loose setting of requirements based on diversified operations among PBC branches, efforts to unify PBC branches, and problems in interfaces with EIS. The cost of this project was US\$48.1 million (approximately ¥5.8 billion), all of which was borrowed from the World Bank. Partial customization was then performed by Chinese-affiliated SI companies, and eventually, on October 4, 2002, a three-month testing period for the large-value payment systems (described below) was started in Beijing and Wuhan.²

ii. Outline

The China National Advanced Payment System (CNAPS) is composed of the High-Value

² This is lagging behind the initially planned July 1, 2002.

Payment System (HVPS), the Bulk-Entry Payment System (BEPS), and the Settlement Account Processing System (SAPS). HVPS is an RTGS that performs real-time processing of large-value funds on a gross amount basis, and has the same functions as Bank of Japan's financial network system (BOJ-NET). BEPS is for small-value funds, with daily netting night batch processing, and has the same function as Data Telecommunication System of All Banks in Japan. SAPS is the system for common operations related to settlement accounts, including receipt and payment of money, settlement of LCHS, and management of overdraft limits. Although such a SAPS function makes up a part of the entire payment system in many other countries, CNAPS uses each of them independently.

There is a host computer at the CNAPS National Processing Center (NPC) in Beijing, and a backup center in Wuxi City, in Jiangsu Province. The NPC and PBC branches, and the NPC and the backup center, are connected via satellite (SINOSAT), with landlines used as a backup. Communication protocols use TCP/IC, and the message protocol is SWIFT-compliant.

PBC branches possess servers that process data from connected financial institutions' head offices and branches, and have PC terminals (EPC) to input data received via floppy disk or in writing from financial institutions that are not connected online.

iii. Payment Structure

a. HVPS

HVPS is a RTGS used for transactions of RMB500,000 or more, and for emergency credit transactions. The host computer processes two-sided concurrent entry, where debiting from a sending bank's accounts and crediting to a receiving bank's accounts are processed simultaneously. Payment becomes final once the entry is performed.

HVPS's operating time is from 8:00 a.m. to 5:00 p.m., 30 minutes ahead of EIS. Funding operations for handling lack-of-funds or executing credit instructions remaining in the queue are to be approved from 5:00 p.m. to 6:00 p.m. (described below in detail.) The average daily number of payments during the testing period is 40,000.

If a sending bank's account balance is insufficient, it will be held in an NSF queue called "Not Settlement File Queue" on the host server. Sending banks set payment instructions as either "priority payment" or "ordinary payment" status, and the NSF queue arranges them accordingly. Processing is performed according to the following rules.

- Priority-payment instructions in the queue are to be processed preferentially.
- Among payment instructions with the same priority order, processing is performed on a first-in-first-out basis.
- If there are priority-payment instructions in the queue, all ordinary-payment instructions in the queue will be held unconditionally.
- Ordinary-payment instructions in the queue will be processed after priority-payment instructions.

Since the inability to process one large-amount payment may delay many second-order payment instructions for a long time, sending banks may manually cancel payment instructions or make the large-amount payment into a second-order payment by changing its order in the NSF queue.³

If a payment instruction remains in the queue at 6:00 p.m., it will be returned to the sending bank, or a liquidity supply may be obtained from PBC by paying a high penalty. (For details,

³ Changes of priority status from priority-payment to ordinary-payment will not be approved.

described below.)

b. BEPS

BEPS is for net payment of small-amount transactions of RMB500,000 or less. Three types of settlement—credit, pre-authorized collection, and dated debit—may be performed. Different from HVPS, BEPS uses one-sided entry, and depending upon the type of payment the timing of credits and debits to sending and receiving banks' accounts will vary. Although a sending bank's account will be debited on the same day, credit to a receiving bank's account will occur on the next day (T+1). For pre-authorized collection, credit to a sending bank's account will be performed on the same day, debit of a receiving bank's account will be T+1, with PBC extending credit to the receiving bank for one day. For dated debit, T+2 entry is performed for the accounts of both the sending and the receiving bank, with no credit extended from PBC. Payment becomes final once crediting and debiting have both been completed.

The system's operating hours are from 8:00 a.m. to 5:00 p.m., and batch processing after business hours closes at 12:00 p.m. In the daytime, payment instructions are retained in branches until 5:00 p.m. For a local transaction between financial institutions located within the jurisdiction of the same branch of PBC, the cut-off time is 5:00 p.m., and netting for the portion of same day is performed. By transmitting only the net position to the host, financial institutions' accounts are also processed within the same day. Payment data is transmitted by nighttime batch processing. For non-local transactions in which the receiving bank is located within the jurisdiction of another branch, the branch of the sending bank will transmit instructions to the host after dividing payment data among receiving banks. At the host, after making entry processing of the sending bank, payment data will be transmitted to the receiving bank via night batch processing. At the receiving branch, accompanied with payment data from other sending banks, netting is performed during the night and payment data is stored in files for netting. Netting will be performed again on the following day, after adding local transactions to the result of netting. The results will be sent to the host at 5:00 p.m., and payment will be performed (entry at the receiving side will be performed at T+1).

c. SAPS

SAPS performs real-time settlement of the receipt and payment of funds, and send positions computed by LCHS to PBC branches. The balance of clearing will be paid after the PBC branches send the net position to the host.

Although financial institutions may conduct real-time verification of deposit balances with PBC, there is also a system that automatically urges verification of overdraft balances. After the 5:00 p.m. cut-off time, a payment window for the following cases will be opened on the system's screen. PBC will issue notifications of overdrafts or incomplete payments to financial institutions.

- If the balance of a payment account is negative.
- If there is an unpaid payment instruction in the HVPS queue.
- If payment is not completed in BEPS, due to insufficient balance.
- If payment has not been completed in LCHS.

In HVPS, financial institutions must cancel payment instructions in the queue by 6:00 p.m., or credit them via HVPS after raising funds from other branches. When an overdraft is not compensated by 6:00 p.m., the unpaid payment instruction in HVPS will be compulsorily returned to the sending bank. If payment is not completed in BEPS or LCHS, PBC will apply a penalty interest rate to financial institutions with overdrafts, and extend an overnight credit.

To avoid arrears of payment due to an interim lack of funds, PBC permits intra-day overdrafts on a collateral basis to financial institutions. PBC monitors the credit and payment ability of financial institutions every day, and may cancel intra-day overdraft facility, if required.

There is an automatic repo function. If a financial institution to which an automatic repo arrangement is permitted lacks funds, CNAPS will automatically request PBC an open market operation, which will supply liquidity according to a pre-arranged agreement. Once an automatic repo agreement is concluded, even if an intra-day overdraft limit has been set, use of the automatic repo must be conducted first. Both systems may not be used simultaneously. Automatic repo function does not currently operate.

iv. Future Schedule

In addition to Beijing and Wuhan, HVPS had been expanded to 14 cities by August 2003, with the addition of Shanghai, Guangzhou, Xian etc HVSP is planned to be expanded up to 300 cities by the end of 2004. BEPS is expected to be developed further and to be introduced in 2004.⁴ Completion of expansion across the country by 2005 is planned. Until then, CNAPS and EIS will coexist. Efforts will also be made to achieve DvP for government bonds, by linking networks with China Government Securities Depository and Clearing Co., Ltd. (CDC).⁵

v. Valuation and Issues to be Resolved

CNAPS has several advantages over EIS. In the current EIS, because financial institutions' deposit accounts with PBC are dispersed among regional branches there are problems (such as differences in call-market rates) of fund efficiency and the effectiveness of financial adjustment. With CNAPS, financial institutions' deposit accounts with PBC are collectively managed by the host center, greatly alleviating these problems. Intra-day overdrafts and automatic repo facilities are also provided, and liquidity risk management is improved. For small-amount payments, particularly between distant places, CNAPS is more efficient than EIS in which payment is performed on a gross basis. Finally, by CNAPS connecting of the government bond entry and payment system at CDC to the payment system, DvP payment of government bonds may become possible.

Commercial banks, as users, have nonetheless indicated some problems, such as in system design. Unlike with BOJ-NET, commercial banks cannot directly access the host center. Since there is a two-tier structure by which commercial-bank branches connect with PBC branches in the same areas, and those PBC branches then connect to the host center, CNAPS is not easier for commercial banks to use. There are also cost-effectiveness issues. Including the four large Chinese banks, due to increased competition commercial banks nationwide have made vast system investments, and improved internal payment systems, but the cost of developing linkages with CNAPS is approximately RMB1–2 million per branch. There is therefore little advantage in connecting small local branches other than those in central cities. For the necessity of replacing EIS in the future by expanding CNAPS all over the country, as planned by PBC, there is such an opinion that it may be sufficient to reach approximately 70-percent coverage, or to expand to up to 300 cities. There are also concerns about the considerable delays in introducing BEPS for small-amount payments. It appears that there have not been adequate discussions between PBC and commercial banks about how to integrate commercial banks' intra-office systems and CNAPS, or on how to finally handle EIS.

⁴ Initially scheduled within 2003.

⁵ Although it was planned for completion within 2003, according CDC in January 2003, they could not commit to a specific period.

(3) Local Clearing House System

i. Outline

The Local Clearing House System (LCHS) is for local payments related to exchange, bill, and check transactions within the same region (cities and counties). There are approximately 2,300 clearing houses throughout the country, and although most LCHS sites are owned and managed by PBC, some are jointly owned by participants. All receipts and payments of funds on a written basis are cleared and settled via LCHS.

ii. Payment Structure

LCHS payments are performed as follows.

- a.** A client requests the sending bank to conduct a transfer.
- b.** The sending bank delivers a payment instruction, in writing or on magnetic tape, to the clearinghouse.
- c.** Processing the transaction manually or using magnetic tape, the clearinghouse calculates each financial institutions' net outgoing and incoming amounts.
- d.** The clearinghouse sends data on the financial institutions' net outgoing and incoming amount to the appropriate PBC branch.
- e.** Based on the data submitted, the PBC branch increases or decreases the financial institutions' deposit balances.
- f.** The sending bank sends a credit notice to the receiving bank.
- g.** The receiving bank makes a credit to the recipient's account.

Clearinghouses in cities and districts which have a large amount of trading have two clearing times each day (morning and afternoon), while other clearinghouses have only one (in the morning). At the busier clearinghouses, trades received in the morning will be paid in the afternoon, and those received in the afternoon will be paid in the morning of the next day, by a PBC branch or a designated commercial bank. Payment within 24 hours after receiving bills is therefore possible. At the less-busy clearinghouses, all payments are performed on the following day. In many cases, payment operations are conducted manually, but in 17 large cities where trading is particularly heavy, classification processing is automated by clearing bills using barcodes, and other efforts to speed up processing. Beijing, Shanghai, Guangzhou, and Nanjing conduct extensive bill clearing.

LCHS payments are performed on the principle debit-first-credit-second. Payments become final when credit processing is completed. If there is an intra-day overdraft, PBC will collect penalty interest. If funds cannot be covered on the same day, an overnight loan will be granted by PBC, but in some cases financial institutions cannot conduct transactions within the next day.

Payments per day in China reach 2.1 million items, totaling RMB400 billion. Although in many cases costs are shared according to participants' trading volumes, there are some cases in which uniform yearly charges are collected, which differ depending upon clearinghouse.

iii. Valuation and Issues to be Resolved

LCHS is one of China's most important payment systems. PBC has determined rules and procedures common to all exchanges in China, and has requested faster classification processing,

and rationalization by establishing communications networks.

(4) Commercial Banks' Intra-office Payment Systems

China's four largest banks have the most extensive centralization and integration hardware and software, on which each spends RMB1–3 billion annually, in their efforts to consolidate computer service centers and improve nationwide networks. If a credit remittance is performed within the same bank, it can process the transaction within approximately 24 hours. Although these banks can carry out payments within two or three hours, based on priority-processing agreements for such transactions as urgent large-amount securities settlements, the determination of priority order still often requires manual processing. Large private banks—such as Minsheng Bank of China and Shanghai Pudong Development Bank—have focused on systems investment, made efforts to centralize data on customers who are subject to international standards, and have focused on Internet banking services to make up for a lack of branches. Most banks' customer account databases are still dispersed, and real-time processing is not possible. Databases should be combined in host centers.

(5) National Interbank System

The National Interbank System (NIS) conducts manual inter-bank payments between distant places. After a payment instruction, either cabled or written, is sent by a sending bank directly to a receiving bank, daily netting is performed for funds payment and the final balance of payment. At each stage, notification of payments between correspondent banks are cabled and completed between PBC branches. After all crediting data are sent to NIS's computer center and inspected there, checking sheets are sent to the sending and receiving banks. NIS's status has decreased recently, due to improvement and expansion of EIS and commercial banks' intra-office systems.

2. Securities Settlement Systems

(1) Outline

China's securities markets are roughly divided into stock exchanges and bond markets.

China's settlement organizations include China Securities Depository and Clearing Corporation (SD&C), a central organization for clearing stocks, trust fund, and convertible bonds, also government bonds and corporate bonds which are listed in the stock exchanges. and China Government Securities Depository and Clearing Co., Ltd. (CDC), a central organization for clearing government bonds, financial debentures, and corporate bonds.

(2) Stock Exchange Settlement Systems

i. Outline

Depending upon investors, issuers, and currencies, stock exchanges are divided into A shares (RMB-denominated and domestically issued), B shares (foreign currency-denominated, domestically issued, and since February 2001 open also to domestic personal investors), and H shares (HK-dollar-denominated, issued in Hong Kong, and issued for overseas investors).⁶ Stock

⁶ There are also N shares (listed in New York), L shares (listed in London), and S shares (listed in Singapore).

exchanges are also classified by holder, into state shares, corporate shares, employee-ownership shares, and general-public shares.

A shares and B shares account for 1,287 companies, whose combined listed stock have a market value of RMB3.8 trillion (as of the end of 2003, with RMB1 equaling approximately ¥13). China is in competition with Hong Kong for the second position in Asia. Among these stocks, only negotiable stocks is defined by the China Securities Regulatory Commission (CSRC) may be traded, and represent only one-third of total shares. Free trade of state ownership shares,⁷ which account for more than 50 percent of all shares, is not permitted. Since the current aggregate value of shares against GNP exceeds 50 percent (equal to those in Japan), negotiable stocks' total market value is still less than 20 percent. Total trading in 2002 was RMB2.8 trillion (RMB11.8 billion per day), amounting to 27 percent of GNP,⁸ with a 65 percent turnover ratio⁹.

There are securities exchanges in Shanghai (established in 1990) and Shenzhen (established in 1991). Shanghai handled about 200 more listed companies than Shenzhen does. Although both exchanges handle listed A shares and B shares (US-dollar-denominated in Shanghai, HK-dollar-denominated in Shenzhen), A shares account for 90 percent of companies and total market value. A company listing A shares will sometimes doubly issue B shares. More companies do this than those who issue only B shares. Listing on both Shanghai and Shenzhen stock exchanges is not permitted.

The stock price earnings ratio (PER) of A shares increased 20–60-fold since 1996, becoming much higher than in the US and UK. There is strong appetite due to a rapid increase in the number of domestic personal investors. A shares have been 3 to 5 times higher in price than B shares, which overall appears to be an overvaluation. After the relatively undervalued B shares were made open to domestic investors, their stock price has declined by nearly half.

This persistent decline continued in 2001, due to a drop in stock prices in the US, the release of state-owned stocks into markets,¹⁰ and the creation of Hong Kong GEM (a market for emerging companies).¹¹ Meanwhile, the market has made efforts to strengthen information disclosure regulations (such as for quarterly settlement disclosure), to strengthen corporate governance (such as in introduction of an outside director system), to strengthen prudential regulations (such as in a revision of criminal laws), and to clarify procedures for listing and de-listing. Market reforms aimed at developing an advanced-country-type market have progressed. Following the opening of

⁷ Combined state shares and state-owned corporation shares are called “state ownership shares.” The details of the difference between state-owned corporation shares and non-state-owned corporation shares are not known, but state-owned corporation seem to hold a larger percentage.

⁸ Computed according to the RMB10.3 trillion GNP in 2002 (8.0 percent of the real economic growth rate.)

⁹ The turnover rate should not consider the non-tradable shares that will triple number.

¹⁰ According to “Provisional Regulations on Raising Social Security Funds by Reducing State-ownership Shares,” by the State Council, the following items were determined in June 2001: when a state-owned corporation is reorganized as a stock corporation, with the new public issue of stock or a capital increase, 10 percent of the total funding amount of state-ownership shares is to be released at market prices; and funds obtained by state-ownership shares should be paid by the National Social Security Fund, which was established to compensate social security funds. Based on this, China Petrochemical Corporation and several other corporations' shares have been released to the markets, bringing about a nearly RMB10 trillion market-value reduction compared with its peak level. In October 2001 the CSRC had to suspend these regulations, and in June 2002, except for companies listed overseas, release of state-ownership shares using this method was officially suspended.

¹¹ Since GEM (where listing requirements are looser than on Chinese domestic exchanges) was created in November 1999, some domestic issuing entities have flowed into it, due to which the competitiveness of B shares declined. Compared with the B shares market, GEM is more convenient for both issuing entities and investors, because no PBC issuing license is required, and because it is not necessary to open a specific foreign currency account for receiving issuing expenses and sending dividends, making issuing procedures simple. Also, corporations can issue stocks a mere two years after their establishment. There is also a small-amount investment of at least HK\$50,000 (approximately ¥770,000). Accordingly, the issuing amount of B shares was zero for 2001 and 2002.

the B shares market to domestic investors in December 2002, for overseas investors there was a move toward opening the A shares market according to the Qualified Foreign Institutional Investor system.¹²

No securities derivatives or repo transactions have been conducted with securities companies.

Figure1: Outline of China's Stock Market

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Number of Domestically-listed Companies	53	182	291	323	530	745	851	949	1,088	1,160	1,224	1,287
B Shares Listed Companies	18	41	58	70	85	101	106	108	114	112	111	111
Number of H Shares listed Companies	0	6	15	18	25	42	43	46	52	60	75	93
Total market value (RMB0.1billion)	1,048	3,531	3,691	3,474	9,842	17,529	19,506	26,471	48,091	43,522	38,329	42,457
Negotiable Stocks (%)	n.a.	24.4	26.3	27.0	29.1	29.7	29.5	31.0	33.5	33.2	32.6	31.0
Shanghai Stock Exchange												
Stock Price Composite Index	780	834	648	555	917	1194	1147	1367	2073	1646	1358	1497
PER (A shares)	n.a.	42.5	23.5	15.7	31.3	39.9	34.4	38.1	59.1	37.6	34.5	36.5
Shenzhen Stock Exchange												
Stock Price Composite Index	241	238	141	113	328	381	344	402	636	476	389	378
PER (A shares)	n.a.	42.7	10.3	9.5	35.4	41.2	32.3	37.6	58.8	40.8	38.2	37.4

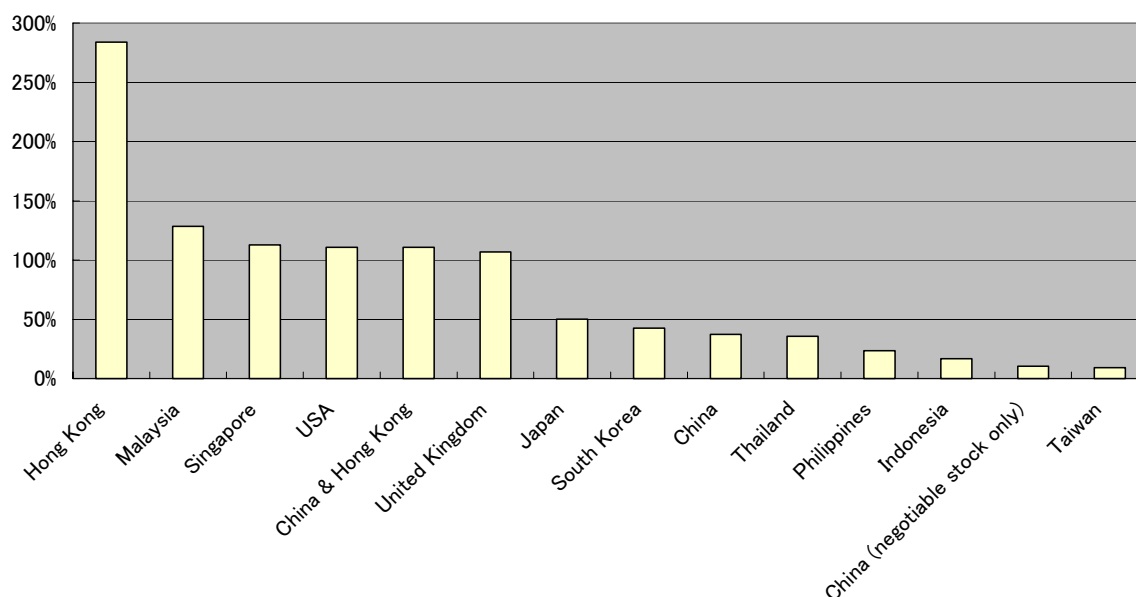
Number of domestically listed companies includes A shares redundantly listed with B and H shares.

Ratio of negotiable stock = negotiable stock's total market value/ total market value

Source: China Securities Regulatory Commission, "China Securities and Futures Statistical Yearbook, 2001",

Factbook of Shanghai and Shenzhen Stock Exchange and website

Figure2: Ratio of Total Market Value of Listed Stocks to GDP



Source: "World Statistics" (2002), of the Ministry of General Affairs; and International Financial Statistics

¹² US\$10 billion and more in investment assets are required in the latest year, and the following conditions have been imposed for each business category: for investment trusts, actual results for more than five years; for insurance and securities companies, more than thirty years of business experience, and more than US\$1 billion in capital stock; for commercial banks, gross assets must be ranked within the world's top 100.

Figure3: Scale of Market by Exchange in 2003

	Shanghai Stock Exchange		Shenzhen Stock Exchange	
	A Shares	B Shares	A Shares	B Shares
Total Trading (RMB 1 billion)	2,633	60	1,073	56
Daily Average Trading (RMB 1 million)	10,923	249	4,452	233
Number of Listed Companies	770	54	491	57
Total Emerging Market (RMB 1 billion)	2,940	40	1,212	53

Note : Since there are companies that redundantly issue A and B shares, aggregate number of listed companies in each column are not equal to the number of listed companies in the text

Source : Stock exchanges' and CSRC's homepages.

ii. Trading System Outline

All investors must open securities accounts with SD&C. The methods for doing so differ between financial corporate (such as securities firms and fund companies) and other investors (such as individual investors and general corporates). Financial corporate investors apply for such accounts directly to the SD&C. For other investors, after applying to an agency organization¹³ for such accounts when starting transactions, and passing the first examination by that organization, the documents for opening are sent to the SD&C electronically by the organization, after which there will be a second examination by the SD&C. If this examination is passed, an examination notice and transaction number for the successful applicant will be sent to the agency organization, based on which it issues a stockholder card, making transactions possible. Investors may open one account each for A shares, B shares, and fund investments.

For funds payment accounts, some investors open accounts with securities companies, and others open accounts with banks designated by securities companies. In the former case, investors' funds are collectively held in a bank account in the name of a securities company, with no separate management, which is conducted on the securities company's book. In the latter case, investors may open accounts directly with a bank, in their own names.

In China there has recently been an upsurge in business tie-ups between banks and securities companies. Investors may open securities-guarantee sub-accounts under ordinary accounts, and may conduct consignment trading and balance inquiry using telephone and internet banking services. When opening such accounts, an identification card or a shareholder code card issued by SD&C is required. SD&C's system allows direct verification of investors' securities balances, and investors may also verify fund balances through securities companies.

Investors can order and consign sales trading with securities companies via writing, telephone, terminal, Internet, and other means. Securities companies pass customers' orders to the stock exchange's trading system, in which all transactions will be executed by automatically matching them online. It is possible for these systems to execute 5,000 transactions per second.

The stock exchanges' business hours are 9:30 a.m. to 11:30 a.m., and 1:00 p.m. to 3:00 p.m., Monday to Friday, for intra-day transactions, and there is a 10-percent trading restriction from the previous day's closing price. The stock exchanges monitor transactions and disclose the required trade information or reports to the CSRC if an irregular transaction occurs. Membership in the stock exchanges is currently 195 companies in Shanghai, and 230 in Shenzhen. All are limited to domestic securities companies and investment trust companies; overseas companies cannot participate. Overseas trade participants must satisfy fixed

¹³ Available to securities companies, commercial banks, and approved SD&C B shares overseas settlement members.

qualification requirements,¹⁴ and must be recognized by the CSRC as a broker exclusively for B shares. Such brokers must conclude agreements with exchange members after paying fees, and execute overseas investors' orders to trade B shares via such members. Approximately half of all B shares brokers are from overseas. Since domestic general members have obtained securities brokers' licenses from the CSRC, it is not necessary for them to obtain the membership admission. Members' admission and withdrawal must be reported to the CSRC.

iii. Outline of SD&C

The SD&C has a head office in Beijing, with staff of nearly 70, and there are approximately 100 other personnel each in Shanghai and Shenzhen. Its capital stock is RMB0.6 billion. In addition to such major services as registration, settlement, and consignment custody, and such contingent services as opening customer accounts, balance control services, SD&C performs such services as preparation of shareholders lists accompanying the issue of stocks, establishment of hypothec, and other services. Risk management is also performed jointly with the CSRC and the Ministry of Finance.

Transactions on the Shanghai Stock Exchange were previously settled by its affiliate, Shanghai Securities Depository and Clearing Corporation, and those on the Shenzhen Stock Exchange were settled by its affiliate, Shenzhen Securities Depository and Clearing Corporation. On March 30, 2001, the CSRC instructed that these corporations be consolidated, to establish SD&C, and since October 1, 2001, all settlement has been performed collectively by it.

iv. Clearing and Settlement System

All listed securities must be registered with the SD&C, and separately stored by investor code, to achieve entirely electronic processing. Although registration in the name of a nominee is still possible, for strictly separate management settlement accounts has usually been opened in the name of the final investor. SD&C may also verify securities and funds balances of securities companies and investors (including individuals).

For A shares, after closing hours the SD&C notifies each member of their net position at point T (the time of contract conclusion), and stock transfer is finished by T night. Payment is performed by the settlement bank at T+1. For B shares, notification of net position is performed at T+1, and payment is performed at T+3. If an overseas investor takes a position for payment, due to time differences the account is credited at T+2, and funds settlement is executed between members at T+3. For B shares in Shanghai, which are denominated in US dollars, payment is performed by SD&C's correspondent bank (City Bank) in New York. For B shares in Shenzhen, denominated in HK dollars, payment is performed through SD&C's correspondent bank (Standard Chartered Bank) in Hong Kong.

The safety net for liquidity risks consists of two stages. The first stage is the Settlement Risk Fund of RMB3 billion, composed of initial investments from the Ministry of Finance, contributions from SD&C's pretax profits (20 percent of operating net profits is deposited every year), and trading-volume based contributions¹⁵ by member securities companies. For the latter two, it is not necessary to contribute amounts once this fund reaches RMB3 billion. In the second stage there is settlement guarantee money, where a member makes deposits to an account with a

¹⁴ Requirements include RMB50 million in net assets, at least two years of experience in international securities, and more than five years of excellent performance as an executive officer and senior manager.

¹⁵ For stock, determined to be 3/10,000 of trading volume. For government bonds, 1/10,000. This includes 30 percent of profits for the four-day application fund frozen period when presenting applications for purchasing new stock, and penalties for operational errors and irregular transactions.

securities exchange. For new members of the Shanghai Stock Exchange, RMB200,000 is required for each seat,¹⁶ and the addition of seats costs RMB50,000 each. In the Shenzhen Stock Exchange, basic guarantee money is RMB250,000 for a number of seats, adjusted every quarter by a percentage of average daily trading in the previous quarter.¹⁷ Funds from the former Shanghai Securities Central Depository and Clearing Corporation and the former Shenzhen Securities Central Depository and Clearing Corporation, the predecessors of the SD&C, are pooled in this fund.

Last year's trading amounted to RMB1.3 billion, in 1.3 million transactions. Membership includes almost all registered securities companies in China (126 at the end of 2002).

Although SD&C is Central Counter Party (CCP), it has no legal basis to become a CCP. SD&C facilitates CCP voluntarily, and detailed management rules are being formulated. Although all settlements must be conducted through SD&C's securities settlement account exclusively for CCP, debit and credit entry are actually conducted directly between member securities companies' accounts.

For A shares, since RTGS has not yet become fully operational in PBC's RMB payment system, and is not linked to the entry system, DVP has not been achieved. For B shares, since securities settlement (T+3) and the verifications of credit differ, DVP cannot be regarded as having been achieved. In US-dollar-denominated Shanghai, up to next day, and in HK-dollar-denominated Shenzhen, up to 5:00 p.m. on the same day, a seller assumes the trade counter-party's default risks. There was usually no short-selling of stocks, and since trading was performed after acquiring sufficient settlement funds, DVP had been substantially achieved. Since this is an automatic matching online system, STP has been performed for domestic investors, but not for foreign investors, since it requires confirmation.

When same-day funds treatment cannot be made, it is necessary to supply liquidity by the next business day. No credit facilities are granted, so if an overdraft occurs penalty interest will be collected, and the requirement ratio for reserve funds for payment will become high. If the number of overdrafts increases, penalty interest will also become higher. Although a "Settlement Risk Fund" may be used for compensation when overdrafts cannot be resolved, none has ever been used.

If securities settlement is not matched, or if funds are not credited to SD&C's payment account at T+3 in the trading of B shares, a failure will occur. This has been rare, since the securities balances of member securities companies can be verified online, and because there is usually no short-selling of stocks (it is prohibited in the Stock Exchanges), although it has happened due to operational errors. When failures occur, if settlement will be never performed by T+5, at T+6 SD&C will carry out the sale. The SD&C (as a CCP) will primarily assume the burden of economic loss in such cases, and the final burden will be determined after discussion with CSRC.

(3) Bond Markets

i. Outline

By starting the underwriting and selling of government bonds in 1991, and issuing financial debentures by policy banks in 1994, and reflecting a dramatic increase of government bond issues

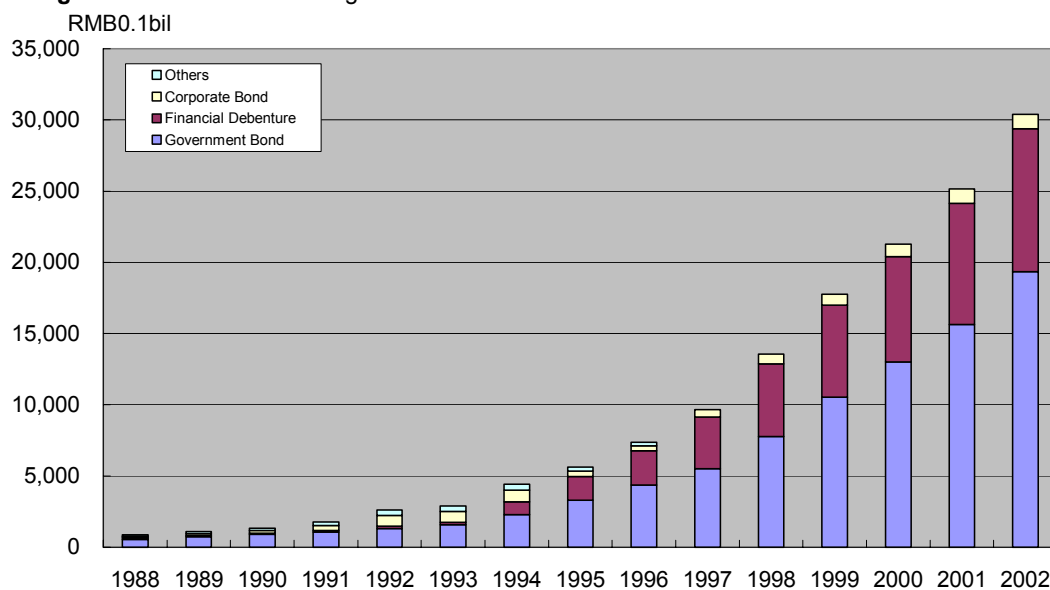
¹⁶ Member may hold multiple seats.

¹⁷ Previous quarterly turnover / number of trading days = quarterly guarantee money (A). If $A < \text{basic guarantee money}$, then it is basic guarantee money only, but if $A > \text{basic security money}$, then the excess portion ($A - \text{basic guarantee money}$) is also to be paid.

(to compensate for budget deficits brought on by aggressive fiscal policies), China's bond market has expanded rapidly mainly by government bonds and financial debentures since 1998.

At the end of 2002, it was composed of government bonds (62 percent), financial debentures (31 percent), central bank bills (5 percent) and corporate bonds (2 percent). The outstanding balance of government bonds amounted to RMB1.93 trillion, equivalent to 19 percent of GDP. By the end of July 2003, the outstanding amount of domestic debt securities rose to nearly RMB 4 trillion.

Figure4: China's Outstanding Bond Issues



Note: Others include national investment bonds, national investment corporation bonds, and other.

There are none outstanding after 1997.

Source: China Financial Almanac

Looking into the details of government bonds, for general government bonds, bookkeeping-type government bonds¹⁸ for corporations mainly consisted of financial institutions and securities companies, and certificate-type government bonds (i.e., savings bonds) for personal investors, have been issued periodically. Bookkeeping-type bonds (structured almost the same as Japanese transfer settlement government bonds) are delivered by transferring them on CDC's books, and are entirely computerized, while for savings bonds a certificate is issued bearing the name of the creditor, amount, and interest rate. Certificate-type government bonds are purchased by personal investors from banks that conduct underwriting, and reselling to third parties is not permitted. If it is necessary to cash government bonds before their maturities, even though it is possible to exchange them for cash at the counters of the banks that sold them,¹⁹ those banks must retain them until their redemption dates.

For specified government bonds, there are also designated government bonds²⁰ issued after specifying investors for endowment insurance funds, unemployment insurance funds, and social

¹⁸ Some are sold to individuals over-the-counter at banks.

¹⁹ The interest rate is determined according to when they are cashed, with 2 percent of the amount, with interest, is to be paid as a bank fee.

²⁰ Designated government bonds were issued from 1995 to 2000, but not in 2001 and 2002.

insurance funds, and RMB270 billion of the special government bonds issued in August 1998 to finance public funds meant to expand the four large state-owned commercial banks' net worth, and a ten-year interest-bearing government bond issued in September 1998, for the four largest banks to supply funds for infrastructure construction.

Government bonds issued in 2002 amounted to RMB592.9 billion, 75-percent composed of bookkeeping-type government bonds, and 25 percent of certificate-type government bonds.

In 1980s, government bonds were traded in the physical-certificate OTC market. After 1990 and with the creation of stock exchanges, the secondary market was mainly integrated into the Shanghai and Shenzhen exchanges. For stock exchange transactions, due to the void of central depository agency and the weakness of the risk control mechanism, securities companies have conducted short-selling repurchase agreement transactions with banks, using government bonds obtained from customers. Securities companies have manipulated stock prices based on the large amount of funds raised. Concerned about this, the authorities established CDC as the CSD for government bonds in 1996, and then created an inter-bank bond market in June 1997, requiring commercial banks to quit from the stock exchanges and perform their transaction only in the inter-bank market.

Non-bank institutions including securities companies may participate in both exchanges and an inter-bank bond market, and may conduct arbitrage transactions between them. Although bonds traded in the exchanges may be brought into the inter-bank bond market, the opposite transactions may not be conducted²¹. After starting in 1997, the inter-bank market had increased its turnover more than 8-fold by 2002, and turnovers including repurchase agreement transactions have considerably exceeded stock exchange transactions. In 2002 the RMB10 trillion barrier was broken, and its turnover has become three times that of stock exchange transactions. Most transactions in the inter-bank market consist of repurchase agreements (96 percent in 2002), and there are very few outright transactions. The Shanghai Stock Exchange has played a central role in these stock exchange transactions, and transactions on the Shenzhen Stock Exchange have become nominal. Large-amount transactions are centrally performed in the inter-bank market, averaging RMB200 million per repo transaction and RMB150 million per outright transaction in 2003.

Participants in the inter-bank market consist of financial institutions, such as commercial banks, city and rural credit cooperatives, trust investment companies, securities companies, insurance companies, investment fund administration companies, and financial companies etc. Since June 2002, individuals and non-financial institutions can invest some kind of government bonds through commercial bank-OTC systems. Since October 2002, all non-financial institutions were permitted to participate indirectly in the inter-bank market through 39 commercial banks. The inter-bank market has substantially become open to all the institutional investors.

In efforts to unify both exchanges, while bookkeeping-type government bonds were issued on both the inter-bank market and stock exchanges in September 1999, participants in stock exchange transactions included non-banks, and there were efforts by the authorities to bring both exchanges closer to each other in products and participants.

PBC's open market operations are entirely performed in the inter-bank market, and purchase of bills under repurchase agreements, sales of bills under repurchase agreements, outright purchases of bills are appropriately selected through 43 primary dealers, and performed regularly on Tuesdays, and on Thursdays if necessary.

²¹ Since 2002, PBC has permitted some kinds of bonds to be traded across the markets.

Figure5: Government Bonds and Financial Debentures, by Category, in 2002

	Government Bond				Financial Debenture
	Certificate-type Government Bond	Bookkeeping Type Government Bond			Bookkeeping Type
Issue Market	OTC	Interbank Market	Stock Exchange	Cross-market	Inter-bank Market
Issue Serial Number	4	11	4	1	27
Issue Type	Underwriting	Bidding (rate/price)	Bidding (rate)	Bidding (rate)	Bidding (rate/spread/price)
Issue Amount (RMB1 billion)	1,473	2,992	864	600	3,275
Investor	Individuals	Institutions & Individuals	Institutions & Individuals	Institutions & Individuals	Institutions
Period	3, 5 years	1, 2, 3, 5, 7, 10, 30 years	5, 7, 10, 15 years	7 years	3, 6 months and 1, 2, 3, 5, 7, 10, 20, 30

Source: China Financial Almanac

Figure6: Turnover by Market and Trade Category

(RMB 1billion)

	Inter-bank			Stock		
	Bond Market	Spot Trading	Repo Trading	Exchange	Spot Transaction	Repo Transaction
1997	31	1	30	1,646	358	1,288
1998	104	3	101	2,232	606	1,626
1999	405	10	395	1,809	530	1,279
2000	1,646	68	1,578	1,889	416 (50)	1,473 (16)
2001	4,097	84	4,013	2,031	482 (43)	1,549 (14)
2002	10,630	441	10,189	3,313	871(233)	2,442(0.5)

Note: Figures in parentheses denote number of transactions in the Shenzhen Stock Exchange.

Not applicable before 1999.

Source: Chinese Financial Almanac, Factbook of Shanghai and Shenzhen Stock Exchange and websites

Depending on the amount of increases of outstanding deposits, before 1994 PBC had approved the issue of some financial debentures to commercial banks, and had determined both issue amount and interest rate. To separate policy credit from commercial credit, when three policy banks—State Development Bank of China, Agricultural Development Bank of China, and Export and Import Bank of China—were established in 1994, the issue of financial debentures started, to raise funds for them. Ninety-five percent of all issues is occupied by the State Development Bank of China, and is traded on the inter-bank bond market.

For corporate bonds, a market was created in Shanghai, Shenzhen, Sichuan Province, and Liaoning Province in 1984, and at some points in 1986 outstanding issues accumulated to several tens of billion of RMB. Many companies defaulted after that, and so issues have been strictly controlled by the State Development Planning Commission (SDPC) ever since. RMB20–30 billion in issues is allocated annually, limiting eligibility to large state-owned corporations, with the following strict conditions: three years' consecutive surpluses before issuing; for joint-stock companies, RMB30 million, and for private limited companies, RMB60 million, in net assets; less than 40 percent of the maximum interest rate in banking deposits.²² Fourteen companies have issued corporate bonds, including China Mobile, Changjiang Three Gorges Project Development Corporation, Shanghai Baoshan Iron, and Steel Complex Corporation. Convertible bonds were limited to already-listed state-owned companies, and such strict conditions as assuring a 10 percent of rate of return on assets (for such infrastructure-related resources as energy and others, 7 percent) were imposed.

The balance of all issued corporate bonds is nearly RMB100 billion (1 percent of GDP), which is extremely small compared with other advanced countries. The amount listed and circulated on stock exchanges is 10 percent or more of the total issued amount. Due to a stock market slump and

²² Interest rates are controlled by PBC. Other emerging markets are under the supervision of the CSRC.

a decline of interest rates, the need to issue bonds has risen since late 2001. To open the door to private companies that have active funding needs, SDPC presented an original plan for easing issuing conditions to the State Council²³. In the middle of 2003, PBC has planned to develop a well-built rating system and support the financial debenture issued by commercial banks.

The channel is open for overseas investors to purchase bonds in China. Since 1998, domestic branches of foreign banks have entered into the inter-bank market. At the end of 2002, overseas investors were permitted to participate in bond markets through QFII arrangements.

ii. Outline of Trading System

A trading system for the inter-bank market was started in June 1997. In October 2000, both financial institutions and corporations were permitted to directly participate in the market. More than 600 direct participants—including approximately 30 foreign banks' branches—have been approved by PBC. Since May 2002, financial institutions were permitted to link with the system. Transactions are conducted using offering systems on the inter-bank call market in the nationwide inter-bank call center. All bonds traded in the inter-bank market and over-the-counter are deposited with the CDC, and settlement is performed across the CDC's book-entry system and bank-OTC system.

Stock exchange transaction systems are the same as those for stocks, and all transactions are processed using automatic matching.

iii. Outline of the CDC

The CDC was established in December 1996, and is wholly-owned by the state. By the Ministry of Finance, it is assigned as the only physical-certificate bond custodian and CSD for all government bonds. It is also authorized by PBC as registering, depositary and clearing agency of inter-bank market. The CDC is under the control of PBC and the Ministry of Finance, and personnel management and supervision is under the China Bank Regulation Commission (CBRC).²⁴ The CDC has the following functions: nationwide consignment and management of government bonds, financial debentures, corporate bonds, and other fixed-income securities; settlement services for participants in securities markets; issuing services for securities issuers (Ministry of Finance, Central Bank, policy banks, state-owned companies, and other qualified issuers); technical services for open-market operations; services for concentrated consignment, management, and registration of bond funds and money market funds;²⁵ and services for providing market information and other intermediary services via publications and the Internet; performing cross-border settlement. The CDC is also responsible for periodically reporting trading status to PBC.

The CDC uses several computer systems: a bond entry system, a bond issuing system, an open-market policy system, information statistical system, bank-OTC central system, and bond holder-owned account inquiry system etc.

iv. Settlement System

Unlike the SD&C, the CDC does not have CCP facilities, so no netting is performed in the

²³ *Shanghai Star*, February 13, 2003.

²⁴ According to structural reform approved by the Tenth National People's Congress in March 2003, the Financial Work Committee will be consolidated into the China Bank Regulation Commission.

²⁵ Services have not yet started.

inter-bank market; securities settlement of each transaction is performed on an RTGS basis.²⁶ Since netting settlement is performed in stock exchange transactions, for small-amount transactions these may be regarded as more efficient than inter-bank transactions.

PBC has initiated attainment of RTGS in funds payments at the beginning of 2003 in large cities (the number comes to 14 by August 2003) such as Beijing, Shanghai, Guangzhou, Wuhan, Xi'an etc. So real-time DVP capability for them and for securities settlement has not been achieved. This will become possible if RTGS in CNAPS becomes fully operational, and the linkage of the entry system is completed. There are currently three types of settlement: PAD, DAP, and FOP. DVP is expected to come into practice generally in the early of 2004.

Settlement dates are T+0 or T+1.

Confirmation of contracted details by participants is required in the inter-bank market, so STP has not been planned.

Since all government bonds issued before the "Provisional Rule for Managing Concentrated Custody of Government Bonds" in 1997 were deposited with the CDC, at the end of 2000 the redemption of government bearer bonds was completed. Government bonds (excluding certificate-type government bonds) are to be made wholly paperless.

For transactions in the Shanghai Stock Exchange, clearing and settlement are consigned to the SD&C in Shanghai. Under the two-tiered depository mechanism, CDC is the CSD for bonds. Bonds traded in stock exchanges are deposited in S&DC, which are ultimately deposited in CDC. As of July 2003, the balance of bonds at the CDC is approximately RMB3.2 trillion, of which re-consigning the balance to the SD&C is approximately RMB300 billion.²⁷

In the processing of rare failure transactions in the inter-bank market, the CDC reports them to the PBC, which handles them on a case-by-case basis.

In January 2002 an agreement on linkage between CDC's settlement system and HKMA's CMU (Central Moneymarkets Unit) was concluded. Technically, interface with HK-dollar RTGS and US-dollar RTGS held with CMU and DVP system have become possible.

In November 2003 the People's Bank of China (PBoC) and Hong Kong Monetary Authority (HKMA) to agreed to provide clearing arrangements for banks in Hong Kong to conduct personal renminbi (RMB) business on a trial basis.²⁸ In late February 2004, banks in Hong Kong started the offer of renminbi deposits and currency exchange services. According to the survey by HKMA to 14 banks, at the close of business on March 3, the total amount of renminbi deposits outstanding was approaching RMB1.5 billion.

²⁶ Both transactions send settlement instructions with encryption keys, and central systems, after verifying trading authorities according to the encryption keys, will transfer funds between accounts.

²⁷ Consistency with the RMB14 trillion figure (of which bonds are RMB1.4 trillion), the total trading amount in 2002 after aggregating stock exchange's amount and inter-bank market's amount, and Shanghai Stock Exchange's RMB3.1 trillion (of which bonds are RMB0.6 trillion) of total trading amount in 2002, has been unknown.

²⁸ The trial basis RMB business will include 4 areas; Deposit-taking, Exchange, Remittances and Renminbi Cards